

**Data Control Points Used to Construct the
Surficial Geology Map (M-120) of
Crawford County, Kansas**

**KGS OPEN-FILE
REPORT 2008-19**

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Data Control Points Used to Construct the Surficial Geology Map (M-120) of Crawford County, Kansas

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Introduction

This report is a supplemental reference to the Surficial Geology of Crawford County, Kansas map (M-120) (West, Sawin, and Brady, 2008), and is a synthesis of the data control points and field notes used to construct the map.

The bedrock geology of Crawford County was mapped on U.S. Geological Survey topographic quadrangle maps at a scale of 1:24,000 (fig.1). Data control points used in mapping the bedrock geology are organized by quadrangle in this report. The location of these control points are plotted on copies of the field maps in previous Kansas Geological Survey (KGS) open-file reports for Crawford County (West and Sawin, 2004; West and Sawin, 2003; West and Sawin, 2002a; West and Sawin, 2001; West and Sawin, 2000). The data control points in this report may be different from those reported in earlier open-file reports and therefore supersede those reports.

The stratigraphic names used herein are from Zeller (1968) with two exceptions. The name Elm Branch Shale was proposed by Heckel and Watney (2002) to replace Ladore Shale (Zeller, 1968), and the Lost Branch Formation and Memorial Shale (in descending order) were proposed by Heckel (1991) to replace the Holdenville Shale (Zeller, 1968). Included in map M-120 is a stratigraphic rock column that depicts the vertical sequence, thickness, and lithologies of the geologic units. A short, generalized description of each geologic unit is also included. A west-east cross section shows the vertical relationship of the rock units.

Numbering System

Data control points are identified by the following letter prefixes. Sites may be identified by one or more of these designations.

- 1) Numbers preceded by the letter **C** refer to measured sections in the Crawford County, Kansas, Measured Sections files of the Kansas Geological Survey. Numbering began with the first measured section in the book and proceeded sequentially to the last section;
- 2) Numbers preceded by the letter **L** refer to sites previously studied by West and others;
- 3) Numbers preceded by the letters **CR** are sites examined and recorded specifically for this mapping project.

4) Control points labeled **BB** refer to localities in Bourbon County, Kansas (West and Sawin, 2002b) that were used in the construction of the Crawford County, Kansas, map.

Crawford County, Kansas

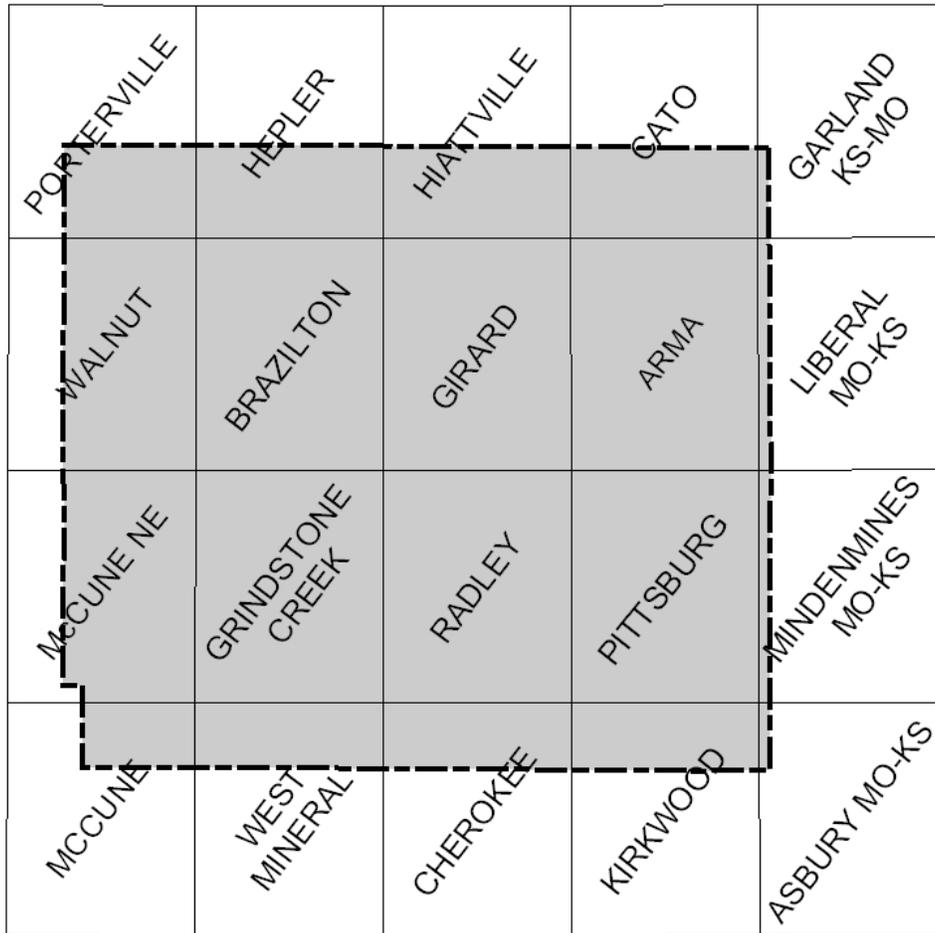


Figure 1. USGS 7.5-minute 1:24,000-scale quadrangles for Crawford County, Kansas.

