

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

DESCRIPTIONS OF MEASURED SECTIONS,
UPPER CRETACEOUS BLACKHAWK FORMATION AND STAR POINT
SANDSTONE IN THE FERRON CANYON, FERRON, THE CAP, FLAGSTAFF PEAK
AND MAHOGANY POINT QUADRANGLES, UTAH

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Open-File Report 81-1026

1981

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INTRODUCTION

The study area is along the eastern front of the southern Wasatch Plateau 5 miles southwest of Ferron and west of Castle Dale, Utah. Here the front forms a steep, highly dissected escarpment and provides nearly continuous outcrops for which detailed lithology and their vertical variations can be described.

Seventy-seven stratigraphic sections of the Upper Cretaceous Blackhawk Formation and Star Point Sandstone were measured and described in the Ferron, Ferron Canyon, The Cap, Flagstaff Peak, and Mahogany quadrangles (plates 1-5). The stratigraphic sections were measured to obtain the thickness and lateral extent of the coal beds of the lower 200 feet of the Blackhawk Formation. In addition, information such as color, grain size, sedimentary structure, fossil content, and nature of the vertical contact of the rock type were also obtained. These were used to construct detailed stratigraphic cross sections and to determine lithofacies relationships and depositional environments of the coal deposits in the Blackhawk Formation and Star Point Sandstone (Muldoon and others, 1980; Muldoon, 1980). The sections are described on the succeeding pages in the same order as they were measured, that is the oldest or lowest unit is listed and described first.

LITHOLOGY

Star Point Sandstone

The Star Point Sandstone within the study area is composed of three prominent sandstone beds separated by interbedded shales, siltstones, and sandstones (Spieker, 1931). This stratigraphic unit underlies the Blackhawk Formation. This study includes primarily the description of the uppermost sandstone bed which ranges from 100 to 175 feet thick. It is gray in fresh outcrops and buff colored in weathered outcrops and forms a prominent

sandstone. Common internal structures are herringbone tabular cross sets, planar and ripple laminations, and festoon crossbeds. The top 10 to 50 feet of the sandstone is usually bleached white, rooted, and occasionally burrowed by Ophiomorpha and Thalassinoides. The upper sandstone bed is locally dissected by sandstones that constitutes a fining-upward sequence. The channel sandstone is marked by an erosional base, festooned crossbeds, convolutions, and ripple laminations. Lag deposits such as basal conglomerates and oyster shell debris occur at the base of the channel sandstone.

Blackhawk Formation

The Blackhawk Formation, which overlies the Star Point Sandstone, consists of sandstone, siltstone, shale, coal, carbonaceous shale, and limestone; the sandstone makes up 55 percent of the formation. The sandstone is buff colored in weathered outcrops and light gray in fresh outcrops. It is fine to medium grained and mineralogically immature, consisting on the average of 55 percent quartz. Sedimentary structures include festoon and planar crossbeds, convolutions, parallel laminations, climbing ripple laminations, animal burrows, and root marks. On the basis of the basal contacts, grain size, and sedimentary structure, the sandstone is subdivided into two major lithogenetic types: channel sandstone and crevasse splay sandstone. The channel sandstone is mainly a medium-grained and a fining-upward sequence, contains mainly festoon-and-planar crossbeds and convolutions, and is marked by an erosional base. The crevasse splay sandstone is principally a fine-grained and a coarsening-upward sequence, displays mainly climbing ripple and burrow structures, and is defined basically by sharp to gradational contact. The siltstones and shales compose about 37 percent of the total bulk of rock deposits of the Blackhawk Formation. They occur commonly as interbedded units. The siltstones are gray to dark gray in color and display ripple laminations.

rock deposits of the Blackhawk Formation. They occur commonly as interbedded units. The siltstones are gray to dark gray in color and display ripple laminations. They contain abundant plant fragments and root marks. The siltstones often grade laterally and vertically into shales, which are gray to dark gray in color, are laminated, and contain abundant macerated plant debris. The shales and siltstones locally grade into a highly calcitic cemented siltstone or a micritic limestone. These rock types are separated by coal and carbonaceous shale beds. The coal beds range in thickness from a few inches to 15 feet. The coal beds occasionally contain thin (less than 1 inch to 6 inches) interbeds of carbonaceous shale. However, the carbonaceous shale more commonly occurs as floor or roof rock and as an isolated bed with a thickness as much as 4 feet and 9 inches. The coal beds often grade laterally into carbonaceous shales.

SUMMARY

The lithologic characteristics of the lower part of the Blackhawk Formation and the uppermost bed of the Star Point Sandstone suggest that they represent a marginal delta plain and delta front complex. That the delta front along the shoreline was modified by longshore currents to form accretion ridge barriers was described by Muldoon (1980). The Blackhawk and Star Point deposits in the study area from Ferron to Castle Dale represent a similar milieu, but the accretion ridge barrier behind which thick peat coals formed was formed in a more stable area, perhaps close to the point source of sediments. This paleoenvironmental analysis is consistent with the deltaic and interdeltic pattern of short-headed point sources that discharged sediments into the Late Cretaceous seaway and reworked them in the direction of longshore drift (Flores 1980).

References cited

- Flores, R.M. 1980, Comparison of depositional models of Tertiary and Upper Cretaceous coal-bearing rocks in some Western Interior basins of the United States, in Carter, L.M., ed., Proceedings of the 4th Symposium on the Geology of Rocky Mountain Coal--1980: Colorado Geological Survey,
- Muldoon, W. J. , 1980, Stratigraphic facies of Cretaceous coal-bearing coastal zone strata of the Wasatch Plateau, Ferron, Utah: North Carolina State University., M. S. thesis, Raleigh, North Carolina, 68 p.
Research Service 10, p. 17-20.
- Muldoon, W.J., Flores, R.M., Cavoroc, V.V., and Sanchez, J.D., 1980, Coal occurrences controlled by river-mouth-bar derived barriers in the Cretaceous Blackhawk Formation and the Star Point Sandstone, central Utah: Geological Society of America Abstract with Programs, v. 12, p. 202.
- Speiker, E.M., 1931, The Wasatch Plateau coal field, Utah: U.S. Geological Survey Bulletin 819, 210 p.

CONVERSION TABLE

1 inch (in.) = 25.4 millimeter (mm)

1 foot (ft) = 0.305 meter (m)

Descriptions of stratigraphic sections

SECTION BM-1

Measured in sec. 23, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
30		Sandstone, bleached, massive, pitted (burrows?)
30		Sandstone, partly weathered. Upper 8 ft of sandstone seems to be more resistant
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
42		Covered, mostly weathered, some shale and siltstone interbeds
25		Sandstone, erosional base, medium-grained, crossbedded, rippled
73		Interbedded sandstone, siltstone, and shale
16		Sandstone, erosional base; medium-grained
27		Shale with siltstone interbeds
5		Sandstone, rippled
35		Sandstone, siltstone, and shale
30		Sandstone, erosional base, medium-grained, crossbedded

SECTION BM-2

Measured in sec. 34, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
6		Coal
3		Carbonaceous shale
2		Coal
5		Shale, vertically grades into fine-grained sandstone that is laminated and rippled
10		Shale and siltstone interbeds
6		Shale
12		Sandstone, erosional base, medium-grained, crossbedded, rippled
28		Covered
7		Sandstone, laminated, rippled
18		Shale and siltstone
5		Sandstone, fine-grained, rippled

SECTION BM-3

Measured in sec. 15, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
20		Sandstone, bleached and massive
75(upper)		Sandstone, prominent tabular crossbedded, rooted, burrowed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1		Carbonaceous shale, coaly stringers
10		Coal
	3	Carbonaceous shale
	3	Shale
5	6	Sandstone, rooted, shale partings
	4	Carbonaceous shale, grades into 5 in. gray shale
1	6	Sandstone, fine-grained, rooted at top
1	6	Carbonaceous shale
5		Sandstone, fine-grained, rippled
7		Covered
	6	Carbonaceous shale
1		Coal
	6	Coal
7	7	Covered, carbonaceous shale
2	8	Sandstone, fine-grained, rippled, rooted
	5	Shale
1	2	Carbonaceous shale
2	4	Siltstone

SECTION BM-3--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	2	Carbonaceous shale
	5	Coal
17		Covered
2	7	Coal
1	6	Shale, gray
7	2	Sandstone, fine-grained, rippled, rooted
4		Covered
2	8	Coal, interbedded siltstone and shale
1	3	Coal
35		Sandstone, erosional base
16		Shale with interbedded and carbonaceous shale, coaly carbonaceous shale, and siltstone
3	6	Sandstone, fine-grained, laminated, rippled, rooted
	5	Shale and carbonaceous shale
	4	Coal
1	3	Shale, carbonaceous, coaly
1	5	Coal
3		Shale, grades upward to siltstone
4		Sandstone, fine-grained, laminated, rippled, some shale breaks
25		Sandstone, erosional base, medium-grained
20		Sandstone, medium-grained, laminated, convoluted, rippled
2		Shale, carbonaceous

SECTION BM-3--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
16		Interbedded shale, carbonaceous shale, and siltstone
4	9	Sandstone, medium-grain, ripple-laminated
1	4	Shale, carbonaceous

SECTION BM-4

Measured in sec. 15, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part measured and described from base to top)		
20		Sandstone, bleached, tabular crossbedded, rooted, burrowed(?)
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1		Carbonaceous shale
10		Coal
4		Shale, silty, rooted
1	2	Coal
3	8	Sandstone, fine-grained, rippled, vertically grades up to carbonaceous shale
1	1	Coal
17		Covered
8		Sandstone, erosional base, medium-grained, massive, bleached top, rooted, burrowed?
	4	Carbonaceous shale
	3	Coal
	6	Carbonaceous shale vertically grades into gray shale
11	6	Sandstone, fine-grained sandstone, rippled, laminated, rooted
4		Covered
2	4	Sandstone, medium-grained, laminated, rippled
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	8	Siltstone, rooted
	6	Coal
	8	Shale, carbonaceous
	6	Coal

SECTION BM-4--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
7	6	Sandstone, erosional, crossbedded
13		Covered
	6	Shale, carbonaceous
	10	Coal
2		Shale, vertically grades to siltstone, rooted
	5	Shale, carbonaceous
1		Coal
7	8	Covered
	7	Shale, carbonaceous
11	4	Sandstone, medium-grained, tabular crossbedded
1	9	Shale, vertically grades into siltstone
5		Sandstone, fine-grained, laminated, rippled and convoluted
42		Covered
6	6	Sandstone, medium-grained, erosional base, crossbedded
2	8	Shale, vertically grades to carbonaceous shale
16		Sandstone, erosional base, medium-grained, planar and festoon crossbedded

SECTION BM-4--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
55		Covered
	4	Siltstone, rooted
	5	Coal
3	6	Siltstone
	14	Sandstone, fine-grained, laminated
2	9	Siltstone
18		Sandstone, erosional base, medium-grained, crossbedded
15		Sandstone, erosional base, medium-grained, crossbedded

SECTION BM-5

Measured in sec. 10, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part measured and described from base to top)		
17		Sandstone, fine-grained, rippled
16	6	Covered
4	6	Sandstone, medium-grained, laminated and rippled
3	6	Sandstone, fine-grained, laminated and rippled
14		Sandstone, medium-grained, rippled
5		Covered
2		Interbedded shale and siltstone
2	8	Sandstone, medium-grained
75		Interbedded sandstone, siltstone, and shale
35		Sandstone, channel, erosional base

SECTION BM-5a

Measured in sec. 10, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
22		Covered
	4	Carbonaceous shale
	3	Coal
1		Shale, carbonaceous
1		Coal

SECTION BM-6

Measured in sec 10, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
169		Sandstone, massive, bleached
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2		Carbonaceous shale
3	5	Sandstone, medium-grained, rippled
4		Interbedded shale and siltstone
	4	Shale, carbonaceous
11	6	Sandstone, medium-grained, rippled, rooted, with many shale partings
	4	Shale, carbonaceous
	6	Coal
4		Shale and siltstone, interbedded
	6	Shale, carbonaceous
8	8	Shale and siltstone, interbedded
	5	Shale, carbonaceous
11		Covered
	7	Shale, carbonaceous
4	9	Sandstone, fine- to medium-grained, rippled, with shale partings
1	2	Shale
	3	Shale, carbonaceous
	7	Coal
1	8	Shale

SECTION BM-6--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	2	Carbonaceous shale
	4	Coal
4	6	Sandstone, fine-grained, rippled, laminated
8		Covered
4	3	Sandstone, fine-grained, rippled
	8	Shale, carbonaceous
	3	Coal
27		Sandstone, erosional base, medium-grained, crossbedded
12		Covered
4	5	Sandstone, fine grained, rippled, with shale partings
1	3	Shale, carbonaceous
9		Sandstone, fine-grained, rippled
3	4	Shale, carbonaceous
4	10	Sandstone, fine-grained, rippled, laminated
1	2	Interbedded shale and siltstone
3	4	Interbedded siltstone and sandstone
2	6	Sandstone, fine-grained, rippled
2		Shale
	6	Shale, carbonaceous
	3	Coal
15		Sandstone, medium-grained, erosional base, bleached

SECTION BM-6--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	4	Interbedded shale and carbonaceous shale
8		Sandstone, medium-grained, crossbedded

SECTION BM-7

Measured in sec. 3, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
25		Sandstone, medium-grained, crossbedded
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
32		Covered
	4	Shale, carbonaceous, coaly
42		Sandstone, erosional base, medium-grained, planar crossbedded, festooned
38		Covered
	8	Siltstone
	4	Shale
	3	Coal
3	6	Sandstone, medium-grained, parallel-laminated, convoluted
4	8	Siltstone
15	6	Sandstone, medium-grained, convoluted, laminated, rooted
	4	Shale, carbonaceous
9	8	Sandstone, erosional base, medium-grained, bleached, rooted
2	5	Interbedded siltstone and shale
4	3	Sandstone, medium-grained, laminated
23		Covered
8		Sandstone, medium-grained, laminated
2	6	Interbedded siltstone and shale
	3	Shale, carbonaceous
16		Sandstone, erosional base, medium-grained, lenticular-bedded

SECTION BM-7--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	9	Coal
4	4	Carbonaceous shale
	4	Coal
4	3	Sandstone, erosional base, medium-grained, festooned, rooted
	6	Shale, silty
	6	Carbonaceous shale
1	1	Shale, silty
8	5	Sandstone, erosional base, medium-grained, convoluted, festooned
2	6	Shale
	6	Coal
2		Shale
5	6	Sandstone, fine-grained, rippled
5	6	Shale
	2	Coal
	6	Shale
3	4	Sandstone, fine-grained, festooned, rippled
2	1	Coal
1	2	Shale
1	8	Sandstone, fine-grained, rippled
2		Shale, carbonaceous
39		Sandstone, medium-grained, festooned, convoluted, rippled

SECTION BM-7--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	10	Shale, with carbonaceous shale stringers
4	2	Sandstone, fine-grained, festooned, rippled
5	4	Shale
1		Sandstone, fine-grained, rippled
3	9	Shale
21	6	Sandstone, erosional base, medium-grained, festooned, convoluted
1	2	Siltstone, carbonaceous
1		Sandstone, silty
	8	Carbonaceous shale
1	4	Coal
1	8	Shale
5	2	Sandstone, fine-grained, festooned, rippled
1	6	Shale
4	6	Sandstone, fine-grained, rippled
2	7	Shale
	4	Carbonaceous shale
1	2	Coal
11	3	Sandstone, erosional base, medium-grained, festooned, convoluted

SECTION BM-7--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part measured and described from base to top)		
117		Sandstone
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	6	Interbedded shale and siltstone
7		Covered
1	6	Coal
1	7	Shale, silty, with coal stringer
62	6	Sandstone, erosional base, medium-grained, festooned
7		Interbedded shale and siltstone, with carbonaceous stringers in the upper part
3		Shale
6		Sandstone, fine-grained, rippled
4		Shale
	8	Carbonaceous shale
3	3	Shale
6	8	Sandstone, fine-grained, rippled, burrowed

SECTION BM-8

Measured in sec 33, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
45		Sandstone
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	4	Coal
20	9	Sandstone, erosional base, medium-grained, festooned, convoluted, planar-crossbedded, bleached
1	6	Carbonaceous shale with coal stringers
5	2	Shale
	3	Coal
5		Siltstone, with carbonaceous shale on the upper part
6	2	Coal
4	3	Shale, sandy, rippled, burrowed, oyster shell fossil fragments
1	2	Interbedded shale, carbonaceous shale, and siltstone
4	8	Coal
	3	Carbonaceous shale
7	4	Shale, sandy, burrowed
	9	Shale
	4	Coal
4	9	Shale, silty
4	11	Sandstone, fine-grained, rippled, rooted
	4	Carbonaceous shale
4	9	Sandstone, erosional base, medium-grained, festooned, rippled
1	8	Shale

SECTION BM-8--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	2	Carbonaceous shale
6		Interbedded shale and siltstone
	3	Coal
7	2	Shale, silty, rippled, burrowed
10	6	Sandstone, erosional base, medium-grained, festooned, rippled
4	8	Interbedded shale and siltstone
3	3	Shale, sandy, burrowed
7	7	Interbedded siltstone and shale
2	5	Shale
	4	Carbonaceous shale
6	3	Sandstone, erosional base, fine- to medium-grained, festooned, rippled
1	2	Coal
1	5	Interbedded shale and siltstone
30		Sandstone, erosional base, medium-grained, convoluted, festooned, rippled
6		Shale, with 1 in. carbonaceous shale stringer
1	6	Coal
4	9	Shale, sandy, rippled
3	5	Coal
	9	Shale
	3	Carbonaceous shale
	9	Coal
3	3	Shale