Quadrangle	page	Quadrangle	page
Porterville	3	McCune NE	45
Hepler	5	Grindstone Creek . .	51
Hiattville	7	Radley	59
Cato	12	Pittsburg	67
Garland	18	Mindenmines	69
Walnut	19	McCune	69
Brazilton	25	West Mineral	70
Girard	30	Cherokee	71
Arma	37	Kirkwood	73
Liberal	45	Asbury	74

PORTERVILLE QUADRANGLE

Field work was conducted during January–March of 2001.

- C-1 = Cherty limestone (Hertha) underlain by yellow clay shale; measured and described by J. M. Jewett in 1935; SW corner, Sec. 35, T.27S., R.21E., Crawford Co., Kansas.
- C-2 = Limestone (Hertha) underlain by yellow clay shale; measured and described by J. M. Jewett in 1935; just south of center of west line of SW1/4, Sec. 25, T.27S., R.21E., Crawford Co., Kansas.
- C-3 = Part of Hertha Limestone and underlying sequence; measured and described by J. M. Jewett in 1936; SE corner, Sec. 29, T.27S., R.22E., Crawford Co., Kansas.
- C-15 = Swope Limestone to “basal Missourian” (Hepler) sandstone; measured and described by J. M. Jewett in 1935; center of west line of SW1/4, NW1/4, Sec. 2, T.28S., R.21E., Crawford Co., Kansas.
- CR-223 = BB-781 = Sandstone (Hepler) caps this hill; near center of south line, SW1/4, Sec. 20, T.27S., R.22E., Bourbon Co., Kansas.
- CR-224 = Cherty soil; near SW corner, Sec. 30, T.27S., R.22E., Crawford Co., Kansas.
- CR-224A = Limestone cobbles in stream bank; along a line south of the center of the north line of NE1/4, SW1/4, SW1/4 toward the center of NE1/4, SW1/4, SW1/4, Sec. 30, T.27S., R.22E., Crawford Co., Kansas.
- CR-225 = Terrain and soil suggests area is underlain by silty, sandy mudrock; SE corner, T.27S., R.22E., Crawford Co., Kansas.
- CR-226 = Terrain and soil suggests area is underlain by silty, sandy mudrock; approximately 500 ft south of center of east line of Sec. 30, T.27S., R.22E., Crawford Co., Kansas.
- CR-227 = Sandstone exposed in road north of C-3; center of east line of SE1/4, Sec. 29, T.27S., R.22E., Crawford Co., Kansas.
- CR-228 = Terrain suggests area is underlain by silty, sandy mudrock and sandstone; center of east line, NE1/4, SE1/4, Sec. 32, T.27S., R.22E., Crawford Co., Kansas.
- CR-229 = Terrain and soil suggests area is underlain by silty, sandy mudrock and sandstone; center of south line, SW1/4, Sec. 29, T.27S., R.22E., Crawford Co., Kansas.

- CR-230 = Approximately 30 to 40 ft of sandstone and sandy, silty mudrock exposed along road ditch on south side of road; from near center of south line, SW1/4, SW1/4, SE1/4 to Walnut Creek near center of south line SW1/4, SE1/4, SW1/4, Sec. 31, T.27S., R.22E., Crawford Co., Kansas.
- CR-231 = Sandstone in road; approximately 1100 ft south of NE corner, Sec. 31, T.27S., R.22E., Crawford Co., Kansas.
- CR-232 = Limestone with mudrock below(?) at top of hill in road ditch on both sides of road; lots of chert gravel in soil and along road; base of limestone (Sniabar?) in road at 1048 ft; area of section C-2; approximately 300 ft south of center of east line, SE1/4, Sec. 26, T.27S., R.21E., Crawford Co., Kansas.
- CR-233 = Limestone in field north of road; approximately 950 ft east of SW corner, Sec. 23, T.27S., R.21E., Bourbon Co., Kansas.
- CR-234 = About 6 ft of thin-bedded, dark gray to black, fossiliferous limestone in drainage north of road; contacts not exposed; possibly Hertha (Sniabar) Limestone; center of south line SW1/4, SW1/4, Sec. 26, T.27S., R.21E., Crawford Co., Kansas.
- CR-234A = Black, platy mudrock to fissile shale in southwest bank of stream, probably Mound City shale; approximately 400 ft north and 150 ft east of SW corner, Sec. 26, T.27S., R.21E., Crawford Co., Kansas.
- CR-235 = Inferred base of Swope Limestone in road at 1045 ft; approximately 200 ft south of center of west line of SW1/4, Sec. 35, T.27S., R.21E., Crawford Co., Kansas.
- CR-236 = Top of Hertha Limestone inferred at 1010 ft in road with black platy to fissile shale exposed in field east of road below 1010 ft; inferred thickness of Hertha (Sniabar) Limestone of 16± ft; approximately 900 ft south of NW corner, Sec. 35, T.27S., R.21E., Crawford Co., Kansas.
- CR-237 = Sandy soil in road; approximately 200 ft west of center of south line, Sec. 36, T.27S., R.22E., Crawford Co., Kansas.
- CR-238 = Sandy soil in road; approximately 450 ft west of SW corner, Sec. 2, T.28S., R.21E., Crawford Co., Kansas.
- CR-239 = Inferred top of Hertha (Sniabar) Limestone at 1030 ft in road (area of section C-1); approximately 500 ft east of SW corner, Sec.35, T.27S., R.21E., Crawford Co., Kansas.
- CR-240 = Inferred top of Hertha (Sniabar) Limestone at 1030 ft in road; approximately 800 ft south of NW corner, Sec. 2, T.28S., R.21E., Crawford Co., Kansas.