SECTION BM-8--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	9	Coal
3	3	Shale
1	1	Sandstone, fine-grained, rippled
3	1	Shale
5	4	Sandstone, fine-grained, rippled, rooted
	9	Shale
1	6	Sandstone, fine-grained, rippled
	1	Carbonaceous shale
2	2	Shale
1	8	Sandstone, fine-grained, rippled
3	5	Shale
3	4	Sandstone, fine-grained, rippled, parallel-laminated
1	1	Shale, with stringer of carbonaceous shale
7	5	Sandstone, fine-grained, rippled
6	2	Interbedded shale and siltstone
	5	Coal
2	10	Shale
6	8	Sandstone, fine-grained, rippled, convoluted
6	7	Shale
6	4	Sandstone, medium-grained, rippled, festooned
8		Shale
4	10	Sandstone, fine-grained, rippled

SECTION BM-8--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
5	4	Shale, with 1 in. coal stringer
2	8	Sandstone, fine-grained, rippled
1	8	Shale
	1	Coal
	7	Shale
1	9	Sandstone, fine-grained, convoluted, rippled
5	9	Sandstone, erosional base, medium-grained, rippled, festooned
4	3	Sandstone, erosional base, medium-grained, crossbedded, with lag deposit

SECTION BM-9

Measured in sec. 35, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
17		Sandstone, medium- to course-grained, crossbedded, massive
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
6	2	Interbedded shale and siltstone
	7	Shale, carbonaceous
	9	Shale, gray
	4	Shale, carbonaceous
4	6	Shale, gray
	8	Shale, carbonaceous
3	4	Coal
	7	Shale, carbonaceous
2	5	Siltstone
4	6	Sandstone, medium-grained, rippled
2	4	Sandstone, fine-grained, rippled, convoluted
1	3	Shale, carbonaceous
5		Covered
2	2	Sandstone, fine-grained, rippled
2	3	Coal
3	5	Sandstone, erosional base, medium-grained, brown-gray, lenticular, crossbedded
4		Covered
	1	Shale, carbonaceous

SECTION BM-9--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	2	Shale, carbonaceous
	8	Coal
	2	Shale, carbonaceous
	8	Coal
	2	Shale, carbonaceous
1	3	Shale, gray
1	6	Siltstone
3	3	Sandstone, fine-grained, rippled
	4	Shale
6	9	Interbedded shale, siltstone, and sandstone
	2	Shale, carbonaceous
2	10	Interbedded shale and siltstone
16		Covered
	6	Shale, carbonaceous
7	3	Interbedded shale, siltstone, and sandstone
8		Covered
	10	Coal
5	4	Interbedded siltstone and shale
	8	Shale, carbonaceous
4	6	Sandstone, erosional base, medium-grained, gray-brown, rippled
3	8	Covered
	5	Shale, carbonaceous
2	3	Coal
9	6	Sandstone, erosional base, medium-grained, rippled, convoluted, rooted

SECTION BM-9--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	4	Shale, carbonaceous
2	11	Coal
4	2	Interbedded shale and siltstone
3	6	Sandstone, erosional base, medium-grained, crossbedded
3	3	Shale
	9	Shale, carbonaceous
	4	Coal
2	6	Shale
	5	Shale, carbonaceous
1	3	Coal
2	10	Interbedded shale and siltstone
1	8	Coal
	3	Shale, carbonaceous
	1	Siltstone
12		Sandstone, fine- to medium-grained, rippled
19		Covered
	3	Shale, carbonaceous
	5	Coal
23		Sandstone, erosional surface, medium-grained, crossbedded

SECTION BM-9a

Measured in sec. 35, T. 19 S., R. 6 E.

Thickness

Feet Inches

Lithology

STAR POINT SANDSTONE

BLACKHAWK FORMATION (lower part, measured and described from base to top)

16		Interbedded shale and siltstone
6		Interbedded siltstone and shale
	4	Shale, carbonaceous
3	6	Coal
6	6	Sandstone, fine-grained, buff white, rippled

SECTION BM-10

Measured in sec. 35, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
6		Sandstone, bleached, crossbedded
8	6	Sandstone, medium-grained, festooned
6	3	Sandstone, medium-grained, crossbedded
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	8	Shale, gray
3	9	Sandstone, erosional base, fine-grained, crossbedded, rippled, rooted
2	8	Interbedded shale, gray, siltstone, and carbonaceous shale
3	5	Sandstone, fine-grained, rippled, rooted
1	6	Covered
4	8	Coal

SECTION BM-10--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
6		Sandstone, medium-grained, brown, festooned
3	4	Sandstone, fine-grained, bleached, rippled, some shale partings
2	8	Shale, gray
4	7	Shale, carbonaceous
1	3	Interbedded shale and siltstone
4	3	Sandstone, fine-grained, bleached, laminated, rooted
1	6	Shale
5	8	Coal
1	9	Shale
	8	Sandstone, fine-grained, bleached, rippled, rooted
1	6	Shale
1	2	Sandstone, fine-grained, rippled
	2	Shale, carbonaceous
	8	Shale, carbonaceous
1	4	Interbedded shale and siltstone
	10	Shale, carbonaceous
2	5	Sandstone, fine-grained, rippled
1	10	Covered
1	2	Sandstone, fine-grained, rippled, bleached, rooted
	4	Shale
1	9	Coal
17		Interbedded shale, siltstone, and sandstone

SECTION BM-10--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	4	Shale, carbonaceous, scoured
11	6	Sandstone, erosional base, medium-grained, crossbedded, bleached, and rooted
3		Shale, gray
	3	Shale, carbonaceous
	4	Coal
4	2	Sandstone, fine-grained, rippled
	6	Interbedded shale and carbonaceous shale
3	4	Sandstone, fine-grained, rippled
1		Siltstone
	8	Shale, carbonaceous
1	7	Siltstone
	4	Shale, carbonaceous
2	8	Siltstone
1	10	Carbonaceous shale, coaly
	9	Siltstone
	1	Shale, carbonaceous
7		Interbedded siltstone and sandstone
	10	Coal
23		Interbedded sandstone and siltstone
2	3	Shale, gray, rooted
1	5	Shale, carbonaceous

SECTION BM-10--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	8	Coal
4	6	Sandstone, erosional base, medium-grained, crossbedded
5	8	Interbedded siltstone and shale
2	6	Sandstone, fine-grained, rippled, laminated, bleached, rooted
2	1	Shale, gray, fissile
4	9	Coal
2	7	Interbedded shale, gray; siltstone; and sandstone
3	10	Shale
8		Sandstone, fine-grained, laminated
4	7	Covered
	16	Coal
13		Sandstone, erosional base, medium-grained, crossbedded

SECTION BM-11

Measured in sec. 34, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
Sandstone, medium-grained, crossbedded, bleached, rooted		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
16		Covered
3	4	Coal
2	3	Shale, gray, fissile
3	6	Sandstone, fine-grained, rippled, bleached, rooted
6	2	Coal
	9	Shale, carbonaceous, coaly
12		Sandstone, erosional base, medium-grained, crossbedded
4	8	Sandstone, fine-grained, laminated
1	2	Shale
	9	Coal
23		Sandstone, erosional base, medium-grained, planar-crossbedded, convoluted
8	7	Sandstone, fine-grained, bleached, laminated
29		Covered
6	8	Sandstone, fine-grained, rippled, rooted
2	6	Shale
	6	Shale, carbonaceous
8		Covered
2	9	Sandstone, fine-grained, rippled, rooted
1	10	Siltstone

SECTION BM-11--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	7	Coal
	3	Shale
10	6	Sandstone, fine-grained, rippled
3		Covered
	5	Shale, carbonaceous
	10	Coal
9	8	Covered
2	9	Coal
4		Covered
3	2	Sandstone, fine-grained, wavy-laminated, rooted
2	10	Shale, gray
	8	Siltstone
	9	Shale
8		Sandstone, erosional base, medium-grained, crossbedded
3	3	Siltstone
4	6	Sandstone, fine-grained, laminated
15		Covered

SECTION BM-12

Measured in sec. 3, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
10		Sandstone, medium-grained, bleached, rooted, planar-crossbedded
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3		Shale, carbonaceous
8		Coal
1	7	Shale, gray
7	4	Sandstone, fine-grained, rippled, planar-crossbedded, bleached, rooted
2		Shale
6	7	Coal
5	3	Interbedded shale and siltstone
4	6	Sandstone, fine-grained, wavy-laminated
	3	Shale, gray
1	8	Sandstone, fine-grained, wavy laminated
	5	Shale, gray
65		Interbedded shale, siltstone, and sandstone
12		Sandstone, medium-grained, festoon-crossbedded

SECTION BM-12--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4		Covered
1	8	Sandstone, fine-grained, rippled

SECTION BM-13

Measured in sec 36, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
5		Sandstone, fine- to medium-grained, crossbedded, bleached, top rooted
BLACKHAWK SANDSTONE (lower part, measured and described from base to top)		
2	4	Coal
	3	Shale, carbonaceous
1	10	Shale, dark-gray, laminated
4	6	Sandstone, fine-grained, laminated, bleached, rooted
4		Coal
3		Shale, gray
2	6	Sandstone, fine-grained, rippled
6		Covered
9	8	Sandstone, fine-grained, laminated, rippled
2	10	Shale, gray
	2	Shale, carbonaceous
10		Interbedded shale, siltstone, and sandstone
23		Covered
8	6	Sandstone, medium-grained, rippled
28		Covered
	4	Shale, carbonaceous

SECTION BM-13--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	9	Shale
5		Interbedded shale and siltstone
3	2	Sandstone, fine-grained, rippled
12	6	Sandstone, erosional base, fine-grained, rippled, crossbedded
	8	Shale, carbonaceous
6	5	Shale
27		Covered
2	3	Sandstone, medium-grained, rippled
2	10	Shale
4	4	Sandstone, medium-grained, crossbedded, laminated, bleached
	8	Shale, carbonaceous
2		Shale
	10	Sandstone, fine-grained, laminated
4		Shale
	6	Coal
3	4	Shale
1	8	Shale
	5	Shale, carbonaceous
	8	Shale
1	4	Sandstone, fine-grained, rippled
1		Sandstone, fine-grained, laminated, rippled
9		Covered
	4	Coal
11		Shale, gray

SECTION BM-13--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	9	Siltstone, laminated
	6	Shale, carbonaceous
4	10	Sandstone, erosional base, fine-grained, laminated
3		Siltstone (shale on bottom)
	4	Shale, carbonaceous
5	7	Sandstone, erosional base, medium-grained, crossbedded, laminated

SECTION BM-14

Measured in sec. 31, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	6	Covered
2	10	Shale, sandy
	8	Shale
	9	Shale, carbonaceous
2	11	Shale, gray
6	8	Sandstone, fine-grained, rippled, crossbedded
4	8	Coal
12		Sandstone, erosional base, fine- to medium-grained, crossbedded, rippled
1		Covered
16		Interbedded shale, siltstone, and sandstone, fine-grained
	2	Shale, carbonaceous
	8	Coal
1	3	Siltstone
	6	Shale, carbonaceous shale
3	2	Shale, silty
1	2	Shale, gray
7	4	Siltstone
23		Covered
8		Sandstone, medium-grained, crossbedded, rippled
26		Covered
7	5	Sandstone, fine-grained, laminated

SECTION BM-14--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
9		Shale, silty
17		Interbedded shale and siltstone
1	2	Coal
11		Interbedded shale, siltstone, and sandstone

SECTION BM-15

Measured in sec. 25, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part measured from base to top)		
	2	Shale, gray
2	4	Coal
	9	Shale, carbonaceous
2	7	Shale, gray
	2	Shale, carbonaceous
2	6	Coal
	3	Shale, carbonaceous
2	7	Shale, gray
3	8	Sandstone, fine-grained, parallel-laminated, bleached
2	2	Coal
4	4	Interbedded shale and siltstone
	3	Shale, carbonaceous
	6	Coal
2	10	Shale
18		Covered
23		Sandstone, erosional base, medium-grained, parallel-laminated, planar-crossbedded
	3	Shale, carbonaceous
1	9	Coal
1	9	Shale, gray
5	10	Sandstone, erosional base, medium-grained, convoluted
21		Interbedded shale, siltstone, and sandstone

SECTION BM-15--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
3	9	Sandstone, fine- to medium-grained, parallel-laminated
	8	Shale
	1	Coal
	3	Shale
5	7	Sandstone, fine-grained, rippled
	8	Shale
2	3	Coal
1	2	Shale
4	3	Sandstone, fine-grained, wavy-laminated, rippled
3	4	Sandstone, erosional base, medium-grained, planar-crossbedded
2	7	Sandstone, erosional base, medium-grained, rippled
12	6	Interbedded shale, siltstone, and sandstone
	3	Coal
6	3	Interbedded shale, siltstone, and sandstone
1	10	Coal
4		Interbedded shale and siltstone
3	6	Siltstone
7		Interbedded shale, siltstone, and sandstone
22	7	Sandstone, erosional base, medium-grained, crossbedded, rippled
32		Interbedded shale, siltstone, and sandstone
4	4	Sandstone, fine- to medium-grained, rippled
2	6	Shale, gray

SECTION BM-15--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	4	Coal
	5	Shale, carbonaceous
8	6	Sandstone, erosional base, medium-grained, festooned, crossbedded

SECTION BM-16

Measured in sec 30, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3	9	Covered
	11	Coal; bottom is a shale; gray top can't be found
9		Covered
	4	Coal
	5	Shale, carbonaceous
	8	Shale, gray
1	2	Siltstone
4	9	Sandstone, fine- to medium-grained, rippled, parallel-laminated
2	6	Shale
2	11	Coal
	7	Shale, carbonaceous
2	8	Sandstone, very fine grained, rippled
11		Interbedded shale and siltstone
11	7	Sandstone, fine-grained, wavy-laminated, bleached
4	6	Coal
3	7	Sandstone, erosional base, fine- to medium-grained, bleached, wavy-laminated
3	4	Covered
3	2	Coal
9	5	Interbedded shale and siltstone
1	3	Sandstone, fine-grained, rippled, bleached

SECTION BM-16--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4	2	Interbedded shale and siltstone
3	8	Sandstone, fine-grained, rippled
1	4	Shale, carbonaceous
3	5	Sandstone, fine-grained, rippled, bleached
7	8	Shale
	10	Coal
1	11	Shale
1	6	Coal
9	4	Interbedded shale and siltstone
4	8	Siltstone
5	7	Sandstone, fine-grained, rippled
	7	Shale, carbonaceous
2	3	Coal
4	2	Shale
	6	Shale
2	9	Sandstone, erosional base, fine- to medium-grained, wavy-laminated, convoluted
2	6	Covered
2	4	Coal, with carbonaceous shale bottom
3	10	Shale
3	3	Sandstone, erosional base, medium-grained, rippled, bleached, rooted

SECTION BM-16--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	11	Shale, carbonaceous
5	4	Sandstone, erosional base, medium-grained, rippled, laminated
7	6	Covered
4	2	Sandstone, medium-grained, rippled, bleached
	6	Shale, carbonaceous
4	10	Covered
	5	Coal
	8	Shale
1	5	Sandstone, fine-grained, parallel-laminated
	7	Shale, gray
3	3	Sandstone, erosional base, medium-grained, planar, crossbedded, rippled, rooted
1	3	Coal
11	6	Sandstone, erosional base, medium-grained, crossbedded, rippled
52		Interbedded shale, siltstone, and sandstone
4	10	Sandstone, fine-grained, rippled
	4	Shale, carbonaceous
1	5	Coal
15		Sandstone, erosional base, medium-grained, crossbedded
18		Sandstone, erosional base, medium-grained, crossbedded, convoluted

SECTION BM-17

Measured in sec. 19, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	4	Coal
3	10	Sandstone, fine-grained, carbonaceous, rippled
2	6	Sandstone, medium-grained, crossbedded, bleached
	7	Shale, carbonaceous shale
2	7	Coal
2		Shale, gray
2	2	Sandstone, medium-grained, rippled
5	9	Shale
3		Sandstone, fine-grained, laminated, bleached
5	6	Covered
1	7	Coal
3	2	Shale, silty
1	7	Shale, gray, carbonaceous
1	6	Sandstone, fine-grained, rippled
13		Sandstone, erosional base, medium-grained, crossbedded
5	5	Covered
22		Sandstone, erosional base, medium-grained, crossbedded
3	6	Covered
4	10	Sandstone, erosional base, medium-grained, crossbedded, rippled

SECTION BM-17--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
67		Covered
6	7	Sandstone, erosional base, medium-grained, parallel-laminated
2		Covered
6	4	Sandstone, fine-grained, rippled
1	5	Covered
14		Sandstone, erosional base, medium-grained, crossbedded
39		Covered
5	3	Sandstone, medium-grained, parallel laminated
2	6	Shale
4	7	Sandstone, medium-grained, wavy-laminated

SECTION BM-18

Measured in sec. 24, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	6	Shale, carbonaceous
	6	Coal
1	7	Shale, carbonaceous
1	5	Sandstone, medium-grained, rippled, bleached
2	7	Shale, gray
2	10	Sandstone, fine-grained, rippled, bleached, rooted
2	11	Coal
3	2	Shale
	2	Shale, carbonaceous
3	3	Sandstone, fine-grained, laminated, bleached
2	8	Sandstone, fine-grained, rippled, laminated, bleached
4	2	Coal, bottom 2-in. carbonaceous shale
	6	Shale
4	9	Sandstone, fine-grained, rippled, siltstone break in middle
1	5	Shale top 2-in. carbonaceous shale
3	5	Coal
1	8	Siltstone, carbonaceous
	1	Shale, carbonaceous
10	7	Sandstone, erosional base, medium-grained, bleached and rooted, festooned, wavy-laminated, rippled
1	10	Coal

SECTION BM-18--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	6	Sandstone, fine-grained, shaly, parallel-laminated, bleached
	8	Carbonaceous shale
4		Interbedded siltstone and shale
1	2	Shale, carbonaceous
10	7	Interbedded shale, siltstone, and sandstone
	5	Shale, carbonaceous
1	2	Shale
1		Shale, carbonaceous
3	10	Interbedded shale and siltstone
1	2	Shale, with 4-in. coal in the middle part
2		Interbedded shale and siltstone
	14	Interbedded shale, carbonaceous shale, with coal in the middle part
2	11	Shale, gray, fissile
24		Sandstone, erosional base, medium-grained, crossbedded, convoluted, bleached
4	3	Coal
4	2	Sandstone, fine-grained, parallel-laminated, shaly
2	7	Shale, gray
3	9	Sandstone, fine-grained, wavy-laminated
1	9	Interbedded shale and siltstone
2	10	Sandstone, erosional base, fine-grained, bioturbated
	7	Shale, gray, carbonaceous at top
1	8	Coal

SECTION BM-18--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
12	6	Sandstone, erosional base, fine- to medium-grained, parallel-laminated
	5	Carbonaceous shale
	7	Coal
26		Sandstone, erosional base, medium-grained, planar-crossbedded, festooned, bleached
2		Shale
1	3	Sandstone, medium-grained, parallel-laminated, bleached, rooted
1	19	Coal
	9	Shale, carbonaceous
	3	Coal
	2	Shale, carbonaceous
3	4	Shale
	7	Shale
	3	Coal
4	2	Sandstone, erosional base, fine- to medium-grained, wavy- and ripple-laminated
1	10	Interbedded shale and siltstone
5	3	Sandstone, medium-grained, wavy- and ripple-laminated, rooted, bleached
	3	Shale, carbonaceous
18		Covered

SECTION BM-18--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4	2	Sandstone, erosional base, medium-grained, rippled
9		Sandstone, carbonaceous, fine-grained, parallel-laminated
	12	Shale
4	3	Sandstone, fine-grained, rippled
	3	Shale, carbonaceous
1	8	Coal
40		Sandstone, erosional base, medium-grained, massive

SECTION BM-19

Measured in sec. 24, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
13		Interbedded shale and sandstone
2		Coal
6	4	Shale, sandy
1	8	Coal
1	3	Carbonaceous shale
1	7	Coaly carbonaceous shale
1	6	Coal
12	3	Sandstone, medium-grained, gray, festooned, convoluted
7	6	Interbedded shale and sandstone
2	2	Shale, carbonaceous
2	10	Interbedded shale and sandstone
	6	Coal
	9	Sandstone, carbonaceous, fine-grained
6	7	Sandstone, medium-grained, crossbedded, rippled
21		Covered
6	4	Sandstone, erosional base, medium-grained, rippled
6		Covered
8	10	Sandstone, medium-grained, wavy-laminated
12		Covered
	9	Coal
2	5	Shale, sandy

SECTION BM-19--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	2	Carbonaceous shale
4	6	Sandstone, erosional base, medium-grained, rippled, parallel-laminated
4	9	Sandstone, fine-grained, parallel-laminated
15	6	Covered
21		Sandstone, erosional base, massive, crossbedded, bleached
5	8	Sandstone, fine-grained, bleached, laminated, rippled
5	3	Covered
1	8	Coal
28		Covered
8	7	Sandstone, erosional base, medium-grained, festooned, convoluted, parallel-laminated
5	4	Shale
4	9	Sandstone, erosional base, medium-grained, rippled, parallel-laminated
1	2	Covered
1	7	Sandstone, fine-grained, rippled
27		Covered
26		Sandstone, erosional base, medium-grained, planar-crossbedded

SECTION BM-20

Measured in sec. 19, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3		Coal
	8	Sandstone, carbonaceous, fine-grained, rooted
3	6	Shale, light-gray
	2	Shale, carbonaceous
2	8	Coal
3	4	Covered
2	6	Sandstone, fine-grained, rippled
4		Covered
3	7	Sandstone, fine-grained, parallel-laminated, rooted
3		Covered
2	8	Coal
5	8	Sandstone, erosional base, fine- to medium-grained, festooned, wavy- and parallel laminated
1	9	Shale
	2	Carbonaceous shale
	10	Coal
5	2	Sandstone, erosional base, medium-grained, parallel-laminated, festooned
4		Covered
2	3	Sandstone, fine-grained, rippled
9	5	Covered

SECTION BM-20--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	6	Shale, carbonaceous
4	6	Sandstone, fine- to medium-grained, rippled, parallel-laminated
32		Covered
1	2	Coal
3	11	Shale
	4	Shale, carbonaceous upper part
	11	Coal
1	8	Shale, carbonaceous
	3	Coal
13		Sandstone, erosional base, medium-grained, parallel-laminated, festooned
5	4	Covered
2	2	Sandstone, fine-grained, rippled
6	3	Covered
	3	Shale, carbonaceous
	3	Coal
4	2	Sandstone, erosional base, fine-grained, wavy- and ripple-laminated
9		Covered
2	2	Sandstone, fine-grained, rippled
2		Covered

SECTION BM-20--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
3	4	Coal
2	4	Shale
8	6	Sandstone, fine- to medium-grained, convoluted, wavy-laminated
35		Covered
11	4	Interbedded shale, siltstone, and sandstone
	5	Shale, carbonaceous
	9	Coal
	2	Shale, carbonaceous
4	7	Interbedded shale, siltstone, and sandstone
	9	Shale, carbonaceous
	8	Coal
28		Sandstone, erosional base, festooned, planar-crossbedded

SECTION BM-21

Measured in sec. 19, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
5		Covered
4	9	Coal
	2	Shale, carbonaceous
3	5	Sandstone, erosional base, medium-grained, rippled, parallel-laminated
2	8	Sandstone, fine-grained, rippled
7	6	Covered, 6-in. coal and carbonaceous shale in the middle part
4	5	Sandstone, erosional base, fine-grained, rippled, bleached, carbonaceous
17		Interbedded shale, siltstone, and shale, carbonaceous, 4-in. coal in middle part
1	4	Shale
3	4	Sandstone, fine-grained, ripple-laminated
	4	Shale, carbonaceous
4	1	Sandstone, fine-grained, rippled, bleached
1	3	Coal
	2	Shale, carbonaceous
3	10	Sandstone, fine-grained, rippled
3	3	Coal
4		Covered
1		Coal

SECTION BM-21--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
10	3	Interbedded shale, siltstone, and sandstone
5	4	Sandstone, erosional base, fine-grained, wavy- and ripple laminated, shaly
26		Covered
3	6	Sandstone, fine-grained, parallel-laminated
1	8	Shale
1	3	Coal
5	3	Interbedded shale and siltstone
33		Covered
2	1	Coal
7	8	Sandstone, erosional base, fine- to medium-grained, rippled, bleached
8	6	Covered
11		Interbedded shale, carbonaceous shale, and sandstone
13	4	Sandstone, erosional base, medium-grained, festooned, planar-crossbedded
4		Interbedded siltstone and shale
9	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
7	8	Covered
11	6	Sandstone, erosional base, medium-grained, festooned, planar-crossbedded, rippled

SECTION BM-22

Measured in sec. 33, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
3	7	Sandstone, medium-grained, crossbedded, bleached
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
23	5	Sandstone, erosional base, medium-grained, festooned, convoluted
1		Shale
	5	Coal
2	6	Carbonaceous shale
3	3	Shale
1	7	Sandstone, fine-grained, rippled, burrowed
	8	Interbedded shale and siltstone, coaly
2		Sandstone, erosional base, festooned
	2	Interbedded shale and carbonaceous shale
1	7	Coal
	4	Carbonaceous shale
	5	Shale
1	11	Siltstone, lime, rippled, and burrowed
	9	Shale
2		Sandstone, medium-grained, rippled, festooned, rooted
	2	Interbedded shale and siltstone
	2	Coal
	8	Sandstone, burrowed, some shell fragments
5	4	Shale

SECTION BM-22--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	1	Siltstone, lime
	8	Shale
	1	Carbonaceous shale
2	3	Shale
1		Sandstone, fine-grained, rippled, burrowed
	10	Shale, dark-gray
1		Sandstone, fine-grained, rippled
2	9	Sandstone, fine-grained, rippled, convoluted
1		Shale
	5	Carbonaceous shale
3		Shale
1	8	Sandstone, fine-grained, rippled, burrowed
3	10	Sandstone, medium-grained, festooned, rippled
1	1	Interbedded shale and coaly carbonaceous shale
	7	Interbedded shale and siltstone
	9	Sandstone, fine-grained, burrowed
1	2	Shale
	8	Siltstone, lime
1	6	Shale
	9	Sandstone, fine-grained, rippled
4	1	Sandstone, fine- to medium-grained, festooned, rippled
	7	Shale
	2	Carbonaceous shale
2	6	Shale

SECTION BM-22--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	1	Sandstone, medium-grained, rippled, burrowed
	3	Coal
1	4	Shale
3	4	Sandstone, medium-grained, festooned, rippled
1	6	Shale
1	7	Sandstone, fine-grained, rippled
1	8	Shale
	11	Sandstone, very fine grained, rippled
2	6	Sandstone, erosional base, medium-grained, oysters
6		Shale, with carbonaceous shale stringers
2	7	Siltstone, lime
3	2	Sandstone, fine- to medium-grained, festooned
2	3	Shale
	6	Coal
4	6	Sandstone, erosional base, medium-grained, rippled, convoluted, parallel-laminated
3	8	Shale
	4	Carbonaceous shale
3	6	Shale
2	8	Sandstone, fine-grained, rippled, rooted
9	6	Sandstone, erosional base, medium-grained, rippled, rooted
3	6	Shale
4	3	Coal
1	5	Shale

SECTION BM-22--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>inches</u>	
3	8	Sandstone, fine-grained, rippled
5	4	Sandstone, erosional base, medium-grained, festooned
	8	Shale
4	1	Sandstone, fine-grained, rippled
15		Sandstone, erosional base, medium-grained, festooned, convoluted
1	4	Shale
21	7	Sandstone, erosional base, medium-grained, festooned
1	10	Shale
5	3	Sandstone, fine-grained, rippled
5		Shale
5		Sandstone, fine-grained, rippled
3	3	Sandstone, erosional base, medium-grained, festooned
5	4	Shale
2	2	Sandstone, fine-grained, rippled
1	8	Shale, with coal stringers
1	9	Shale, silty
23		Sandstone, erosional base, medium-grained, festooned, convoluted

SECTION BM-23

Measured in sec. 33, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	7	Shale, carbonaceous
5		Interbedded shale and siltstone
26	6	Sandstone, channel, erosional base, medium-grained, festooned, convoluted, rippled
4	9	Shale
3	5	Sandstone, fine-grained, rippled, rooted, burrowed
22		Interbedded shale and siltstone
4	5	Sandstone, fine-grained, rippled
12		Interbedded shale and siltstone
16		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
40+		Interbedded shale and siltstone

SECTION BM-24

Measured in sec.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
40		Sandstone
1	9	Carbonaceous shale
2	4	Coal
32		Sandstone, medium-grained, crossbedded, bleached
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	9	Coal
2	9	Carbonaceous shale
5	3	Shale
3	3	Coal
3	2	Shale
5	8	Sandstone, fine-grained, rippled
2	9	Interbedded shale and siltstone
	3	Shale, carbonaceous
	5	Coal
6	8	Sandstone, erosional base, medium-grained, festooned, parallel-laminated, rippled
1	6	Coal
1	3	Shale, carbonaceous
7	11	Interbedded shale and siltstone
1	9	Sandstone, fine-grained, rippled, rooted
3	3	Interbedded shale and siltstone
	2	Shale, carbonaceous

SECTION BM-24--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
6	8	Sandstone, fine- to medium-grained, rippled, convoluted
24		Interbedded shale and siltstone
1		Shale, carbonaceous, coaly
1	8	Shale, gray
4	9	Sandstone, fine-grained, rippled, convoluted
1	1	Coal
6	4	Interbedded shale and siltstone
	2	Coal
4	3	Sandstone, erosional base, fine-grained, rippled
7	3	Interbedded shale and siltstone
	6	Shale, carbonaceous
2	7	Coal
4		Interbedded shale and siltstone
3		Shale, carbonaceous
	6	Coal
2	10	Interbedded shale, siltstone, and coal stringers
18		Sandstone, medium-grained, festooned, rippled
2	7	Coal
1	2	Shale
6	2	Sandstone, fine-grained, festooned, rippled
	6	Shale
	8	Shale, carbonaceous
1	4	Interbedded shale and siltstone

SECTION BM-24--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	3	Coal
3	6	Interbedded shale and siltstone
	8	Coal
3		Interbedded shale and siltstone
1	1	Sandstone, fine-grained, rippled
1	7	Interbedded shale and siltstone
1	2	Sandstone, fine-grained, rippled
4		Interbedded shale and siltstone
3	5	Sandstone, fine-grained, rippled, rooted, burrowed
1		Interbedded shale and siltstone
	5	Shale, carbonaceous
14	9	Interbedded shale and siltstone
	6	Shale, carbonaceous
	6	Coal
	7	Shale, carbonaceous, with coaly stringers
23		Sandstone, erosional base, festooned, planar-crossbedded, convoluted, rippled, bleached
1	2	Shale, carbonaceous
1	2	Coal
3	2	Interbedded shale and siltstone
3	4	Sandstone, fine-grained, rippled, rooted
	5	Shale
	8	Shale, carbonaceous

SECTION BM-24--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	3	Coal
5	2	Interbedded shale and siltstone
9	6	Sandstone, fine-grained, festooned, rippled
5	4	Interbedded shale and siltstone
8	8	Sandstone, fine-grained, festooned, rippled
7	7	Interbedded shale and siltstone
1	5	Sandstone, fine-grained, rippled, rooted
25		Interbedded shale and siltstone
10		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-25

Measured in sec. 18, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
40		Sandstone, medium-grained, crossbedded
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	4	Coal
	6	Carbonaceous shale
	4	Coal
29		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
5	6	Interbedded shale and siltstone
7	6	Sandstone, fine-grained, rippled, rooted, burrowed
1	11	Coal
	2	Shale, carbonaceous
2	4	Sandstone, fine-grained, rippled
4	5	Interbedded shale and siltstone
7	3	Sandstone, erosional base, festooned, convoluted, rippled
3		Interbedded shale and siltstone
1	4	Sandstone, fine-grained, rippled
	6	Shale
3	4	Sandstone, fine-grained, rippled, rooted
5	4	Interbedded shale and siltstone
1	3	Sandstone, fine-grained, rippled, burrowed
	4	Shale, carbonaceous
2	10	Shale, carbonaceous

SECTION BM-25--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	8	Sandstone, fine-grained, rippled
1	7	Coal
3	9	Shale
2	10	Sandstone, fine-grained, rippled, rooted, bleached
	2	Shale
	3	Shale, carbonaceous
2	8	Interbedded shale and siltstone
2	8	Sandstone, fine-grained, rippled, burrowed
4	3	Interbedded shale and siltstone
5	6	Sandstone, erosional base, fine- to medium-grained, festooned, convoluted, rippled, bleached
	4	Shale, carbonaceous
3	4	Coal
	2	Shale
	8	Siltstone
1	4	Sandstone, fine-grained, festooned, rippled
	3	Shale, carbonaceous
1	7	Coal
1	2	Shale
1	5	Sandstone, fine-grained, parallel-laminated
6	7	Interbedded shale and siltstone
3	2	Sandstone, erosional base, fine-grained, festooned, convoluted, rippled, wavy-laminated
2	9	Interbedded shale and siltstone

SECTION BM-25--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	8	Coal
2	11	Interbedded shale and siltstone
2	10	Sandstone, fine-grained, laminated, rippled
2	11	Interbedded shale and siltstone
1	2	Coal
	8	Carbonaceous shale
1	2	Interbedded shale and siltstone
	6	Coal
11	7	Interbedded shale and siltstone with carbonaceous shale stringers
4	5	Sandstone, erosional base, fine-grained, festooned, rippled, rooted
8	2	Interbedded shale and siltstone
	8	Shale, carbonaceous
1	8	Shale, silty
6	3	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, rooted
2		Interbedded shale and siltstone
1	4	Sandstone, medium-grained, rippled
17	6	Interbedded shale, siltstone, and sandstone
1	8	Sandstone, erosional base, medium-grained, festooned, convoluted, burrowed, rooted
5	10	Interbedded shale and siltstone
1	3	Sandstone, fine-grained, rippled

SECTION BM-25--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	2	Interbedded shale and siltstone
	9	Coal
1	3	Interbedded shale and siltstone
1	9	Shale, silty
	2	Coal
2	2	Sandstone, medium-grained, festooned, rooted
3		Interbedded shale and siltstone
4	7	Sandstone, medium-grained, festooned, rippled
17	6	Interbedded shale and siltstone
3	5	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
6		Interbedded shale and siltstone
9	4	Sandstone, medium-grained, festooned, rippled, rooted
9	6	Interbedded shale and siltstone
4	2	Sandstone, fine-grained, festooned, rippled

SECTION BM-26

Measured in sec. 18, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
40		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	9	Coal
30		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, bleached
4	1	Coal
16		Sandstone, erosional base, medium-grained, festooned, convoluted, bleached
	4	Carbonaceous shale
2	2	Coal
2	5	Shale
4	6	Sandstone, fine-grained splay, rippled
6	7	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
2	7	Interbedded shale and siltstone
8	9	Sandstone, erosional base, fine-grained, festooned
10	6	Interbedded shale and siltstone
8	6	Sandstone, erosional base, medium-grained, festooned, convoluted, heavily rooted
6	1	Interbedded shale and siltstone
5	3	Sandstone, medium-grained, festooned, rippled
6	7	Interbedded shale and siltstone

SECTION BM-26--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	5	Sandstone, medium-grained, wavy-laminated, convoluted
9		Interbedded shale and siltstone
5	2	Sandstone, erosional base, medium-grained, festooned, convoluted
3	3	Interbedded shale and siltstone, with carbonaceous shale stringers
4	9	Sandstone, medium-grained, rippled, burrowed
3		Interbedded shale and siltstone
	8	Sandstone, fine-grained, wavy-laminated
3	6	Interbedded shale and siltstone
9	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, rooted
5	7	Interbedded shale and siltstone
5	6	Sandstone, erosional base, medium-grained, festooned, rippled
7	6	Shale
1	1	Carbonaceous shale
8	4	Sandstone, erosional base, medium-grained, festooned, convoluted, wavy-laminated
1		Shale
12		Sandstone, erosional base, medium-grained, festooned, convoluted, rooted