CR-241 = Sandstone in road; area of section C-15; center of west line, NW1/4, Sec. 2, T.28S., R.21E., Crawford Co., Kansas.

HEPLER QUADRANGLE

Field work was conducted during January–March of 2001.

CR-199 = Sandstone float in road; NE corner, Sec. 26, T.27S., R.22E., Crawford Co., Kansas.

CR-200 = Sandstone in road; center of north line Sec. 25, T.27S., R.22E., Crawford Co., Kansas.

CR-201 = Possible top of Altamont Limestone in road at 970 ft; approximately 300 ft west of center of north line of Sec. 29, T.27S., R.23E., Crawford Co., Kansas.

CR-202 = Possible top of Altamont Limestone in road at 970 ft; center of north line of Sec. 29, T.27S., R.23E., Crawford Co., Kansas.

CR-203 = Possible base of Altamont Limestone in road at 970 ft; NE corner, Sec. 29, T.27S., R.23E., Crawford Co., Kansas.

CR-204 = Sandstone (Bandera) in road ditch on east side of road at 950 ft; approximately 400 ft north of center of west line of Sec. 28, T.27S., R.23E., Crawford Co., Kansas.

CR-205 = Possible base of Altamont Limestone at 968 ft in road; center of west line of Sec. 28, T.27S., R.23E., Crawford Co., Kansas.

CR-206 = Thin limestone in drainage approximately 1/8 mi east of road, possibly indicating the top of Altamont Limestone at 980 ft; approximately 800 ft south and 400 ft east of center of west line of Sec. 28, T.27S., R.23E., Crawford Co., Kansas.

CR-207 = Sandstone (Bandera) in road ditch east of road; contact with base of Altamont Limestone at 982 ft; hand leveling to top of hill indicated at least 11 ft of Altamont Limestone; top of Altamont Limestone suggested at 993 ft; from NW corner to the center of the west line of Sec. 33, T.27S., R.23E., Crawford Co., Kansas; probably Nowata Shale from here to the SW corner of Sec. 33, T.27S., R.23E., Crawford Co., Kansas.

CR-208 = Suggested base of Altamont Limestone at 972 ft in road ditch on south side of road; approximately 300 ft east of center of north line of Sec. 33, T.27S., R.23E., Crawford Co., Kansas.