SECTION BM-27

Measured in sec. 18, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
49		Sandstone
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
6	4	Coal
8		Interbedded shale and siltstone
2	2	Coal
	8	Carbonaceous shale
16		Sandstone, erosional base, medium-grained, festooned, rippled
5	6	Interbedded shale and siltstone
1	3	Coal
7	6	Interbedded shale and siltstone
4	9	Sandstone, erosional base, medium-grained, festooned, convoluted, rooted, bleached, burrowed
3	2	Shale
5	4	Siltstone, lime
	7	Carbonaceous shale
4	9	Interbedded shale and siltstone
7	4	Sandstone, medium-grained, rippled, rooted, burrowed
4	10	Interbedded shale and siltstone
10	3	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
1	7	Shale, carbonaceous
9	2	Sandstone, erosional base, medium-grained, festooned, convoluted, wavy laminated, bleached, burrowed, rooted

SECTION BM-27--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	5	Coal
	8	Carbonaceous shale
3	2	Coal
3		Interbedded shale and siltstone, scoured
3	9	Sandstone, fine-grained, rippled
7	2	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
1	3	Shale
54		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
27		Interbedded shale and siltstone
45		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-28

Measured in sec. 18, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
44		Sandstone
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	7	Coal
4	5	Shale
3	6	Sandstone, fine-grained, rippled
2	4	Interbedded shale and siltstone
4	9	Sandstone, erosional base, fine-grained, festooned, convoluted, rippled, rooted
	3	Carbonaceous shale
2	1	Coal
2	2	Shale
3	1	Sandstone, fine-grained, rippled, rooted
	8	Carbonaceous shale
7	6	Interbedded shale and siltstone
1		Sandstone, fine-grained, rippled
6	4	Interbedded shale and siltstone
5	4	Sandstone, fine-grained, parallel-laminated, wavy-laminated
4	9	Interbedded shale and siltstone
1	8	Coal
13	6	Interbedded shale, siltstone, and sandstone
4	8	Interbedded shale and siltstone
6	9	Sandstone, fine-grained, rippled

SECTION BM-28--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4	7	Interbedded shale and siltstone
6	10	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, rooted, burrowed
1	8	Shale, carbonaceous
7	4	Sandstone, erosional base, medium-grained, festooned, convoluted, laminated
14		Interbedded shale and siltstone
2	6	Coal
1	4	Sandstone, erosional base, fine-grained, festooned
4	7	Interbedded shale and siltstone
1	3	Sandstone, fine-grained, rippled
9	4	Interbedded shale and siltstone
7	8	Sandstone, erosional base, medium-grained, festooned, convoluted, rooted, burrowed
7	3	Interbedded shale and siltstone
12		Sandstone, erosional base, medium-grained, festooned, convoluted
11	6	Interbedded shale and siltstone
3	2	Sandstone, erosional base, medium-grained, massive
3	6	Shale, gray
16		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
8	5	Interbedded shale and siltstone

SECTION BM-28--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	2	Sandstone, medium-grained, massive
23		Interbedded shale, siltstone, and sandstone
30		Sandstone, erosional base, medium-grained, convoluted, festooned, rippled

SECTION BM-29

Measured in sec. 18, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3	7	Coal
12	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
5	5	Interbedded shale and siltstone
	11	Shale, carbonaceous, coaly
20	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
3	2	Shale, with carbonaceous shale stringers
1		Coal
2	2	Shale, with carbonaceous shale stringers
2	4	Coal
3	5	Interbedded shale and siltstone
6	2	Sandstone, fine-grained, rippled
1	3	Shale, carbonaceous
5	4	Sandstone, fine-grained, rippled, wavy-laminated, convoluted
1	7	Shale, carbonaceous in uppermost part
1	5	Coal
14		Interbedded shale and siltstone
	7	Coal
1	4	Shale
3	7	Sandstone, erosional base, fine-grained, festooned, convoluted, laminated

SECTION BM-29--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	9	Shale, carbonaceous
	8	Shale, carbonaceous
	2	Coal
4	2	Sandstone, erosional base, fine-grained, convoluted, rippled, wavy-laminated
2	4	Shale, carbonaceous
2	8	Sandstone, fine-grained, rippled
1		Shale, carbonaceous
5	3	Sandstone, erosional base, medium-grained, festooned, rippled
6	4	Interbedded shale and siltstone
3	2	Coal
	9	Sandstone, fine-grained, rippled, burrowed
4	9	Coal
3	2	Sandstone, erosional base, medium-grained, festooned, rippled, rooted
1		Shale, carbonaceous
5	3	Sandstone, fine- to medium-grained, convoluted, laminated
	9	Shale, carbonaceous
7	6	Sandstone, erosional base, medium-grained, festooned, rippled, parallel-laminated
19		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
	4	Coal

SECTION BM-29--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
6	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rooted
6	4	Interbedded shale and siltstone
4	9	Sandstone, fine-grained, rippled, rooted, burrowed
4	3	Interbedded shale and siltstone
9	6	Sandstone, erosional base, medium-grained, festooned, convoluted, laminated
5	7	Interbedded shale and siltstone
11	4	Sandstone, erosional base, medium-grained, festooned, convoluted, laminated, bleached
2	7	Coal
24		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, bleached, rooted
13		Interbedded shale and siltstone
4	2	Sandstone, medium-grained, festooned, rippled
9	7	Interbedded shale and siltstone, with carbonaceous stringers in upper part
7		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-30

Measured in sec. 18, T. 19 S., R. 7 E.

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
30		Sandstone, medium-grained, crossbedded
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	7	Coal
4	7	Interbedded shale and siltstone
1	9	Coal
1	1	Carbonaceous shale, coaly
	9	Coal
	2	Shale
13	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
1		Interbedded shale and carbonaceous shale
1		Coal
31		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
3	6	Interbedded shale and siltstone
5	4	Sandstone, medium-grained, festooned, convoluted, rippled, bleached
	6	Coal
4	11	Interbedded shale and siltstone
3	7	Sandstone, medium-grained, convoluted, wavy-laminated, rooted
10	4	Interbedded shale and siltstone
21		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-30--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
3	6	Interbedded shale and siltstone
3	2	Sandstone, medium-grained, parallel-laminated, rippled, rooted, burrowed
2	3	Interbedded shale and siltstone
3	5	Sandstone, medium-grained, wavy-laminated, rooted, burrowed
2	8	Coal
8	4	Interbedded shale and siltstone
22		Sandstone, erosional base, medium-grained, festooned, convoluted, wavy-laminated
15		Interbedded shale and siltstone
7	8	Interbedded sandstone and siltstone
	8	Carbonaceous shale
7	6	Interbedded shale and siltstone
2	4	Coal
14		Interbedded shale and siltstone
4	11	Coal
7	2	Sandstone, erosional base, medium-grained, festooned, wavy-laminated
11	6	Sandstone, erosional base, medium-grained, convoluted, festooned, rippled
3	7	Interbedded shale and siltstone
18		Sandstone, erosional base, medium-grained, festooned, convoluted

SECTION BM-30A

Measured in sec. 18, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	1	Coal
	1	Coal
	14	Interbedded shale, siltstone, and sandstone, burrowed
TONGUE OF STAR POINT SANDSTONE TONGUE		
30		Sandstone, medium-grained, crossbedded, bleached
BLACKHAWK FORMATION		
	6	Coal
6	8	Interbedded shale and siltstone
2	2	Sandstone, fine-grained, rippled

SECTION BM-30b

Measured in sec. 18, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	6	Coal, silty
1	1	Coal
1	4	Sandstone, fine-grained, carbonaceous, burrowed

SECTION BM-30D

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	2	Coal
	10	Shale, silty, carbonaceous
	8	Coal
STAR POINT SANDSTONE TONGUE		
15		Sandstone, medium-grained, crossbedding

SECTION BM-31

Measured in sec. 35, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
37		Sandstone
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	6	Carbonaceous shale
	6	Coal
14		Sandstone, erosional base, festooned, convoluted, wavy-laminated
6	3	Interbedded shale and siltstone
1	3	Sandstone, medium-grained, lenticular-bedded, rippled, rooted
	2	Carbonaceous shale
2	4	Coal
2	9	Carbonaceous shale
1	2	Interbedded shale and siltstone
5	8	Sandstone, fine- to medium-grained, festooned, rippled, rooted
7	3	Interbedded shale and siltstone with thin carbonaceous shale stringers
4	1	Interbedded shale and siltstone with thin carbonaceous shale
13		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
2	1	Interbedded shale and siltstone
2	9	Coal
7	7	Interbedded shale and siltstone
5	3	Sandstone, erosional base, fine-grained, festooned, convoluted, wavy-laminated.

SECTION BM-31--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	1	Interbedded shale and siltstone
5	4	Sandstone, erosional base, medium-grained, festooned
1	6	Interbedded shale and siltstone
	6	Coal
1	6	Interbedded shale and siltstone
3	2	Sandstone, medium-grained, rippled, convoluted, burrowed, rooted, bleached
	9	Shale, carbonaceous, coaly
5	1	Interbedded shale and siltstone
5	4	Coal
2	9	Carbonaceous shale
6	5	Interbedded shale and siltstone
1	1	Coal
5	2	Sandstone, fine-grained, wavy-laminated
1	7	Coal
15	4	Interbedded shale, siltstone, and sandstone
	2	Coal
2	2	Carbonaceous shale
2	8	Interbedded siltstone, shale, and carbonaceous shale
7	4	Sandstone, erosional base, festooned, convoluted, rooted, bleached
	7	Carbonaceous shale
7	3	Interbedded shale and siltstone with carbonaceous stringers

SECTION BM-31--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4	6	Sandstone, fine-grained, rippled, convoluted, rooted, burrowed
	10	Shale, carbonaceous
2	4	Sandstone, fine-grained, rippled, rooted
	4	Carbonaceous shale
27		Interbedded shale, siltstone, and sandstone
14		Sandstone, erosional base, medium-grained, convoluted, lenticular-bedded, rooted
8	8	Interbedded shale and siltstone
2	1	Sandstone, fine-grained, lenticular-bedded, rippled, convoluted, bleached
2	6	Interbedded shale and siltstone
6	7	Sandstone, erosional base, medium-grained, festooned, rooted, bleached
7	9	Interbedded shale and siltstone
4	8	Sandstone, medium-grained, festooned, parallel-laminated, rippled, rooted
6	3	Interbedded shale and siltstone
	4	Shale, carbonaceous
4	2	Interbedded shale and siltstone
1	3	Sandstone, fine-grained, rippled
2	4	Interbedded shale, siltstone, and sandstone
2	5	Sandstone, fine-grained, wavy-laminated, convoluted, rippled

SECTION BM-32

Measured in sec. 35, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
41		Sandstone, medium-grained, crossbedded, burrowed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
16	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
4	8	Interbedded shale and siltstone
2	2	Shale, carbonaceous, silty
2	8	Sandstone, fine-grained, rippled, rooted, burrowed; shale partings
3	2	Interbedded shale and siltstone
5	1	Sandstone, medium-grained, festooned, rippled, rooted
	2	Shale, carbonaceous
1	6	Coal
1		Siltstone
13		Sandstone, erosional base, medium-grained, festooned, convoluted, laminated, bleached
2	9	Coal
12	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rooted
2	1	Coal
15		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
1	8	Interbedded shale and siltstone

SECTION BM-32--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
5	8	Sandstone, erosional base, medium-grained, festooned, rippled
6		Interbedded shale and siltstone
	2	Carbonaceous shale
8	6	Interbedded shale and siltstone
1	10	Sandstone, fine-grained, rippled, burrowed, rooted
1	1	Coal
4	9	Interbedded shale and siltstone
1	3	Sandstone, fine-grained, wavy-laminated
5		Interbedded shale and siltstone
16		Sandstone, erosional base, medium-grained, festooned, convoluted, wavy-laminated, rooted
10	7	Interbedded shale and siltstone
9	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rooted
4	5	Interbedded shale, siltstone, and sandstone
8	9	Sandstone, erosional base, medium-grained, festooned, rippled
2		Interbedded shale and siltstone
4	6	Sandstone, medium-grained, festooned, rippled
3	4	Interbedded shale and siltstone
31		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-33

Measured in sec. 33, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
38		Sandstone, medium-grained, crossbedded
BLACKHAWK FORMATION (measured and described from base to top)		
1	8	Carbonaceous shale
40		Sandstone, erosional base, medium-grained, festooned, convoluted
7		Interbedded shale and siltstone
4	6	Sandstone, medium-grained, festooned, rippled
52		Interbedded shale and siltstone
9		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-34

Measured in sec. 19, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
40		Sandstone, medium-grained, crossbedded
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3	5	Coal
2	2	Carbonaceous shale
2	2	Coal
1		Carbonaceous shale
4	10	Interbedded shale and siltstone
5	2	Sandstone, erosional base, medium-grained, convoluted, festooned, rooted, bleached
	8	Interbedded shale and siltstone
	6	Carbonaceous shale, with coaly stringers
1	2	Shale
2	3	Sandstone, fine-grained, rippled, with carbonaceous stringer in middle part
2	1	Interbedded shale and siltstone
5	1	Sandstone, erosional base, medium-grained, festooned, convoluted, rooted
1	4	Carbonaceous shale
2	7	Coal
12	6	Interbedded sandstone and shale
22	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-34--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	8	Carbonaceous shale, coaly
3	7	Shale, siltstone
33		Sandstone, erosional base, medium-grained, convoluted, festooned, rippled
7	2	Interbedded shale and siltstone with carbonaceous shale in the upper part
4	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, rooted
1	8	Shale
8	11	Sandstone, erosional base, medium-grained, festooned, rippled, rooted
	6	Carbonaceous shale
5	7	Sandstone, erosional base, festooned, rippled
9	8	Interbedded shale and siltstone
2	8	Sandstone, medium-grained, rippled
2	5	Interbedded shale and siltstone
1	6	Sandstone, fine-grained, rippled
1	2	Interbedded shale and siltstone
1	7	Sandstone, fine-grained, rippled
1	8	Interbedded shale and siltstone
1	9	Sandstone, fine-grained, rippled
6	6	Interbedded shale and siltstone
2	7	Sandstone, fine-grained, rippled, rooted

SECTION BM-34--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	9	Shale
1	4	Sandstone, fine-grained, rippled, rooted
10	11	Sandstone, erosional base, medium-grained, convoluted, festooned, rooted
8	6	Interbedded shale and siltstone
5	3	Sandstone, erosional base, medium-grained, rippled, convoluted, festooned, rippled, rooted
1	5	Coal
	8	Shale
1	7	Coal
	7	Shale
5	8	Sandstone, medium-grained, convoluted, festooned, rippled
6	9	Interbedded shale and siltstone
1	8	Sandstone, fine-grained, rippled
15		Interbedded shale and siltstone
3	4	Sandstone, medium-grained, rippled, convoluted, rooted
10	9	Interbedded shale, siltstone, and sandstone
8	6	Sandstone, erosional base, fine- to medium-grained, festooned, convoluted, wavy-laminated, rippled

SECTION BM-35

Measured in sec. 34, T. 19 S., R. 5 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
38		Sandstone, medium-grained, crossbedded, burrowed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	2	Coal
1	8	Carbonaceous shale, coaly
4	2	Coal
	4	Carbonaceous shale
1	8	Shale
5	3	Interbedded siltstone and sandstone
	3	Carbonaceous shale
5	5	Coal
5		Interbedded siltstone and shale
	8	Carbonaceous shale
1	10	Shale, carbonaceous, coaly
5	6	Interbedded siltstone and shale
4	3	Sandstone, medium-grained, rippled, rooted
	5	Carbonaceous shale
4	6	Interbedded shale and siltstone
8	6	Sandstone, fine- to medium-grained, rippled, convoluted, laminated
4	7	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
6	1	Interbedded shale and siltstone

SECTION BM-35--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4	2	Sandstone, fine-grained, rippled, convoluted
1		Interbedded shale and siltstone
	8	Carbonaceous shale
11	3	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, rooted
3	10	Interbedded shale and siltstone, scoured
1	1	Shale
2	6	Sandstone, medium-grained, heavily rooted, rippled
	8	Shale
	3	Coal
5	7	Sandstone, erosional base, medium-grained, festooned, rippled
2	6	Shale
2	8	Sandstone, fine- to medium-grained, rippled, rooted
3	1	Interbedded shale and siltstone
6	9	Sandstone, erosional base, medium-grained, festooned, convoluted, wavy-laminated, rooted
14	6	Interbedded shale and siltstone
1	3	Coal
	10	Interbedded shale and siltstone
1	10	Sandstone, fine- to medium-grained, festooned, rippled
2	8	Interbedded shale and siltstone
27		Sandstone, erosional base, fine- to medium-grained, festooned, planar-crossbedded, rippled, parallel-laminated

SECTION BM-35--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	6	Sandstone, medium-grained, rippled, rooted
4	7	Interbedded shale and siltstone
3	1	Sandstone, medium-grained, festooned, rippled, rooted
	6	Shale
	5	Coal
4	7	Interbedded siltstone and shale
8	6	Sandstone, medium-grained, wavy-laminated, shaly
18		Interbedded shale and siltstone
10	6	Sandstone, erosional base, medium-grained, festooned, rooted
3	8	Interbedded shale and siltstone
5	3	Sandstone, medium-grained, rippled, rooted
17		Interbedded shale and siltstone
65		Sandstone, erosional base, fine- to medium-grained, festooned, convoluted, rippled

SECTION BM-36

Measured in sec. 24, T. 19 S., R. 5 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
41		Sandstone, medium-grained, crossbedded
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	7	Shale
	8	Carbonaceous shale
2	6	Coal
	3	Carbonaceous shale
1	5	Shale
3	5	Sandstone, fine-grained, rippled, wavy-laminated
5	3	Sandstone, erosional base, medium-grained, festooned, convoluted
15	6	Sandstone, erosional base, medium-grained, festooned, convoluted, rippled
4	10	Shale
	6	Carbonaceous shale
4	9	Coal
4	3	Interbedded shale and siltstone
	7	Carbonaceous shale
5	2	Interbedded shale and siltstone
5	1	Sandstone, medium-grained, rippled, wavy-laminated, burrowed, rooted
	7	Coal
4	9	Interbedded shale and siltstone