- CR-209 = Thin-bedded sandstone in east bank of drainage on both sides of road; near center of north line, NE1/4, NW1/4, NE1/4, Sec. 33, T.27S., R.23E., Crawford Co., Kansas.
- CR-210 = Suggested base of Altamont Limestone at 972 ft in road ditch on south side of road; center of north line, NE1/4, Sec. 33, T.27S., R.23E., Crawford Co., Kansas.
- CR-211 = Thin-bedded sandstone in east bank of drainage on both sides of road; approximately 500 ft east of NW corner, Sec. 34, T.27S., R.23E., Crawford Co., Kansas.
- CR-212 = Limestone in road at 985 ft similar to the lower limestone of the Altamont Limestone; center of north line, Sec. 34, T.27S., R.23E., Crawford Co., Kansas.
- CR-215 = Sandstone exposed in drainage south of road; approximately 150 ft west of center of north line of Sec. 3, T.28S., R.23E., Crawford Co., Kansas.
- CR-216 = Limestone (Altamont?) in road and in field north of road; near base(?); center of south line of SE1/4, SW1/4, SE1/4, Sec. 33, T.27S., R.23E., Crawford Co., Kansas.
- CR-217 = Altamont Limestone in place in field north of road; approximately 300 ft west and 200 ft north of center of south line of Sec. 29, T.27S., R.23E., Crawford Co., Kansas.
- CR-218 = Thin, dense, black, fossiliferous limestone (Checkerboard?) in road at 971 ft; center of east line of Sec. 1, T.28S., R.22E., Crawford Co., Kansas.
- CR-219 = Altamont Limestone exposed at 958 ft with approximately 11 ft of Altamont exposed in road ditch eastward along drainage on the north side of road; approximately 200 ft east of SW corner, Sec. 1, T.28S., R.22E., Crawford Co., Kansas.
- CR-220 = Sandstone in road; approximately 800 ft west of SE corner, Sec. 2, T.28S., R.22E., Crawford Co., Kansas.
- CR-221 = Sandstone in road; near center of north line of NE1/4, NE1/4, NW1/4, Sec. 27, T.27S., R.22E., Crawford Co., Kansas.
- CR-221A = Sandstone and thin-bedded, platy, silty mudrock exposed in road; approximately 200 ft east of center of north line of Sec. 27, T.27S., R.22E., Crawford Co., Kansas.
- CR-222 = Sandstone in road; center of north line of NW1/4, Sec. 26, T.27S., R.22E., Crawford Co., Kansas.

HIATTVILLE QUADRANGLE

Field work was conducted during January–March of 2000.

- C-5 = Pawnee (Laberdie) Limestone in old quarry; measured and described by W. Ives, August 1952; just west of center of east line, SW1/4, Sec. 31, T.27S., R.24E., Crawford Co., Kansas.
- BB-55 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 950 ft; 75 ft of Labette Shale here (A. Bennison, personal communication, 2000); center of east line of SE1/4, SE1/4, Sec. 32, T.27S., R.24E., Crawford Co., Kansas.
- BB-56 = Top of Fort Scott (Higginsville) Limestone at 880 ft in bed of West Fork of Dry Wood Creek; just west of center of north line of SW1/4, SW1/4, Sec. 33, T.27S., R.24E., Crawford Co., Kansas.
- BB-57 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 950 ft; in road just south of center of east line of NE1/4, NE1/4, Sec. 32, T.27S., R.24E., Crawford Co., Kansas.
- BB-58 = Earthy limestone below Anna shale associated with coaly smut; near center of north line of NE1/4, NW1/4, NE1/4, Sec. 33, T.27S., R.24E., Crawford Co., Kansas.
- BB-59 = Englevale sandstone in creek; sandstone appears to strike north-south with a NW dip suggesting a plunging anticline or an isoclinal fold(?); near center of east line of SE1/4, Sec. 28, T.27S., R.24E., Crawford Co., Kansas.
- BB-63 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 971 ft just below top of hill which is at an elevation of 981 ft; center of south line of Sec. 28, T.27S., R.24E., Crawford Co., Kansas.
- BB-86 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 972 ft; just north of center of north line of NW1/4, NW1/4, Sec. 25, T.27S., R.24E., Bourbon–Crawford County line, Kansas.
- CR-41 = Base of Fort Scott (Blackjack Creek) Limestone estimated at 900 ft based on the top of the Blackjack Creek limestone which is exposed in the fields on both sides of the road; well exposed in the west bank of the stream on the south side of the road; low domical to tabular chaetetids in upper part of limestone; Little Osage shale and Higginsville limestone exposed east of this site in the road and at the top of the hill; estimated thickness of Fort Scott Limestone is 20-25 ft; near center of north line, NE1/4, NW1/4, Sec. 11, T.28S., R.24E., Crawford Co., Kansas.