SECTION BM-36--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
5	8	Sandstone, fine- to medium-grained, rippled
12	6	Sandstone, medium-grained, festooned, convoluted, burrowed, rooted
3	4	Interbedded shale and siltstone
5	1	Sandstone, medium-grained, rippled, convoluted
5	3	Interbedded shale and siltstone
6	8	Sandstone, fine- to medium-grained, wavy-laminated, rippled
2	2	Interbedded shale and siltstone
2	7	Sandstone, erosional base, medium-grained, festooned, convoluted
3	3	Interbedded shale and siltstone
4	9	Sandstone, erosional base, medium-grained, festooned, rippled
3	5	Interbedded shale and siltstone
	7	Shale, carbonaceous, coaly
19		Sandstone, erosional base, medium-grained, festooned, convoluted, rippled, bleached
	8	Coal
6	9	Sandstone, erosional base, medium-grained, festooned, rippled
11	4	Interbedded shale and siltstone
2	8	Sandstone, medium-grained, rippled, convoluted

SECTION BM-37

Measured in sec. 26, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
55		Sandstone, fine-grained, crossbedded; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	11	Coal
2	7	Shale, gray
2	3	Sandstone, gray, fine-grained, rippled
	8	Coal
9	6	Interbedded shale and siltstone
6	3	Coal
4	8	Shale, gray
2	2	Sandstone, gray, medium-grained, burrowed, rippled, massive
	4	Coal
5	8	Interbedded shale and siltstone
	7	Coal
4	6	Sandstone, gray, fine-grained, rippled
1	8	Interbedded shale and siltstone
	4	Coal
	9	Interbedded shale and siltstone
	3	Carbonaceous shale

SECTION BM-37--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
7	4	Interbedded shale and siltstone
	2	Carbonaceous shale
1	3	Coal
5	7	Sandstone, gray, erosional base, medium-grained, festooned, rippled, convoluted
1	6	Coal
1	2	Shale, gray
2	2	Sandstone, light-gray, erosional base, medium-grained, wavy-laminated
3	1	Shale, gray
1	7	Sandstone, light-gray, fine- to medium-grained, rippled
1	4	Coal
1	2	Shale, dark-gray
7	4	Sandstone, gray, medium-grained, wavy-laminated, festooned, convoluted
2	3	Interbedded shale and siltstone

SECTION BM-37--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	7	Sandstone, gray, erosional base, fine- to medium-grained, rippled, rooted
1	4	Coal
	2	Carbonaceous shale
1	8	Interbedded shale and siltstone
2	6	Sandstone, light-gray, fine- to medium-grained, rooted, wavy-laminated, convoluted
3	7	Shale, gray
8		Sandstone, gray, erosional base, medium-grained, festooned, convoluted
8	3	Interbedded shale and siltstone
2	5	Sandstone, fine- to medium-grained, wavy-laminated
	4	Carbonaceous shale
1	9	Coal
31		Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned; siltstone interbeds

SECTION BM-37--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	6	Carbonaceous shale
2	8	Coal
6	9	Sandstone, gray, erosional base, medium-grained, convoluted, festooned, rippled, rooted
5	3	Interbedded shale and siltstone
1	2	Carbonaceous shale
2	8	Interbedded shale and siltstone
	8	Carbonaceous shale
1	2	Coal
4	5	Sandstone, light-gray, medium-grained, wavy laminated
2	4	Interbedded shale and siltstone
	3	Carbonaceous shale
18		Sandstone, light gray, erosional base, medium-grained, festooned, convoluted
4	4	Interbedded shale and siltstone
6	3	Sandstone, gray, erosional base, medium-grained, convoluted, festooned

SECTION BM-37--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
16		Sandstone, light-gray, erosional base, medium-grained, festooned
8	5	Interbedded shale and siltstone
5	3	Sandstone, gray, erosional base, medium-grained, convoluted, festooned, rooted
7	4	Interbedded shale and siltstone
	7	Coal
35		Sandstone, gray, erosional base, medium-grained, festooned

SECTION BM-38

Measured in sec. 26, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	1	Coal
6	2	Interbedded shale and carbonaceous shale
2	6	Coal
6	8	Sandstone, gray, erosional base, medium-grained, festooned
	9	Interbedded shale and siltstone
5	3	Sandstone, gray, fine-grained, wavy-laminated, rippled, rooted
13	4	Interbedded shale, siltstone, and sandstone
5	2	Sandstone, gray, medium-grained, rooted, burrowed
13	6	Interbedded shale and siltstone
8	9	Sandstone, light-gray, erosional base, fine- to medium-grained, festooned, convoluted
7	6	Interbedded shale and siltstone
10	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
6	9	Interbedded shale and siltstone
	7	Coal
17		Interbedded shale and siltstone

SECTION BM-38--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
11	9	Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned
5	4	Interbedded shale and siltstone
3	2	Sandstone, gray, medium-grained, festooned
12		Interbedded shale and siltstone
7	4	Sandstone, gray, erosional base, medium-grained, massive
3	6	Interbedded shale and siltstone
9	5	Sandstone, gray, erosional base, medium-grained, massive, festooned
16		Interbedded shale and siltstone
10	3	Sandstone, gray, erosional base, medium-grained, wavy-laminated, festooned

SECTION BM-39

Measured in sec. 35, T. 20 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
55		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	9	Carbonaceous shale, silty, coaly
3	2	Sandstone, gray, fine-grained, burrowed
1	8	Coal
	4	Carbonaceous shale
3	1	Shale, gray
4	7	Sandstone, gray, fine-grained, rippled, rooted
6	7	Shale, gray
2	1	Sandstone, gray, fine-grained, rippled, burrowed,
2	8	Sandstone, gray, erosional base, festooned, rippled
6	1	Coal
	4	Carbonaceous shale
1	8	Interbedded shale and siltstone
3	4	Coal
1	2	Interbedded coal and coaly carbonaceous shale
	3	Carbonaceous shale
24		Interbedded siltstone, shale, and sandstone
1	4	Coal
35	6	Sandstone, gray, erosional base, medium-grained, festooned, convoluted
2		Shale, gray
1	10	Coal

SECTION BM-39--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
21	6	Interbedded siltstone and shale
27		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted,
5	6	Sandstone, gray, medium-grained, wavy-laminated
6	7	Interbedded shale and siltstone
1	4	Coal
13	8	Interbedded shale and siltstone
11	2	Sandstone, gray, erosional base, medium-grained, festooned, convoluted
3	4	Interbedded shale and siltstone
2	7	Sandstone, gray, medium-grained, wavy-laminated, convoluted
2	4	Interbedded shale and siltstone
9	3	Sandstone, light-gray, erosional base, medium-grained, wavy-laminated, festooned, rooted
	2	Carbonaceous shale
	4	Coal
4	6	Sandstone, gray, medium-grained, wavy-laminated, rippled
	10	Carbonaceous shale
	3	Coal
12	7	Interbedded siltstone and shale
4	8	Sandstone, gray, medium-grained, festooned
	7	Carbonaceous shale

SECTION BM-39--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	6	Coal
2	7	Interbedded shale and siltstone
1	3	Sandstone, gray, medium-grained, rippled
7		Carbonaceous shale
	4	Coal
15	3	Interbedded siltstone and shale
14	10	Sandstone, light-gray, erosional base, medium-grained, wavy-laminated, festooned, convoluted

SECTION BM-40

Measured in sec. 13, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
41		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	7	Sandstone, gray, fine-grained, bleached, rippled
	4	Sandstone, gray, fine-grained, bleached, rippled, burrowed
2	5	Carbonaceous shale
	10	Coal
	3	Carbonaceous shale
1	2	Shale, gray
	8	Sandstone, gray, fine-grained, rippled
	3	Carbonaceous shale
2	6	Coal
	3	Carbonaceous shale
2	1	Shale, gray
3	7	Sandstone, gray, fine-grained, rippled, rooted, burrowed
	2	Carbonaceous shale
2	2	Shale
	7	Carbonaceous shale, coaly

SECTION BM-40--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	6	Sandstone, gray, fine-grained, wavy-laminated, convoluted,
4	3	Siltstone, dark-gray, carbonaceous
	7	Carbonaceous shale, coaly
	4	Coal
	5	Carbonaceous shale, coaly
1	5	Interbedded shale and siltstone
	4	Carbonaceous shale, coaly
27		Sandstone, gray, erosional base, medium-grained, convoluted, festooned,
2	7	Interbedded shale and siltstone
1		Carbonaceous shale
1	1	Coal
2	4	Interbedded shale and siltstone
	4	Carbonaceous shale, coaly
1	11	Coal
4	4	Sandstone, gray, erosional base, medium-grained, convoluted
4	6	Interbedded shale and siltstone
4	1	Sandstone, gray, fine- to medium-grained, wavy-laminated, convoluted
12	6	Interbedded shale, siltstone, and sandstone
	3	Coal
2	7	Siltstone, gray, burrowed

SECTION BM-40--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
13		Sandstone, gray, erosional base, medium-grained, convoluted, rippled, rooted
2	5	Interbedded shale and siltstone
1	10	Sandstone, gray, fine- to medium-grained, rippled, convoluted
3	2	Interbedded shale and siltstone
21		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted; a few shale and siltstone interbeds
8		Interbedded shale and siltstone
2	3	Coal
1	5	Shale, dark-gray
1	2	Sandstone, gray, medium-grained, festooned, convoluted
8		Carbonaceous shale
2	11	Coal
4	3	Sandstone, gray, fine-grained, wavy-laminated, rooted
	3	Carbonaceous shale, coaly
	3	Coal
	2	Carbonaceous shale
1	4	Shale, dark-gray
3	2	Sandstone, light-gray, fine- to medium-grained, festooned, convoluted

SECTION BM-40--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
5	1	Interbedded shale and siltstone
7	3	Sandstone, gray, erosional base, festooned, convoluted, rippled, rooted, burrowed
1		Shale, light-gray
	8	Carbonaceous shale
1	2	Coal
2	7	Sandstone, dark-gray, medium-grained, rippled
1	3	Shale, gray
	5	Coal
	7	Shale, dark-gray
2	8	Sandstone, gray, medium-grained, rippled, burrowed
4	6	Interbedded shale and siltstone,
4	3	Sandstone, gray, fine-grained, wavy-laminated, festooned
5	2	Interbedded shale and siltstone
	4	Coal
	10	Interbedded shale and siltstone
6	3	Sandstone, gray, erosional base, fine- to medium- grained, wavy-laminated, festooned
6	8	Interbedded shale and siltstone
1	7	Sandstone, gray, medium-grained, convoluted, festooned, rippled

SECTION BM-40--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
7		Interbedded shale, siltstone, and sandstone
1	3	Sandstone, gray, fine-grained, rippled, burrowed
	1	Carbonaceous shale
2	7	Coal
	4	Carbonaceous shale, coaly
	6	Coal
	4	Carbonaceous shale, coaly
4	10	Interbedded shale, siltstone, and sandstone
9	7	Sandstone, gray, erosional base, medium-grained, festooned, convoluted
2	4	Shale, light-gray
8	6	Sandstone, light gray, erosional base, medium-grained, festooned, convoluted, rooted
9	4	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rooted
10	6	Interbedded shale, siltstone, and sandstone
2		Carbonaceous shale
5	7	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rooted, burrowed
6	8	Interbedded shale and siltstone
	2	Carbonaceous shale
	10	Coal

SECTION BM-41

Measured in sec. 13, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	2	Carbonaceous shale
	6	Coal
6	2	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rooted
3	6	Coal
1	7	Shale, dark-gray, carbonaceous
3	4	Sandstone, gray, medium-grained, rippled
	6	Shale and siltstone, interbedded
1		Carbonaceous shale
4	7	Interbedded shale and siltstone
1	7	Coal
3	4	Interbedded shale and siltstone
10	3	Sandstone, light-gray, erosional base, medium-grained, wavy-laminated, festooned, rooted
4	4	Interbedded shale and siltstone
	5	Carbonaceous shale
1		Coal
1	5	Interbedded shale and siltstone
	10	Coal
	11	Interbedded shale and siltstone

SECTION BM-41--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
3	1	Coal
6	4	Sandstone, gray, erosional base, medium-grained, wavy-laminated, convoluted, rooted
6	2	Interbedded shale and siltstone
11	3	Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned
3	6	Interbedded shale and siltstone
1	7	Sandstone, gray, medium-grained, rooted
2	8	Interbedded shale and siltstone
9	3	Sandstone, gray, erosional base, fine-grained, wavy-laminated, festooned, burrowed
9	8	Interbedded shale and siltstone
6	4	Sandstone, gray, fine-grained, parallel-laminated, rippled
2	1	Interbedded shale and siltstone
	5	Coal
15		Interbedded shale and siltstone
3	8	Coal
1	5	Sandstone, dark-gray, medium-grained, burrowed, rooted
	8	Coal scour
13	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
10	9	Interbedded shale and siltstone
4	10	Sandstone, gray, erosional base, medium-grained, festooned, rooted

SECTION BM-41--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
6	8	Interbedded shale and siltstone
8	6	Sandstone, gray, erosional base, medium-grained, convoluted, festooned, rooted
29		Interbedded shale, siltstone, and sandstone
	4	Carbonaceous shale
2	10	Coal
	2	Carbonaceous shale
	8	Shale, dark-gray
8	4	Sandstone, gray, erosional base, medium-grained, convoluted, festooned, rooted
10	6	Interbedded shale, siltstone, and sandstone
15	4	Interbedded shale and siltstone
9		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-42

Measured in sec. 12, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	1	Shale, dark-gray, rooted
1	10	Coal
1	3	Shale, dark-gray
3	2	Sandstone, gray, fine-grained, rippled
	10	Coal
7	6	Interbedded shale and siltstone
9	3	Sandstone, fine- to medium-grained, gray, erosional base, festooned
	2	Carbonaceous shale
2	9	Coal
	6	Carbonaceous shale, coaly
	4	Coal
10	2	Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned, rooted
	5	Coal
3	1	Interbedded shale and siltstone
2	1	Sandstone, gray, medium-grained, rippled
3	11	Interbedded shale and siltstone
13		Sandstone, light-gray, erosional base, fine-grained, festooned, rippled
	4	Shale, dark-gray

SECTION BM-42--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	3	Coal
8		Sandstone, gray, erosional base, fine- to medium-grained, festooned, convoluted, rippled, rooted
1	6	Interbedded shale and siltstone
4	2	Sandstone, gray, medium-grained, rippled, rooted
1	2	Shale, gray
	10	Carbonaceous shale
	9	Coal
	6	Shale, dark-gray
4	8	Sandstone, light-gray, medium-grained, wavy-laminated, rooted
7	2	Interbedded shale and siltstone
5	3	Sandstone, light-gray, medium-grained, wavy-laminated, rooted, burrowed
30		Interbedded shale and siltstone

SECTION BM-43

Measured in sec. 12, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
42		Sandstone, light-gray, medium-grained, festooned, burrowed; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	6	Shale, dark-gray, slightly carbonaceous
1	4	Carbonaceous shale
	7	Coal
	4	Carbonaceous shale
	6	Shale, gray
1	5	Interbedded shale and siltstone
3	6	Sandstone, light-gray, medium-grained, parallel-laminated, burrowed
	6	Carbonaceous shale
2	8	Coal
	4	Carbonaceous shale
2	1	Interbedded shale and siltstone
1	10	Sandstone, gray, medium-grained, rippled, rooted
1	7	Interbedded shale and siltstone
2	6	Sandstone, gray, fine- to medium-grained, rippled, burrowed
4	2	Interbedded shale, siltstone, and coal stringers
4	10	Sandstone, gray, medium-grained, wavy-laminated, rooted
	7	Coal
12		Interbedded shale and siltstone
5	7	Sandstone, gray, medium-grained, rippled, rooted

SECTION BM-43--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
3	6	Interbedded shale and siltstone
2	4	Coal
14	9	Interbedded shale and siltstone
	10	Coal
	3	Shale, dark-gray
1	8	Sandstone, dark gray, fine-grained, rippled
1	3	Interbedded shale and siltstone
	2	Carbonaceous shale
8		Interbedded shale and siltstone
3	2	Sandstone, gray, medium-grained, rippled, burrowed, rooted
2	9	Shale, light-gray
4	5	Sandstone, light-gray, erosional base, medium-grained, rooted, festooned, convoluted
1	6	Interbedded shale and siltstone
4	10	Sandstone, gray, fine-grained, wavy-laminated
3	2	Interbedded shale and siltstone
4	6	Sandstone, gray, erosional base, medium-grained, festooned, rippled, rooted
14	6	Interbedded shale and siltstone
8	2	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rooted
1	8	Coal
	4	Carbonaceous shale
10	6	Interbedded shale and siltstone

SECTION BM-43--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	5	Carbonaceous shale
8		Interbedded shale and siltstone
	3	Carbonaceous shale
5	6	Interbedded shale and siltstone
6	3	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted
9	2	Interbedded shale and siltstone
	10	Carbonaceous shale
7	8	Interbedded shale and siltstone
12	3	Sandstone, gray, medium-grained, rooted, rippled, convoluted
10	6	Interbedded shale and siltstone
	2	Carbonaceous shale
5	7	Interbedded shale and siltstone
13	6	Sandstone, light-gray, erosional base, medium-grained, wavy-laminated, festooned
10	4	Interbedded shale and siltstone
2	2	Sandstone, light-gray, medium-grained, rooted, festooned, rippled
5	3	Interbedded shale and siltstone
8	6	Sandstone, gray, fine- to medium-grained, rippled, rooted
11	7	Interbedded shale and siltstone
5	8	Sandstone, gray, erosional base, medium-grained, convoluted, festooned
14	6	Interbedded shale and siltstone
9	6	Sandstone, gray, medium-grained, massive