- CR-42 = Fort Scott (Blackjack Creek) Limestone in creek with top just below road level and in field north of road; low domical to tabular chaetetids in upper part of limestone; near center of north line, NW1/4, Sec. 11, T.28S., R.24E., Crawford Co., Kansas.
- CR-43 = Light-gray, thin, wavy-bedded, skeletal limestone (Higginsville); upper beds of Fort Scott (Higginsville) Limestone at 923 ft in road; near center of south line, SW1/4, SW1/4, Sec. 2, T.28S., R.24E., Crawford Co., Kansas.
- CR-44 = Estimated base (contact covered) of Pawnee (Myrick Station) Limestone/top of Anna shale at 980 ft in road ditch; approximately 200 ft south of center of west line, SW1/4, SW1/4, Sec. 3, T.28S., R.24E., Crawford Co., Kansas.
- CR-45 = Blocks of Pawnee (Laberdie) Limestone in road and in field east of road; near center of west line, Sec. 4, T.28S., R.24E., Crawford Co., Kansas.
- CR-46 = Blocks of Pawnee (Laberdie) Limestone in fields in all directions; NW corner, Sec. 33, T.27S., R.24E., Crawford Co., Kansas.
- CR-47 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 950 ft in road; very thin tabular chaetetids in Myrick Station limestone; near center of south line, SE1/4, SW1/4, NW1/4, Sec. 27, T.27S., R.24E., Crawford Co., Kansas.
- CR-48 = Sandstone in creek north of road, possibly Englevale; approximately 200 ft west of center Sec. 27, T.27S., R.24E., Crawford Co., Kansas.
- CR-48A = Upper part of Fort Scott (Higginsville) Limestone with top estimated at 899 ft along drainage and in field; near center NW1/4, NE1/4, SE1/4, Sec. 27, T.27S., R.24E., Crawford Co., Kansas.
- CR-49 = Top of very hard, dense, bluish-gray (weathers orangish brown) limestone in the Pawnee at approximately 925 ft; forms bed of creek; approximately 100 ft east and 200 ft north of center of south line, SW1/4, SE1/4, Sec. 24, T.27S., R.23E., Bourbon Co., Kansas.
- CR-50 = Sandstone in road at top of hill; approximately 300 ft west of center of north line, NW1/4, Sec. 25, T.27S., R.23E., Crawford Co., Kansas.
- CR-51 = Sandstone in road; approximately 0.2 mi east of center of north line, Sec. 26, T.27S., R.23E., Crawford Co., Kansas.
- CR-51A = Limestone float in road ditches and fields on both sides of road; approximately 400 ft east of center on north line, Sec. 26, T.27S., R.23E., Crawford Co., Kansas.

- CR-52 = Sandy soil in fields northwest, northeast, and southeast of section corner; NW corner Sec. 26, T.27S., R.23E., Crawford Co., Kansas.
- CR-53 = Sandstone in road; near center of west line, SW1/4, NW1/4, NW1/4, Sec. 26, T.27S., R.23E., Crawford Co., Kansas.
- CR-54 = Limestone in road at 990 ft; probable base of Altamont Limestone; near center of west line, NW1/4, SW1/4, Sec. 26, T.27S., R.23E., Crawford Co., Kansas.
- CR-55 = Reddish-brown, friable sandstone in place in stream bed on west side of road; near center of east line, NE1/4, SE1/4, SE1/4, Sec. 27, T.27S., R.23E., Crawford Co., Kansas.
- CR-56 = Estimated top of Anna shale/ base of Pawnee (Myrick Station) Limestone at 990 ft in field; a lot of Myrick Station and Laberdie limestone float along top of ridge; mudrock and siltstone of Labette Shale exposed in gullies and stream northwest of ridge; near center of west line, NW1/4, Sec. 2, T.28S., R.24E., Crawford Co., Kansas.
- CR-56A = Sandstone in Labette Shale in drainage below pond; approximately 100 ft north and 300 ft east of center of west line, NW1/4, NW1/4, Sec. 2, T.28S., R.24E., Crawford Co., Kansas.
- CR-59 = Labette Shale at top of hill and in fields at road intersection; center of west line, Sec. 26, T.27S., R.24E., Crawford Co., Kansas.
- CR-59A = Sandstone from elevation of 900 ft in road and down the slope in ditches on both sides of the road to site BB-59; light-gray and yellowish-brown mudrock in pond dam 400 ft west of this point; center of west line, SW1/4, SW1/4, Sec. 27, T.27S., R.24E., Crawford Co., Kansas.
- CR-59B = Sandstone in road 150 ft west of SE corner, Sec. 28., T.27S. R.24E., Crawford Co., Kansas.
- CR-60 = Sandstone in field west of road; near center of east line, NE1/4, SE1/4, NE1/4, Sec. 30, T.27S., R.24E., Crawford Co., Kansas.
- CR-60A = Estimated base of Altamont Limestone in road at 1020 ft just south of T junction with road to the west; near NE corner, Sec. 30, T.27S., R.24E., Crawford Co., Kansas. Near this same NE corner is a concrete post with the following inscription "Kansas Federal Aid Project No. 34, Sect A, 1921."
- CR-60B = Sandstone (Bandera) in place in road ditch on south side of road; approximately 300 ft west of NE corner, Sec. 30, T.27S., R.24E., Crawford Co., Kansas.

- CR-61 = Sandstone and mudrock in drainage with Bandera Shale soil in fields; near center of south line, Sec. 30, T.27S., R.24E., Crawford Co., Kansas.
- CR-62 = Sandstone in road; near center of south line, SW1/4, Sec. 30, T.27S., R.24E., Crawford Co., Kansas.
- CR-63 = Pawnee (Laberdie) Limestone at 940 ft based on float in field and drainage east of road; near center of NE1/4, SW1/4, SW1/4, Sec. 29, T.27S., R.24E., Crawford Co., Kansas.
- CR-64 = Estimated top of Pawnee (Laberdie) Limestone at 965 ft on east side of Farlington Lake; Laberdie is an algal limestone and exposed around the entire lake; near center, SE1/4, NW1/4, Sec. 5, T.28S., R.24E., Crawford Co., Kansas.
- CR-65 = Estimated top of Anna shale/base of Pawnee (Myrick Station) Limestone at 935 ft in exposure along southeast side of road; Mine Creek shale is only a shaly parting when present; Laberdie is mostly an algal limestone and Myrick Station is a hard, dense, reddish-brown, slightly skeletal limestone with very thin tabular chaetetids that are not conspicuous; estimated thickness of Pawnee Limestone is 25 ft; near center SW1/4, SW1/4, Sec. 32, T.27S., R.24E., Crawford Co., Kansas.
- CR-65A = Sandstone and silty mudrock of Labette Shale in creek bed and along banks just below spillway of Farlington Lake, Crawford County State Park #2; near center S1/2, SW1/4, Sec. 32, T.27S., R.24E., Crawford Co., Kansas.
- CR-66 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 920 ft in drainage northeast of active quarry; sequence similar to that at CR-65; near center SE1/4, NW1/4, SE1/4, Sec. 31, T.27S., R.24E., Crawford Co., Kansas.
- CR-66A = Active quarry in Pawnee Limestone, total thickness 25+ ft, top at 950 ft; sequence much like that at CR-65 and CR-66; Laberdie limestone is mostly algal but the middle part contains interbedded tabular chaetetids with some slight mounding, possibly with calcite-filled voids beneath some tabular layers; L-811 and measured section 38 of Price (1981) dissertation; near center of east 1/2, SW1/4, Sec. 31, T.27S., R.24E., Crawford Co., Kansas.
- CR-67 = Base of Altamont Limestone at 1018 ft in road; approximately 150 ft east of center of north line NW1/4, NE1/4, Sec. 36, T.27S., R.23E., Crawford Co., Kansas.
- CR-68 = Sandstone in road ditches on both sides of road; west of CR-67 along north line for a distance of approximately 0.15 mi; east of center of north line, Sec. 36, T.27S., R.23E., Crawford Co., Kansas.

- CR-69 = Base of Altamont Limestone at 997 ft in road; approximately 100 ft west of center of north line, NE1/4, NE1/4, Sec. 35, T.27S., R.23E., Crawford Co., Kansas.
- CR-70 = Altamont Limestone at 995 ft in road; near center of north line NW1/4, Sec. 35, T.27S., R.23E., Crawford Co., Kansas.
- CR-71 = CR-213 = Altamont Limestone at 995 ft in road; approximately 100 ft north of center of west line SW1/4, NW1/4, Sec. 35, T.27S., R.23E., Crawford Co., Kansas.
- CR-72 = Altamont Limestone at 990 ft in road ditch and in drainage west of road; near center of west line SW1/4, SW1/4, NW1/4, Sec. 35, T.27S., R.23E., Crawford Co., Kansas.
- CR-73 = Sandstone in road; just west of center of south line SE1/4, SE1/4, Sec. 35, T.27S., R.23E., Crawford Co., Kansas.
- CR-74 = Sandstone in road; near center of south line SW1/4, SE1/4, SW1/4, Sec. 36, T.27S., R.23E., Crawford Co., Kansas.
- CR-75 = Sandstone in road; approximately 200 ft east of center of south line SW1/4, SE1/4, Sec. 36, T.27S., R.23E., Crawford Co., Kansas.
- CR-76 = Sandstone in road; just east of center of south line SE1/4, SE1/4, Sec. 35, T.27S., R.23E., Crawford Co., Kansas.
- CR-76A = Old quarry in Pawnee Limestone in field east of road; slightly south and east of center SW1/4, SW1/4, NW1/4, Sec. 6, T.28S., R.24E., Crawford Co., Kansas.
- CR-77 = Sandstone in road; along south line SE1/4, SE1/4, SE1/4, Sec. 1, T.28S., R.23E., Crawford Co., Kansas.
- CR-78 = Estimated top of Altamont Limestone at 1040 ft in road; near center of south line SE1/4, SW1/4, SE1/4, Sec. 1, T.28S., R.23E., Crawford Co., Kansas.
- CR-79 = Estimated base of Altamont Limestone at 1028 ft in road culvert; near center of south line SW1/4, SW1/4, SW1/4, Sec. 1, T.28S., R.23E., Crawford Co., Kansas.
- CR-80 = Estimated top of Altamont Limestone at 1025 ft in road; just south of center of west line NW1/4, SE1/4, NE1/4, Sec. 2, T.28S., R.23E., Crawford Co., Kansas.
- CR-81 = Estimated top of Altamont Limestone at 1025 ft in road; near center of N1/2, NE1/4, Sec. 2, T.28S., R.23E., Crawford Co., Kansas.