SECTION BM-44

Measured in sec. 12, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
42		Sandstone, medium-grained, festooned, burrowed; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
5		Coal
41		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted
14	9	Interbedded shale and siltstone
11	3	Sandstone, gray, medium-grained, rippled, convoluted
6	10	Interbedded shale and siltstone
8	3	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted
6	4	Interbedded shale and siltstone
3	3	Sandstone, light-gray, medium-grained, parallel-laminated, festooned, rippled
7	4	Interbedded shale and siltstone
4	4	Sandstone, light gray, fine- to medium-grained, rippled, convoluted, festooned, rooted
7	3	Interbedded shale and siltstone
11	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
4	8	Interbedded shale and siltstone
7	6	Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned, rippled

SECTION BM-44--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
15	3	Interbedded shale and siltstone
3	1	Sandstone, gray, medium-grained, rippled, rooted
4	2	Interbedded shale and siltstone
4	9	Sandstone, light-gray, medium-grained, rooted, convoluted, rippled
7	1	Interbedded shale and siltstone
1	10	Sandstone, light-gray, fine- to medium-grained, rippled
4	10	Interbedded shale and siltstone
4	3	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
6	9	Interbedded shale and siltstone
22		Sandstone, light-gray, erosional base, medium-grained, wavy-laminated, festooned, convoluted, rooted
6	6	Interbedded shale and siltstone
1	2	Sandstone, light-gray, medium-grained, rippled, burrowed
13		Interbedded shale and siltstone
4	3	Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned, rippled
21		Interbedded shale and siltstone
7	8	Sandstone, gray, erosional base, medium-grained, convoluted, festooned, rippled

SECTION BM-45

Measured in sec. 12, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
42		Sandstone, light-gray, medium-grained, festooned, burrowed; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	9	Sandstone, light-gray, medium-grained, rippled, rooted
1	5	Carbonaceous shale, coaly
7	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
	5	Carbonaceous shale
	10	Coal
8	6	Sandstone, light-gray, erosional base, medium-grained, wavy- laminated, festooned, convoluted, rooted
2	1	Interbedded shale and siltstone
	6	Carbonaceous shale
1		Coal
	3	Carbonaceous shale
6	2	Interbedded shale and siltstone
2	9	Sandstone, light-gray, medium-grained, rippled, convoluted, burrowed
10	2	Interbedded shale and siltstone
1	5	Sandstone, light-gray, fine- to medium-grained, rippled, rooted
	3	Carbonaceous shale
	5	Coal

SECTION BM-45--Continued

<u>Thickness</u>		
<u>Feet</u>	<u>Inches</u>	<u>Lithology</u>
5	2	Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned, rooted
8		Interbedded shale and siltstone
8	6	Sandstone, light-gray, erosional base, fine- to medium-grained, convoluted, festooned, rooted; shale and siltstone interbeds
4	9	Interbedded shale and siltstone
1	1	Carbonaceous shale
8	3	Interbedded shale and siltstone
4	10	Sandstone, gray, erosional base, medium-grained, convoluted, festooned, rooted, burrowed
9	1	Interbedded shale and siltstone
2	10	Sandstone, gray, medium-grained, festooned, rooted, burrowed
1	8	Interbedded shale and siltstone
3	2	Sandstone, light-gray, medium-grained, convoluted, wavy-laminated, rooted
3		Sandstone, gray, very fine grained, rippled
27	6	Interbedded shale and siltstone
5	2	Sandstone, gray, fine-grained, wavy-laminated, rooted
2	7	Interbedded shale and siltstone
28		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
29		Interbedded shale and siltstone
3	3	Sandstone, light-gray, fine-grained, rooted, wavy-laminated
2	9	Interbedded shale and siltstone

SECTION BM-45--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
27		Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned, rippled
7	3	Interbedded shale and siltstone
3	2	Sandstone, light-gray, fine-grained, rippled, rooted
3	4	Interbedded shale and siltstone
4	2	Sandstone, light-gray, fine-grained, wavy-laminated, rooted
6	2	Interbedded shale and siltstone
11	6	Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned

SECTION BM-46

Measured in sec. 7, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
6	10	Coal
2	6	Shale, dark-gray, carbonaceous
7		Sandstone, light-gray, erosional base, fine- to medium-grained, festooned, rippled; shale and siltstone interbeds
	3	Carbonaceous shale
5	2	Coal
3	3	Interbedded siltstone and shale
1	2	Coal
1	9	Shale, gray
3		Sandstone, gray, fine- to medium-grained, rippled, festooned, rooted
	3	Carbonaceous shale, coaly
2		Coal
	2	Carbonaceous shale, coaly
2	10	Interbedded shale and siltstone
11	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
	2	Carbonaceous shale
1	2	Coal
1	2	Shale, dark-gray
2	5	Sandstone, gray, fine-grained, rippled, festooned, rooted

SECTION BM-46--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
7		Interbedded shale and siltstone
3	6	Sandstone, gray, medium-grained, festooned, rippled
5	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted
11		Interbedded shale and siltstone
2	3	Coal
4	9	Interbedded shale and siltstone
2	7	Sandstone, light-gray, very fine grained, wavy-laminated, rooted
2	7	Interbedded shale and siltstone
4	2	Sandstone, light-gray, erosional base, medium-grained, festooned, rippled, convoluted, rooted
1	6	Coal
7	2	Interbedded shale and siltstone
8	3	Sandstone, light-gray, erosional base, medium-grained, festooned, rooted
3		Sandstone, gray, medium-grained, rippled, rooted
2	2	Interbedded shale and siltstone
9	6	Sandstone, light-gray, erosional base, medium-grained, festooned, rippled
7	8	Interbedded shale and siltstone
2	4	Sandstone, light-gray, fine-grained, rippled, rooted
1	9	Interbedded shale and siltstone
15		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-46--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
19	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted
	8	Carbonaceous shale
7		Interbedded shale and siltstone
1	8	Sandstone, gray, medium-grained, rippled, rooted
2	3	Shale, dark-gray, carbonaceous
3	5	Sandstone, gray, fine-grained, rooted, burrowed
6	4	Interbedded shale and siltstone
5	2	Sandstone, gray, erosional base, medium-grained, festooned, rooted
4	3	Interbedded shale and siltstone
5	6	Sandstone, gray, medium-grained, massive, rooted
	6	Carbonaceous shale
1	7	Coal
1	2	Carbonaceous shale
10	4	Interbedded shale and siltstone
1	6	Carbonaceous shale
5	3	Interbedded shale and siltstone
4	2	Sandstone, light-gray, medium-grained, rippled, rooted
	3	Carbonaceous shale
17		Interbedded shale and siltstone

SECTION BM-47

Measured in sec. 7, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
BLACKHAHK FORMATION (lower part, measured and described from base to top)		
6		Coal
2		Covered
2	7	Coal
1	10	Carbonaceous shale
1	2	Coal
	3	Carbonaceous shale
2	8	Interbedded shale and siltstone
1	9	Coal
	5	Shale, dark-gray
2	2	Sandstone, light-gray, fine-grained, rippled, rooted
1	8	Coal
2		Interbedded shale and siltstone
4	7	Sandstone, light-gray, wavy-laminated
1		Shale
1	6	Coal
4	8	Interbedded shale and siltstone
27		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
6	6	Interbedded shale and siltstone
18		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-47--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
13		Interbedded shale and siltstone
1	10	Sandstone, light-gray, medium-grained, rippled
5		Interbedded shale and siltstone
	6	Coal
3	8	Interbedded shale and siltstone
1	4	Carbonaceous shale
5	2	Interbedded shale and siltstone
4	2	Sandstone, light-gray, medium-grained, wavy laminated
7	3	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rippled
1	3	Shale, gray
10	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
2	6	Interbedded shale and siltstone
7	3	Sandstone, light-gray, medium-grained, wavy-laminated
24		Interbedded shale and siltstone
	3	Carbonaceous shale
2	7	Sandstone, gray, medium-grained, rippled
3	7	Interbedded shale and siltstone
2	5	Coal
12		Interbedded shale and siltstone, and sandstone
3	4	Sandstone, gray, fine- to medium-grained, wavy-laminated, rooted
15		Interbedded shale and siltstone

SECTION BM-47--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
10	6	Sandstone, light-gray, medium-grained, wavy laminated
30		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-48

Measured in sec. 7, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
46		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
11	10	Coal
	2	Carbonaceous shale
1	8	Shale, dark-gray
2	3	Sandstone, gray, medium-grained, festooned, rippled
3	9	Interbedded shale and siltstone
4	3	Sandstone, gray, fine-grained, wavy-laminated, rooted
4	6	Interbedded siltstone and shale
14	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
	6	Carbonaceous shale
2		Coal
	10	Shale, dark-gray
1	3	Sandstone, light-gray, fine-grained, rippled
15		Interbedded shale and siltstone
1	5	Carbonaceous shale
5	8	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rooted
13	6	Interbedded shale, siltstone, and sandstone
	6	Coal
7	4	Interbedded shale and siltstone

SECTION BM-48--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	3	Sandstone, light-gray, fine-grained, wavy-laminated, rooted
1	7	Shale, light-gray
2	5	Sandstone, light-gray, fine- to medium-grained, rippled, rooted
	7	Carbonaceous shale
	10	Coal
2	6	Sandstone, dark-gray, medium-grained, rippled, rooted
1	8	Interbedded shale and siltstone
2		Sandstone, light-gray, fine-grained, rippled, rooted
1	4	Coal; carbonaceous shale at top and bottom
4	8	Interbedded shale and siltstone
7	6	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, wavy-laminated, rooted
16		Interbedded shale and siltstone
5	3	Sandstone, gray, fine-grained, rippled, rooted
2	4	Coal
1	8	Shale, gray; thin coal stringers,
8	4	Sandstone, gray, medium-grained, rippled, rooted
7		Interbedded shale and siltstone
5	5	Sandstone, light-gray, medium-grained, wavy-laminated
1		Shale, gray
	6	Carbonaceous shale
5	4	Interbedded shale and siltstone
1	9	Sandstone, light-gray, medium-grained, rippled, rooted

SECTION BM-48--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
23		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
15		Shale, siltstone, and sandstone
3	2	Sandstone, gray, medium-grained, convoluted, festooned
4	6	Sandstone, gray, erosional base, medium-grained, festooned, convoluted
3	4	Sandstone, gray, erosional base, fine-grained, festooned, rooted
5	3	Interbedded shale and siltstone
2	7	Sandstone, light-gray, medium-grained, wavy-laminated, rooted
2	3	Shale, light-gray
8		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, burrowed
9	4	Interbedded shale and siltstone
19		Sandstone, gray, erosional base, medium-grained, festooned, wavy-laminated, rooted

SECTION BM-49

Measured in sec. 7, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STARPOINT SANDSTONE		
36		Sandstone, light-gray, medium-grained, festooned, burrowed; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
11	3	Coal
12		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
3	2	Interbedded shale and siltstone
1	4	Siltstone, gray, rooted
	3	Carbonaceous shale
	5	Coal
7	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted
5	6	Interbedded shale and siltstone
2	6	Sandstone, light-gray, fine-grained, rippled
1	2	Shale, gray
5	8	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
3	4	Interbedded shale and siltstone
4	2	Sandstone, light-gray, medium-grained, rippled, rooted
	3	Carbonaceous shale
	4	Coal
	3	Carbonaceous shale
1		Shale, dark-gray

SECTION BM-49--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	8	Sandstone, gray, fine-grained, rippled
25		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
11		Sandstone, light-gray, medium-grained, wavy-laminated, rooted
12		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
2	9	Coal
14	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
9	3	Interbedded shale and siltstone
5	7	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
4	8	Interbedded shale and siltstone, scour
5	6	Sandstone, gray, medium-grained, rippled
28		Interbedded shale and siltstone
2	4	Coal
1	5	Shale, dark-gray
5		Sandstone, gray, fine-grained, rippled
4	7	Sandstone, light-gray, fine-grained, rippled
4	9	Interbedded shale and siltstone; sharp contact
4	6	Sandstone, light-gray, fine- to medium-grained, rippled, rooted
1	9	Shale, light-gray
	5	Coal

SECTION BM-49--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
5	2	Sandstone, light- gray, medium-grained, festooned, rippled
2	7	Interbedded shale and siltstone
5	3	Sandstone, light-gray, medium-grained, rippled, parallel-laminated
7	6	Interbedded shale, siltstone, and sandstone
	4	Carbonaceous shale
30		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-50

Measured in sec. 7, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
50		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	4	Shale, dark-gray, carbonaceous, rooted
9	2	Coal
24		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
2	3	Interbedded siltstone and shale
	7	Coal
2		Shale, dark-gray
3	1	Sandstone, gray, fine-grained, rippled
1	5	Interbedded siltstone and shale
5	6	Sandstone, light-gray, very fine grained, rippled, burrowed
4	3	Interbedded siltstone and shale
6	3	Sandstone, light-gray, fine- to medium-grained, wavy-laminated, rooted
1	6	Coal
2	10	Interbedded shale and siltstone
10	6	Interbedded shale and siltstone
18		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
2	5	Interbedded shale and siltstone
3	6	Sandstone, light-gray, fine- to medium-grained, rippled, rooted
	2	Carbonaceous shale

SECTION BM-50--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	5	Coal
7	1	Interbedded siltstone and shale
6	6	Sandstone, light-gray, fine- to medium-grained, festooned, rippled, rooted
	2	Shale, dark-gray, carbonaceous
1	6	Coal
	5	Carbonaceous shale, coaly
	8	Coal
5	7	Interbedded siltstone and shale
6	10	Sandstone, gray, medium-grained, rippled, rooted
1	6	Shale, light-gray
4	2	Sandstone, light-gray, medium-grained, rippled, rooted
3	4	Interbedded siltstone and shale
3	2	Sandstone, light-gray, fine- to medium-grained, wavy-laminated
6	3	Sandstone, light-gray, erosional base, fine- to medium-grained, massive
17		Interbedded shale, siltstone, and sandstone
3		Sandstone, light-gray, medium-grained, rippled, rooted
21		Interbedded shale and siltstone
2	9	Sandstone, light-gray, medium-grained, rippled, rooted
3	6	Sandstone, gray, bleached, fine- to medium-grained, wavy-laminated
6	6	Interbedded shale and siltstone
1	4	Sandstone, gray, fine-grained, rippled

SECTION BM-50--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
5	8	Sandstone, light gray, medium-grained, rippled, rooted
4		Interbedded siltstone and shale
17	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
7	8	Interbedded shale and siltstone
5	5	Sandstone, light-gray, medium-grained, rippled, rooted
6	10	Interbedded shale and siltstone
2	3	Sandstone, light-gray, medium-grained, wavy laminated, rooted
	10	Interbedded shale and siltstone
2	3	Sandstone, gray, fine- to medium-grained, wavy-laminated, rooted
6		Interbedded shale and siltstone
1	8	Sandstone, light-gray, fine- to medium-grained, rippled, rooted

SECTION BM-51

Measured in sec. 5, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
47		Sandstone, light gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3	10	Coal
	3	Carbonaceous shale, coaly
4	5	Coal
4		Interbedded shale and siltstone
2	5	Sandstone, gray, medium-grained, rippled
1	2	Shale, dark-gray, carbonaceous
2	2	Interbedded shale and siltstone
3	2	Sandstone, light-gray, fine- to medium-grained, rippled
1		Shale, gray
5	7	Sandstone, light-gray, medium-grained, rippled, convoluted, rooted
1	6	Interbedded shale and siltstone
10	6	Sandstone, light-gray, erosional base, medium-grained, festooned, rooted
	10	Coal
4	6	Sandstone, gray, erosional base, medium-grained, festooned
14	9	Interbedded shale and siltstone
3	7	Sandstone, light-gray, fine-grained, wavy-laminated, rooted
9		Interbedded shale and siltstone
2	3	Sandstone, light gray, medium-grained, rippled

SECTION BM-51--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	11	Coal
3	4	Shale, dark-gray
9	6	Sandstone, light-gray, erosional base, fine- to medium-grained, festooned, wavy-laminated, rooted
	2	Shale, dark-gray, carbonaceous, rooted
3	9	Coal
	8	Shale, dark-gray, carbonaceous
6	8	Interbedded shale and siltstone
5	5	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted
7	7	Shale, gray
7	4	Sandstone, light-gray, fine-grained, rippled
1	8	Interbedded shale and siltstone
1	8	Coal
1	8	Interbedded shale and siltstone
2	2	Coal
1	5	Shale, dark gray
10	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
3	6	Interbedded shale and siltstone
1	10	Sandstone, light-gray, very fine grained, rippled
5	2	Interbedded shale and siltstone
	2	Carbonaceous shale
2		Coal

SECTION BM-51--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	1	Interbedded shale and siltstone
6	5	Sandstone, light-gray, fine-grained, rippled, burrowed, rooted
4	2	Interbedded siltstone and shale
1	4	Sandstone, light-gray, fine-grained, rippled
23		Interbedded shale and sandstone
35		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-52

Measured in sec. 5, T. 19 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
48		Sandstone, light gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
10	3	Coal
2	4	Sandstone, gray, medium-grained, rippled, burrowed
17		Interbedded shale and siltstone
4		Shale, gray
2	6	Siltstone, gray, rippled, burrowed
1	3	Sandstone, gray, fine- to medium-grained, rippled, parallel-laminated
1	8	Sandstone, gray, fine-grained, silty, wave-laminated
2	7	Shale, dark-gray, carbonaceous
5	4	Sandstone, gray, medium-grained, wavy-laminated, rooted
7	3	Interbedded shale and siltstone
4	7	Sandstone, light-gray, fine- to medium-grained, rippled, wavy laminated
10	3	Interbedded shale and siltstone
1	5	Carbonaceous shale
2	7	Sandstone, gray, fine-grained, rippled
8	6	Interbedded shale and siltstone
	10	Sandstone, gray, fine-grained, rippled
1	5	Coal
13		Interbedded shale and siltstone

SECTION BM-52--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
53		Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
2		Interbedded shale and siltstone
6	3	Sandstone, gray, medium-grained, rippled, burrowed
4	6	Interbedded shale and siltstone
18	6	Sandstone, light-gray, erosional base, medium-grained, parallel-laminated, rippled, wavy-laminated
11		Interbedded shale and siltstone
12	8	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
14		Interbedded shale and siltstone
6	4	Sandstone, gray, fine-grained, rippled, wavy-laminated
1	9	Shale, gray
8	4	Sandstone, gray, fine-grained, wavy-laminated
37		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-53

Measured in sec. 33, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
70		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3	2	Coal
	8	Shale, gray
3		Sandstone, gray, fine-grained, rippled, rooted
	10	Coal
1	1	Carbonaceous shale
7	6	Interbedded shale and siltstone
4	9	Sandstone, gray, fine-grained, rippled, wavy-laminated
18		Interbedded shale, siltstone, and sandstone
26		Sandstone, light-gray, erosional base, fine- to medium-grained, festooned, convoluted, rippled
12		Siltstone, gray, burrowed
73		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
4	9	Interbedded shale and siltstone
5	3	Sandstone, gray, medium-grained, rippled
6	4	Interbedded shale and siltstone
2	8	Siltstone, gray, rooted
24		Interbedded shale and siltstone
4	2	Sandstone, gray, fine-grained, rippled
17	6	Sandstone, gray, erosional base, fine- to medium-grained, festooned, rippled

SECTION BM-53--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
17	6	Sandstone, gray, erosional base, fine- to medium-grained, festooned, rippled
11	6	Interbedded shale and siltstone
5	10	Sandstone, gray, fine-grained, rippled, rooted, burrowed
3	7	Sandstone, gray, fine-grained, wavy-laminated, rippled, rooted
	6	Carbonaceous shale
1	1	Coal
2	4	Shale, gray
7	2	Sandstone, fine-grained, rippled
5	3	Sandstone, gray, medium-grained, wavy-laminated, convoluted, rooted
6	6	Interbedded shale and siltstone
37		Sandstone, light-gray, erosional base, medium-grained, wavy-laminated, festooned, convoluted, rippled

SECTION BM-54

Measured in sec. 28, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
71		Sandstone, gray, medium-grained, festooned, burrowed; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	49	Carbonaceous shale
1	2	Coal
	7	Shale, coal, carbonaceous
9	8	Coal
	4	Carbonaceous shale
2	5	Interbedded shale and siltstone
4	8	Sandstone, gray, fine- to medium-grained, wavy-laminated, irregularly rippled, rooted
	6	Shale, carbonaceous
4	2	Interbedded shale and siltstone
1	8	Interbedded siltstone and shale
2	8	Sandstone, gray, very fine grained, limy, festooned, wavy-laminated
1	6	Interbedded shale and siltstone
4	7	Sandstone, light-gray, erosional base, medium-grained, festooned, rooted
	3	Carbonaceous shale
1		Coal
4	9	Sandstone, light-gray, fine- to medium-grained, parallel-laminated; contains 3-in.-thick shale and siltstone partings

SECTION BM-54--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4	5	Interbedded shale and siltstone
1		Coal
2	11	Sandstone, gray, medium-grained, rippled, wavy-laminated
5	7	Interbedded shale and siltstone
8	2	Sandstone, gray, fine-grained, limy, rippled, rooted
2	2	Interbedded shale and siltstone
5		Coal
4	4	Interbedded shale and siltstone
3	2	Sandstone, gray, fine-grained, parallel-laminated, rippled
5	8	Interbedded shale and siltstone
7	8	Sandstone, light-gray, medium-grained, wavy-laminated, rippled
10		Sandstone, light-gray, erosional base, medium-grained, wavy-laminated
15		Interbedded shale and siltstone
4	4	Sandstone, gray, very fine grained, rippled, parallel-laminated
8	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
3	6	Interbedded shale and siltstone
4	9	Sandstone, light-gray, medium-grained, festooned, rippled, convoluted, rooted
24	6	Sandstone, light-gray, erosional base, fine- to medium-grained, festooned, rippled; contains shale and siltstone interbeds
3	5	Interbedded shale and siltstone
3	5	Siltstone, gray, rippled, limy

SECTION BM-54--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
6	3	Interbedded shale and siltstone
4	7	Sandstone, gray, medium-grained, rippled, parallel-laminated
3	8	Interbedded shale and siltstone
3	2	Sandstone, light-gray, fine- to medium-grained, festooned, rippled
4	6	Interbedded shale and siltstone
2	8	Sandstone, light-gray, medium-grained, parallel-laminated, rippled
11		Interbedded shale and siltstone
2		Sandstone, light-gray, fine- to medium-grained, rippled, burrowed, rooted
5	6	Interbedded shale and siltstone
1	4	Sandstone, gray, fine-grained, rippled
2	8	Interbedded shale and siltstone
39		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rooted

SECTION BM-55

Measured in sec. 21, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
80		Sandstone, gray, medium-grained, festooned, rooted; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	3	Coal
	2	Carbonaceous shale
1	2	Shale, gray
1	7	Siltstone, gray, rooted
	3	Carbonaceous shale
	2	Coal
5	8	Sandstone, gray, erosional base, fine-grained, festooned, rippled
5		Interbedded shale and siltstone
12	3	Sandstone, gray, erosional base, fine-grained, festooned, rippled, wavy-laminated
	7	Carbonaceous shale
2	10	Interbedded shale and siltstone
4	2	Sandstone, gray, erosional base, very fine grained, festooned, convoluted, wavy-laminated
6	3	Interbedded shale and siltstone
8		Interbedded shale and siltstone
27		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
1	2	Carbonaceous shale

SECTION BM-55--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
19		Interbedded shale and siltstone
4	2	Sandstone, gray, medium-grained, rippled, burrowed, festooned
17	6	Interbedded shale and siltstone
9	6	Sandstone, gray, erosional base, fine- to medium-grained, festooned, convoluted, rippled
6	3	Sandstone, gray, medium-grained, wavy-laminated, convoluted,
12		Interbedded shale and siltstone
1	5	Coal
6	6	Interbedded shale and siltstone
38	6	Sandstone, light-gray, erosional base, medium-grained, rippled, convoluted, festooned
18		Interbedded shale and siltstone
23		Sandstone, light-gray, erosional base, medium-grained, rippled, convoluted, festooned
7	2	Interbedded shale and siltstone
38	8	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled, wavy-laminated

SECTION BM-56

Measured in sec. 20, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
125		Sandstone, gray, medium-grained, festooned, rooted; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	4	Carbonaceous shale
2	8	Coal
5	3	Interbedded shale and siltstone
6		Sandstone, light-gray, erosional base, fine-grained, rippled, festooned, convoluted
15	6	Interbedded shale and siltstone
19		Sandstone, light-gray, erosional base, medium-grained, convoluted, festooned
14		Interbedded shale and siltstone
22		Sandstone, light-gray, erosional base, fine-grained, festooned, wavy-laminated
19	6	Interbedded shale, siltstone, and sandstone
27		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
5	7	Interbedded shale and siltstone
5	2	Sandstone, gray, fine- to medium-grained, wavy-laminated, rippled
2	7	Shale, dark-gray, carbonaceous
12	6	Sandstone, gray, fine-grained, rippled, wavy-laminated
1	9	Shale, gray

SECTION BM-56--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	7	Sandstone, gray, very fine grained, rippled
17		Interbedded shale, siltstone, and sandstone
2	3	Shale, gray
3	8	Sandstone, gray, fine-grained, rippled
27		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
1	8	Carbonaceous shale
	11	Coal
19	4	Interbedded shale and siltstone
10		Sandstone, light-gray, erosional base, medium-grained, festooned, rippled

SECTION BM-57

Measured in sec. 17, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
80		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2	7	Interbedded siltstone, sandstone, and shale
	7	Coal
2	3	Sandstone, gray, fine-grained, rooted
1	2	Shale
	10	Coal
3	9	Interbedded shale, siltstone, and sandstone
	6	Carbonaceous shale
1	10	Coal
	4	Carbonaceous shale
31		Interbedded shale, siltstone, and sandstone
12	6	Sandstone, gray, erosional base, fine-grained, festooned, rippled
12		Interbedded shale and siltstone
27	6	Sandstone, light-gray, erosional base, fine-grained, festooned, convoluted, rippled
6	4	Interbedded shale and siltstone
16		Sandstone, gray, erosional base, medium-grained, festooned, convoluted
5	6	Interbedded shale and siltstone
4	9	Sandstone, gray, fine- to medium-grained, wavy-laminated, convoluted

SECTION BM-57--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
24		Interbedded siltstone and sandstone
1	1	Coal
26		Sandstone, gray, erosional base, medium-grained, festooned, convoluted
32		Interbedded siltstone and sandstone, fine-grained
	7	Coal
16		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
11	6	Interbedded shale and siltstone
13		Sandstone, light-gray, erosional base, fine- to medium-grained, festooned, convoluted, wavy-laminated, rooted
1	3	Carbonaceous shale
5	10	Interbedded shale and siltstone
19		Sandstone, gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-58

Measured in sec. 7, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	4	Carbonaceous shale
1	3	Coal
1	2	Shale, dark-gray
3	8	Sandstone, gray, fine-grained, rippled
5	9	Interbedded shale and siltstone
10	7	Sandstone, gray, erosional base, medium-grained, festooned
4	3	Interbedded shale and siltstone
13		Sandstone, gray, erosional base, medium-grained, festooned, wavy-laminated, convoluted, rippled
7		Interbedded shale and siltstone
8	6	Sandstone, gray, medium-grained, wavy-laminated
17		Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rippled, rooted
	10	Coal
1	4	Interbedded siltstone and shale
	6	Carbonaceous shale
37		Sandstone, gray, medium-grained, festooned, convoluted
	7	Interbedded shale and siltstone
12	6	Sandstone, gray, erosional base, medium-grained, festooned, convoluted
10	3	Covered
18		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-58--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
11		Covered
12	9	Sandstone, gray, medium-grained, wavy-laminated, rippled, rooted
10	5	Interbedded shale and siltstone
8	9	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
23		Interbedded shale and siltstone
32		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-59

Measured in sec. 18, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
80		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	10	Shale
	5	Carbonaceous shale
16		Covered
17		Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rippled
10	2	Interbedded shale and siltstone
	1	Carbonaceous shale
2	1	Coal
27		Sandstone, light-gray, erosional base, medium-grained, rippled, convoluted, festooned
6	3	Interbedded shale and siltstone; carbonaceous shale stringers at lowermost part
6	9	Sandstone, gray, fine-grained, wavy-laminated, festooned
15	6	Interbedded shale and siltstone
34		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
12		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
7	8	Interbedded shale and siltstone
13	6	Sandstone, light-gray, erosional base, fine-grained, wavy-laminated, festooned, rooted

SECTION BM-59--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
6	9	Interbedded shale and siltstone
4	2	Sandstone, light-gray, fine- to medium-grained, festooned, rooted
14		Interbedded shale and siltstone
6	9	Sandstone, light-gray, fine- to medium-grained, rippled, festooned, convoluted, wavy-laminated
14	10	Interbedded shale and siltstone
6	6	Sandstone, light-gray, fine-grained, rippled
1	10	Siltstone, gray, rippled, limy
10	3	Interbedded shale and siltstone
	8	Coal
15		Interbedded shale and siltstone
8	4	Sandstone, gray, fine- to medium-grained, rippled

SECTION BM-R

Measured in sec. 12, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
10		Sandstone, gray, fine-grained, festooned, rippled; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	13	Siltstone, gray
1	6	Carbonaceous shale
3	2	Sandstone, gray, erosional base, medium-grained, burrowed; contains oyster fossils
1	4	Shale, gray
	4	Shale, silty, burrowed
1	5	Coal
4	3	Covered
2	2	Siltstone, gray, burrowed
1	1	Carbonaceous shale, coaly
	3	Coal
15		Sandstone, gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-S

Measured in sec. 12, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
10		Sandstone, gray, medium-grained, festooned, burrowed; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	5	Carbonaceous shale
2	7	Sandstone, light-gray, erosional base, medium-grained, festooned, burrowed; contains oyster fossils
	9	Shale, burrowed, gray
	7	Sandstone, rippled, gray, fine- to medium-grained
	4	Carbonaceous shale
	5	Coal
27		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled

SECTION BM-W

Measured in sec. 12, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
10	10	Sandstone, light-gray, fine-grained, festooned, burrowed; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	7	Sandstone, gray, very fine grained, rippled
1	7	Carbonaceous shale
20		Sandstone, light-gray, medium-grained, festooned, rooted
1	6	Coal
	8	Interbedded shale and siltstone
4	9	Sandstone, light-gray, fine-grained, rippled, burrowed
47	6	Covered
55		Sandstone, gray, erosional base, medium-grained, festooned, convoluted

SECTION BM-X

Measured in sec. 12, T. 18 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
125		Sandstone, light-gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
5	5	Coal
2	2	Carbonaceous shale
18		Sandstone, splay, erosional base, fine- to medium-grained, festooned, convoluted, rippled, rooted; shale and siltstone interbeds
	10	Coal
12		Interbedded shale and siltstone
3	4	Sandstone, light-gray, medium-grained, festooned, rooted
16	5	Interbedded shale and siltstone
6	6	Coal
8	6	Interbedded shale and siltstone
6	3	Interbedded siltstone and sandstone
11		Interbedded shale and siltstone
25	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
	6	Carbonaceous shale
1	8	Coal

SECTION BM-X--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	10	Shale, dark-gray
7	6	Sandstone, light-gray, erosional base, medium-grained, festooned, rippled; shale and siltstone interbeds
5	3	Interbedded shale and siltstone
3	5	Sandstone, light-gray, fine-grained, wavy-laminated, rooted
1	6	Interbedded shale and siltstone
2	8	Sandstone, light-gray, fine-grained, wavy-laminated, rooted
4	7	Sandstone, gray, fine- to medium-grained, rippled
11		Interbedded shale and siltstone
6	10	Sandstone, light-gray, fine- to medium-grained, rippled
6	8	Interbedded shale and siltstone
5	6	Sandstone, gray, fine-grained, rippled, convoluted, rooted
	4	Carbonaceous shale
3	2	Interbedded shale and siltstone
13		Sandstone, light-gray, erosional base, medium- to coarse-grained, festooned, rooted
7	6	Interbedded shale and siltstone
8	6	Sandstone, light-gray, medium-grained, festooned, rooted
8	10	Interbedded shale and siltstone
2	2	Sandstone, light-gray, fine-grained, rippled, burrowed
12		Interbedded shale and siltstone
6	3	Sandstone, light-gray, erosional base, medium-grained, festooned, rooted, burrowed
10	3	Interbedded shale, siltstone, and sandstone
2	3	Sandstone, gray, fine-grained, rippled, rooted

SECTION BM-Y

Measured in sec. 12, T. 18 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
52		Sandstone, light-gray, medium-grained, festooned, rooted; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	8	Coal
3	2	Interbedded shale and siltstone
1	9	Sandstone, light-gray, very fine grained, rippled
	13	Carbonaceous shale
	18	Sandstone, light-gray, erosional base, medium-grained, festooned, rooted
	14	Carbonaceous shale
6		Interbedded shale and siltstone
8	8	Sandstone, gray, erosional base, fine- to medium-grained, festooned, convoluted
7		Interbedded shale and siltstone
13	9	Sandstone, light-gray, erosional base, medium-grained, festooned, rippled
25		Sandstone, light-gray, erosional base, medium-grained, festooned, rippled
31		Interbedded shale and siltstone
	6	Shale, light-gray
	3	Carbonaceous shale
19		Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rooted

SECTION BM-Y--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	6	Shale, gray
4	3	Sandstone, gray, medium-grained, rippled
3	5	Siltstone, gray, rippled
	6	Shale, gray
5	6	Sandstone, gray, fine- to medium-grained, rippled
	4	Shale, gray
2	10	Sandstone, gray, medium-grained, convoluted, rippled
1	9	Shale, gray
10	4	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
3	6	Sandstone, gray, fine-grained, wavy-laminated
1	10	Interbedded shale and siltstone
2	11	Sandstone, gray, fine-grained, rippled
5	3	Interbedded shale and siltstone
4	9	Sandstone, gray, fine- to medium-grained, rippled
11		Interbedded shale and siltstone
1	5	Coal
5	7	Interbedded shale and siltstone
	12	Carbonaceous shale
2	3	Shale, dark-gray
25		Sandstone, gray, erosional base, medium-grained, festooned, convoluted, rippled
7	8	Interbedded shale and siltstone
	6	Carbonaceous shale

SECTION BM-Y--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
10	6	Interbedded shale and siltstone
	10	Carbonaceous shale
12	9	Interbedded shale and siltstone
6	5	Sandstone, gray, erosional base, fine- to medium-grained, festooned, convoluted, rippled
2	6	Interbedded shale and siltstone
2		Sandstone, gray, fine-grained, rippled, rooted
3	2	Shale, gray
6	6	Sandstone, gray, fine-grained, rippled, rooted
8	9	Interbedded shale and siltstone
8	3	Sandstone, gray, medium-grained, festooned, wavy-laminated
2	9	Interbedded shale and siltstone
2	3	Sandstone, gray, medium-grained, rippled
1	9	Sandstone, gray, medium-grained, rippled

SECTION BM-Z

Measured in sec. 6, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
50		Sandstone, gray, medium-grained, festooned; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
	4	Interbedded shale, siltstone, and sandstone
25	6	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
11	8	Sandstone, gray, medium-grained, rippled, festooned
10		Sandstone, light-gray, erosional base, medium-grained, festooned, rippled
21		Interbedded sandstone, shale, and siltstone
2	4	Sandstone, gray, medium-grained, rippled
1	8	Interbedded shale and siltstone
3	2	Sandstone, gray, medium-grained, rippled
4	4	Interbedded shale and siltstone
9	6	Interbedded shale and siltstone
15	4	Sandstone, gray, medium-grained, rippled, convoluted
23		Interbedded shale and siltstone
7	5	Sandstone, gray, erosional base, medium-grained, festooned, convoluted, burrowed