CR-82 = Estimated base of Altamont Limestone at 1015 ft in road; approximately 100 ft west of CR-73 along the north line of NE1/4, NE1/4, Sec. 2, T.28S., R.23E., Crawford Co., Kansas.

CR-214 = Altamont Limestone; SW corner, Sec. 34, T.27S., R.23E., Crawford Co., Kansas.

CR-214A = Contact of thin, wavy bedded limestone with underlying yellowish brown mudrock; approximately 250 ft west of SE corner, Sec. 34, T.27S., R.23E., Crawford Co., Kansas.

CATO QUADRANGLE

Field work was conducted during January–March of 2000.

C-6 = Verdigris (Ardmore) limestone to Breezy Hill limestone; abandoned strip pit and road cut on U.S. Highway 69; measured and described by W. Howe, July 1948; center SW1/4, SW1/4, Sec. 32, T.27S., R.25E., Crawford Co., Kansas.

C-7 = Coal, overlying limestone (possibly Verdigris limestone) and shale; operating strip pit of Meade Coal Company; measured and described by W. Howe, July 1948; center NW1/4, SW1/4, Sec. 28, T.27S., R.25E., Crawford Co., Kansas.

C-8 = Sequence similar to that at C-7; small operating strip pit by Morris Brothers; fragments of silicified chaetetids in gravel at top of exposure; measured and described by W. Howe, August 1948; NW1/4, NW1/4, Sec.27, T.27S., R.25E., Crawford Co., Kansas.

C-30 = Sandstone below Breezy Hill limestone (“Squirrel” sandstone) to Blackjack Creek limestone with rounded chaetetids; measured and described by W. Howe, July 1948 = Jewett (1945), site 111 = Knight (1985), section NA = Roth (1991), section H69; road cut 6.3 mi north of Arma, Kansas, on U.S. Highway 69; center NW1/4, SW1/4, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.

C-31 = Sequence similar to that at C-30, measured and described by R.C. Moore in 1937; probably the same as C-30 and mis-spotted at center NW1/4, SE1/4, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.

C-32 = Sequence similar to that at C-30; measured and described by J. M. Jewett, 1939 = Jewett (1945), site 111; road cut 2.5 mi south of Bourbon–Crawford Co. line on U.S. Highway 69, center west line Sec. 5, T.28S., R.25E., Crawford Co., Kansas.

C-33 = Tebo coal to Chelsea sandstone in road ditches at crossroads; measured and described by W. Howe, July 1948; SW corner Sec. 2, T.28S., R.25E., Crawford Co., Kansas.

- L-812 = Fort Scott (Blackjack Creek) Limestone with domical chaetetids; road cuts on both sides of U.S. Highway 69, 0.3 mi south of L-702; Roth (1991), locality 812; SW corner Sec. 5 and SW corner Sec. 6, T.28S., R.25E., Crawford Co., Kansas.
- BB-89 = L-994 = Base of Fort Scott (Blackjack Creek) Limestone at 890 ft; ripplemarks in sandstones of the upper Cabaniss “Lagonda,” Breezy Hill limestone, Mulky coal (1 dm), and “Excello” in road; blocks of Blackjack Creek limestone with tabular chaetetids in strip pit rubble; just east of center of south line NW1/4, Sec. 25, T.27S., R.24E., Crawford Co., Kansas.
- BB-90 = Top of Verdigris limestone in the bed of Dry Wood Creek at 822 ft; near center of east line NE1/4, SE1/4, SE1/4, Sec. 25, T.27S., R.24E., Crawford Co., Kansas.
- BB-91 = Top of Verdigris limestone in drainage in field at 829 ft; just east of center of north line, NW1/4, Sec. 30, T.27S., R.25E., Crawford Co., Kansas.
- BB-94 = L-996 = Base of Fort Scott (Blackjack Creek) Limestone at 883 ft; chaetetids in Blackjack Creek; center of west line of SW1/4, NW1/4, Sec. 25., T.27S., R.24E., Crawford Co., Kansas.
- BB-95 = Base of Fort Scott (Blackjack Creek) Limestone at 906 ft with “Excello”, Mulky coal, Breezy Hill limestone, and upper Cabaniss “Lagonda” below; near center of north line of NW1/4, NE1/4, Sec. 25., T.27S., R.24E., on the Bourbon Co.–Crawford Co., Kansas, line.
- BB-98 = Possible top of Verdigris limestone at 835 ft in road ditch; near center of north line, NE1/4, NW1/4, NW1/4, Sec. 29, T.27S., R.25E., on the Bourbon Co.–Crawford Co., Kansas, line.
- BB-99 = Mudrock and sandstone of upper Cabaniss, traces of Mulky coal, some underclay, “Excello”, and Blackjack Creek; base of Fort Scott (Blackjack Creek) Limestone at 919 ft; Breezy Hill limestone not seen; chaetetids in Blackjack Creek; near center of north line, NW1/4, NE1/4, Sec. 29, T.27S., R.25E., on the Bourbon Co.–Crawford Co., Kansas, line.
- BB-100 = Breezy Hill limestone, Mulky coal (0.5 ft), “Excello”, and Blackjack Creek; base of Fort Scott (Blackjack Creek) Limestone at 922 ft in road; near NE corner, Sec. 29, T.27S., R.25E., on the Bourbon Co.–Crawford Co., Kansas, line.
- BB-101 = Top of Verdigris limestone at 836 ft in road ditch on south side of road; near center of north line of NW1/4, NW1/4, NE1/4, Sec. 27, T.27S., R.25E., on the Bourbon Co.–Crawford Co., Kansas, line.