SECTION Z

Measured in sec. 6, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1	9	Coal
	4	Carbonaceous shale
4	9	Sandstone, gray, fine-grained, wavy-laminated, festooned
2	7	Interbedded shale and siltstone
	7	Carbonaceous shale
	4	Carbonaceous shale, coaly
3	2	Sandstone, gray, medium-grained, wavy-laminated
	9	Carbonaceous shale
	8	Coal
4	5	Shale and siltstone, interbedded
5	3	Sandstone, gray, medium-grained, wavy-laminated, festooned, rippled
13		Sandstone, gray, fine-grained, rippled
27		Interbedded shale and siltstone
16		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
9	8	Interbedded shale and siltstone
16	5	Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
12	6	Interbedded shale and siltstone
2	3	Siltstone, gray, rippled

SECTION DS-1

Measured in sec. 12, T. 18 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
65		Sandstone, fine-grained, festooned, burrowed; silty uppermost part
15		Sandstone, fine- to medium-grained, festooned, convoluted
50		Sandstone, erosional base, fine- to medium-grained, festooned, planar-crossbedded, clay-clast, lag deposit
45		Sandstone, erosional base, medium-grained, festooned, convoluted, ripple-laminated, bleached
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
7		Coal
2		Shale
3		Sandstone, fine- to medium-grained, festooned, rippled, burrowed
5		Shale, silty
3	6	Interbedded shale and siltstone
	4	Coal
2		Interbedded shale and siltstone
	8	Shale
2	8	Coal
3	6	Sandstone, very fine grained, convoluted, rippled
3		Interbedded shale and sandstone
	4	Coal
2		Interbedded shale and siltstone

SECTION DS-1--Continued

Thickness		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
3		Sandstone, very fine grained, rippled
	2	Shale
1		Coal
	2	Shale
6		Sandstone, erosional base, fine- to medium-grained, festooned, convoluted, rippled
8		Interbedded siltstone and shale
	4	Coal
2		Interbedded siltstone and shale
	2	Coal
7	10	Interbedded siltstone and shale
1		Coal
6		Siltstone, rippled, bioturbated, rooted, bleached
2		Interbedded siltstone and shale
3		Siltstone, rippled
4		Interbedded siltstone and shale
2	6	Sandstone, very fine grained to fine-grained, convoluted, rippled, rooted

SECTION DS-2

Measured in sec. 28, T. 18 S., R. 7 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
12		Coal
8		Interbedded siltstone and shale
8		Siltstone, very fine ripple laminations
3		Interbedded siltstone and shale
25		Sandstone, erosional base, fine- to medium-grained, festooned, rippled, convoluted
40		Interbedded siltstone and shale
7		Siltstone, shaly, rippled
20		Interbedded siltstone and shale
14		Sandstone, silty, fine- to medium-grained, rippled
25	8	Interbedded siltstone and shale
10	8	Sandstone, erosional base, fine- to medium-grained, festooned, rippled, rooted
4		Interbedded siltstone and shale
1		Coal
5		Siltstone, rippled
3	8	Shale
	3	Coal
15	8	Sandstone, erosional base, fine- to medium-grained, festooned, convoluted, rippled
3		Shale
10		Siltstone, shaly, rippled

SECTION DS-2--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2	6	Sandstone, fine- to medium-grained, rippled, burrowed
7		Shale, carbonaceous
5		Siltstone, rippled
15		Interbedded siltstone and shale
1		Sandstone, fine- to medium-grained, rippled
5		Interbedded siltstone and shale
1		Coal
2		Siltstone, rippled
6		Interbedded siltstone and shale
	7	Coal

SECTION RF-1

Measured in sec. 11, T. 18 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4		Sandstone, medium-grained, festooned; base not exposed
40		Sandstone, gray, erosional base, medium-grained, festooned, convoluted
4		Siltstone, gray, rooted
1	10	Coal
	6	Shale, gray, silty
3	6	Sandstone, gray, fine-grained, gradational base, rippled, rooted
2	3	Coal
	6	Siltstone, gray
20		Sandstone, gray, gradational base, fine-grained, rippled
8		Sandstone, gray, erosional base, fine-grained, festooned, convoluted
	8	Siltstone, gray, rooted
3	10	Coal
1	2	Siltstone, gray, rippled
20		Interbedded sandstone, siltstone, and shale
3	6	Siltstone, gray, rooted
1	1	Coal
3	8	Shale, silty, gray
	3	Carbonaceous shale
1	10	Sandstone, gray, fine-grained, rooted
1	1	Shale

SECTION RF-1--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
10		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
4		Siltstone, gray, rooted, carbonaceous
	6	Coal
1	2	Siltstone, gray, shaly, rippled
1		Siltstone, gray
2	4	Sandstone, gray, fine-grained, rippled, convoluted, rooted
3	6	Siltstone, dark-gray, carbonaceous, rooted
	2	Coal
	8	Carbonaceous shale
3		Siltstone, shaly, gray
4	10	Sandstone, gray, fine-grained, rippled
1		Siltstone, shaly, rippled
1		Sandstone, gray, fine-grained, rippled
1	3	Siltstone, gray, shaly
11		Sandstone, gray, fine-grained, rippled, festooned, rooted
3		Siltstone, gray, rooted
3	6	Coal
2	6	Covered
1		Coal
6		Siltstone, gray, shaly
1	10	Sandstone, gray, fine-grained, rippled
1		Carbonaceous shale
4		Siltstone, gray, shaly

SECTION RF-1--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
4		Sandstone, gray, fine-grained, rippled
1	7	Siltstone, gray, rooted
	3	Carbonaceous shale
2		Coal
2	6	Sandstone, gray, fine-grained, rippled
	8	Siltstone, gray
5	3	Siltstone, gray, rippled
1	6	Siltstone, gray
6		Sandstone, gray, fine-grained, rippled, convoluted
3		Siltstone, gray, rooted
	8	Siltstone, dark-gray, carbonaceous
1	3	Coal
	5	Shale, dark-gray
5		Sandstone, light-gray, fine-grained, rippled, convoluted
	4	Siltstone, gray, rippled
9		Sandstone, light-gray, fine-grained, rippled
	6	Siltstone, gray, rooted
	1	Carbonaceous shale
25		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
2		Siltstone, dark-gray, carbonaceous
3		Siltstone, gray
1	6	Sandstone, rippled
4		Siltstone, gray, rippled

SECTION RF-1--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
2		Siltstone, gray, rooted
	5	Coal
48		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
10		Covered
20		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled

SECTION RF-2

Measured in sec. 11, T. 18 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
3	6	Siltstone, dark-gray, carbonaceous, rooted
	5	Coal
	6	Carbonaceous shale
1	3	Coal
	6	Carbonaceous shale
	3	Coal
1	6	Siltstone, gray, rooted
	3	Shale, gray, rooted
2	6	Coal
	4	Carbonaceous shale
14		Sandstone, gray, fine-grained, rippled, rooted
	8	Siltstone, carbonaceous, coaly
	4	Coal
3		Interbedded shale and siltstone, rooted
3	4	Coal
	4	Carbonaceous shale
2	3	Coal
	4	Siltstone, dark-gray, carbonaceous
8	6	Covered
	3	Carbonaceous shale
1		Siltstone, dark-gray
1	6	Sandstone, gray, fine-grained, rippled
1	3	Siltstone, gray, rippled

SECTION RF-2--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	5	Carbonaceous shale
1	6	Siltstone, gray, sandy to carbonaceous
1		Sandstone, light-gray, fine-grained, rippled
3	6	Siltstone, sandy
4	2	Sandstone, light-gray, fine-grained, rippled, rooted
	2	Carbonaceous shale
1	4	Siltstone, gray, sandy
	8	Siltstone, gray, shaly
	3	Carbonaceous shale
	4	Shale, siltstone
	3	Coal
	6	Siltstone
6	6	Sandstone, gradational base, fine-grained, rippled, convoluted
2	6	Siltstone, upper part (6-in. thick), rippled
3	6	Sandstone, rippled, fine-grained, gradational base
2	6	Sandstone, rippled, fine-grained, gradational base
5		Siltstone
	1	Sandstone, gray, fine-grained, rippled, rooted
	3	Siltstone, gray, rooted
1		Carbonaceous shale
1		Carbonaceous shale
1		Siltstone, gray, shaly
1		Sandstone, gray, fine-grained, rooted
	4	Siltstone, gray, rooted

SECTION RF-2--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	1	Carbonaceous shale
	3	Coal
6		Sandstone, light-gray, fine-grained, rippled, convoluted
1		Shale, gray, carbonaceous
1	3	Sandstone, gray, fine-grained, rooted
1		Siltstone, gray, rooted
	1	Carbonaceous shale
	2	Shale, gray
	8	Carbonaceous shale
	10	Siltstone
4		Sandstone, gray, fine-grained, rippled, rooted
1	2	Shale, dark-gray, carbonaceous
	2	Coal
	6	Siltstone, dark-gray
3		Sandstone, gray, very fine grained, rippled
	1	Siltstone, gray, rooted
3	6	Sandstone, gray, very fine grained, rippled, rooted
	8	Coal
10		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
1	2	Siltstone, gray, rippled
	1	Carbonaceous shale
	3	Siltstone, gray, rooted
	4	Carbonaceous shale, coaly

SECTION RF-2--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
3	6	Siltstone, gray, rippled
5		Sandstone, gray, fine-grained, rippled
2	10	Coal
1		Siltstone, gray, rippled
1	3	Sandstone, gray, fine-grained, rippled
3		Siltstone, gray, rippled
2		Limestone, gray, micritic
1		Shale, gray
	6	Carbonaceous shale
5	6	Siltstone, gray, shaly
	6	Limestone, gray
5		Siltstone, gray, rippled
2		Sandstone, gray, fine-grained, rippled, rooted
	3	Carbonaceous shale
2		Coal
2		Siltstone, gray, rippled
3		Sandstone, light-gray, fine-grained, rippled
2	6	Siltstone, gray
3	1	Sandstone, light-gray, fine-grained, rippled
10		Interbedded sandstone and siltstone; contains carbonaceous shale lenses and root marks
	3	Carbonaceous shale
1	6	Coal
	8	Siltstone, dark-gray, carbonaceous

SECTION RF-2--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
1	4	Siltstone, gray, rippled
8	6	Sandstone, light-gray, fine-grained, rippled, convoluted
	8	Shale, gray
1		Siltstone, gray, rippled
6	6	Sandstone, light-gray, fine-grained, rippled, convoluted
	4	Shale, gray, silty
	1	Carbonaceous shale
27		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted, rippled
3	6	Siltstone, gray, rooted
	10	Coal
3	6	Sandstone, light-gray, fine-grained, rippled, rooted, silty lowermost 6-in.
	6	Coal
95		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted; contains siltstone interbeds

SECTION RF-3

Measured in sec. 12, T. 18 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
45		Sandstone, gray, erosional base, medium-grained, festooned, convoluted
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
1		Siltstone, gray, rooted
	2	Coal
1		Siltstone, gray, rippled
2	6	Sandstone, gray, fine-grained, rippled
1		Siltstone, gray, shaly
2		Shale, gray, silty
	4	Carbonaceous shale
35		Covered
44		Sandstone, light-gray, medium-grained, festooned, convoluted, rippled; base not exposed
3	6	Siltstone, gray, carbonaceous
3	6	Siltstone, gray, limy, rippled, burrowed
1		Shale, gray, silty
	1	Clinker
2		Shale, gray, limy
7		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted
4	2	Siltstone, gray, limy, rippled
	3	Siltstone, gray, shaly, carbonaceous
1	6	Siltstone, gray, burrowed

SECTION RF-3--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
7		Limestone, muddy; abundant plant fragments
	6	Shale, gray
	9	Sandstone, light-gray, erosional base, medium-grained, lag deposit, festooned, convoluted
6	6	Shale, gray, silty, limy
	6	Ironstone, reddish-brown
2	8	Shale, gray, silty
7		Siltstone, sandy, gray, limy, rippled, Fe layers
110		Sandstone, light-gray, erosional base, medium-grained, festooned, convoluted; contains siltstone interbeds
3	6	Siltstone, gray, rippled
3		Clinker
4		Sandstone, light-gray, fine-grained, rippled
1	6	Siltstone, gray, rippled
1	6	Sandstone, light-gray, fine-grained, rippled
3		Siltstone, gray, rippled
3		Siltstone, gray, shaly
2		Sandstone, light-gray, fine-grained, rippled
8		Siltstone, gray, rippled
3		Sandstone, gray, fine-grained, rippled
4		Siltstone, gray, rippled, burrowed
4		Siltstone, gray, sandy, rippled

SECTION RF-4

Measured in sec. 31, T. 19 S., R. 6 E.

Thickness		
<u>Feet</u>	<u>Inches</u>	<u>Lithology</u>
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
80		Sandstone, gray, festooned, rippled, rooted; base not exposed
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
4	3	Coal
3	6	Siltstone, dark-gray, sandy, carbonaceous, rooted
1	11	Carbonaceous shale
1	7	Coal
	8	Shale, dark-gray, carbonaceous
1	4	Sandstone, gray, fine-grained, rippled
13		Siltstone, gray, sandy, rooted
2		Coal
	8	Shale, dark-gray, rooted
	8	Coal
	7	Shale, gray, silty
17	6	Sandstone, gray, erosional base, medium-grained, convoluted, festooned
9	6	Siltstone, sandy, rooted
1	8	Coal
8	5	Sandstone, gray, rippled, fine-grained
11		Siltstone, gray, shaly
	3	Siltstone, dark-gray, carbonaceous, rooted

SECTION RF-4--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	11	Coal
	6	Siltstone, gray
4		Sandstone, gray, fine-grained, rippled
9	6	Siltstone, light-gray
	2	Carbonaceous shale
1	6	Shale, gray
	3	Carbonaceous shale
10		Siltstone, light-gray
3	10	Sandstone, gray, convoluted, festooned
12		Siltstone, gray, sandy
	3	Carbonaceous shale, coaly
2		Shale, silty
15		Sandstone, erosional base, medium-grained, festooned, convoluted
5		Shale, gray, silty
5		Sandstone, gray, fine-grained, rippled
2	6	Shale, gray
3		Sandstone, gray, fine-grained, rippled
5		Shale, gray, silty
3		Sandstone, gray, fine-grained, rippled

SECTION RF-5

Measured in sec. 30, T. 19 S., R. 6 E.

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
STAR POINT SANDSTONE (upper part, measured and described from base to top)		
80		Sandstone, festooned lower 60 ft, crossbeds rippled, subparallel laminated upper part, bleached
BLACKHAWK FORMATION (lower part, measured and described from base to top)		
2		Coal
4		Siltstone, sandy
1		Carbonaceous siltstone, coaly, partly burned
5		Sandstone, gradational base, fine-grained, rippled
13		Covered
2		Sandstone, rooted, fine-grained
	3	Carbonaceous
2	3	Coal
	6	Shale
	5	Coal
	10	Siltstone
13		Sandstone, erosional base, medium-grained, convoluted, festooned, rippled upper 3 ft
3	6	Shale, gray
	1 1/2	Carbonaceous siltstone
1	6	Shale
	6	Sandstone, rippled, fine-grained, gradational base
3		Shale, silty, gray
	5	Carbonaceous shale
	8	Coal

SECTION RF-5--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	6	Carbonaceous siltstone
2	6	Shale
	2	Carbonaceous siltstone, coaly
3		Shale, silty
3	6	Partly covered, festooned
	2	Carbonaceous siltstone
	7	Coal
1		Siltstone
1		Sandstone, gradational base, rippled
1		Shale
	1	Carbonaceous shale
1		Siltstone
1	2	Sandstone, gradational base, rippled
1	1	Carbonaceous shale, some coal stringers
2	6	Siltstone
4		Sandstone, gradational base, rippled, fine-grained
5		Siltstone, sandy, carbonaceous, shaly upper 1 ft
	3	Coal lenses (of whatever eroded)
42		Sandstone, erosional base, fine-grained, convoluted, rippled, upper 5 ft
30		Covered
4		Sandstone, rippled, fine-grained
2		Shale

SECTION RF-5--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	2	Coal
1	3	Siltstone
5		Sandstone, fine-grained, sharp base, rippled, convoluted
10		Siltstone, shaly
	1 1/2	Carbonaceous shale
7		Siltstone
	2	Carbonaceous shale
2	6	Siltstone
5	6	Siltstone, gradational base, fine-grained, rippled, convoluted
5		Siltstone
7		Sandstone, rippled, silty interbed-splay
	6	Shale
	1 1/2	Coal
	1	Siltstone
20		Sandstone, erosional base, red-grained, convoluted, festooned
1		Sandstone, gradational base, rippled
10		Covered
1		Siltstone
22		Siltstone, erosional base, fine-grained, convoluted, festooned
10		Shale, silty
2		Sandstone, gradational base, fine-grained, rippled, convoluted
1 1/2		Siltstone
4		Sandstone, gradational base, rippled, convoluted, fine-grained

SECTION RF-5--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
10		Siltstone, shaly
3		Sandstone, gradational base, rooted, rippled uppermost part
	1 1/2	Coal, lenses, erosional
30		Sandstone, erosional base, fine-grained, convoluted, festooned
1		Shale
	1	Carbonaceous shale
1		Siltstone
1	2	Sandstone, gradational base, rippled
1	1	Carbonaceous shale, coal
2 1/2		Siltstone
4		Sandstone, gradational base, rippled, fine-grained
5		Siltstone, carbonaceous, shaly upper 1 ft
3	1	Coal lenses (of what was eroded)
42		Sandstone, erosional base, fine-grained, convoluted, festooned, rippled upper 5 ft
30		Covered
4		Sandstone, rippled, fine-grained
2		Shale
	2	Coal
1	3	Siltstone
5		Sandstone, fine-grained, gradational base, rippled, convoluted
10		Siltstone, shaly
	1 1/2	Carbonaceous shale
7		Siltstone

SECTION RF-5--Continued

<u>Thickness</u>		<u>Lithology</u>
<u>Feet</u>	<u>Inches</u>	
	2	Carbonaceous shale
2 1/2		Siltstone
5 1/2		Sandstone, gradational base, fine-grained, rippled, convoluted
5		Siltstone
7		Sandstone, rippled, silty interbeds-splay
	6	Shale
	1 1/2	Coal
	1	Siltstone
20		Sandstone, erosional base, medium-grained, convoluted, festooned