- BB-102 = Verdigris limestone blocks (float) in stream at 825 ft; near center of north line of NE1/4, NW1/4, Sec. 26, T.27S., R.25E., on the Bourbon Co.–Crawford Co., Kansas line.
- BB-103 = Sandstone of upper Cabaniss in road; near center of the north line of NE1/4, NW1/4, Sec. 32, T.27S., R.25E., Crawford Co., Kansas.
- BB-104 = Top of Verdigris limestone at 860 ft; using three widely spaced points on top of Verdigris, dip was determined to be 2.6 degrees east and strike north 8 degrees east; near center of north line of NW1/4, Sec. 33, T.27S., R.25E., Crawford Co., Kansas.
- BB-104A = Exposure in Clemens Mine #22 that was active when sequence was measured and described by R. R. West and USGS colleagues (B. Cecil & F. Dulong) 6 June 1993; from underclay below Croweburg coal to a thin, hard, fossiliferous limestone above the Bevier coal; near center of west line Sec. 28, T.27S., R.25E., Crawford Co., Kansas, and N1/2 Sec. 34, T.28S., R.25E., Crawford Co., Kansas.
- CR-10 = Poor exposure of sandstone in road ditch, probably the same as exposed at CR-9 in Garland quadrangle; near center of north line, NW1/4, Sec. 25, T.27S., R.25E., Crawford Co., Kansas.
- CR-11 = Blocks of Verdigris limestone and large concretions in stream (not in place); near center of north line of NE1/4, NE1/4, Sec. 26, T.27S., R.25E., Crawford Co., Kansas.
- CR-12 = Three inches of dark-gray, fossiliferous crystalline limestone above coal, probably the Mineral, at approximately 788 ft in north bank of stream on east side of road; approximately 200 ft east of center of NW1/4, NE1/4, Sec. 26, T.27S., R.25E., Crawford Co., Kansas.
- CR-13 = Poor exposure of sandstone in road ditch on north side of road; center of south line, SE1/4, NE1/4, Sec. 26, T.27S., R.25E., Crawford Co., Kansas.
- CR-14 = Sandstone and mudrock sequence above coal, probably Mineral, in north bank of stream on east side of road; small nodular limestone at 800 ft (water level on 27 December 1999) immediately above coaly to black shale sequence with in situ *Stigmara* about 2 ft long and parallel to bedding; south of Arcadia Cemetery, near center of SW1/4, NW1/4, Sec. 36, T.27S., R.25E., Crawford Co., Kansas.
- CR-15 = Blocks of Verdigris limestone in stream on east side of road at 810 ft (not in place); near center of east line, NW1/4, Sec. 26, T.27S., R.25E., Crawford Co., Kansas.

- CR-16 = Sandstone in road; near center of south line, SE1/4, SE1/4, SE1/4, Sec. 26, T.27S., R.25E., Crawford Co., Kansas.
- CR-17 = Verdigris limestone in road ditch on west side of road, top at 845 ft; new pond west of road with spoil pile containing blocks of Verdigris; approximately 150 ft north of center of east line, NE1/4, SE1/4, Sec. 27, T.27S., R.25E., Crawford Co., Kansas.
- CR-18 = Good exposure of Verdigris showing the three limestone beds and intervening mudrocks in west-facing highwall at east end of abandoned pit of Clemens Mine; good control point, top of Verdigris between 845 ft and 850 ft; approximately 200 ft west of center of east line, SE1/4, SE1/4, Sec. 27, T.27S., R.25E., Crawford Co., Kansas.
- CR-22 = Sandstone outcrop in stream on north side of road, probably Chelsea; near center of south line, SW1/4, SE1/4, SE1/4, Sec. 2, T.28S., R.25E., Crawford Co., Kansas.
- CR-23 = Sequence from stream bed south to section corner compares well with section C-33; Tebo coal to Chelsea sandstone; along west side of Pleasant Valley Cemetery, approximately 400 ft north of SW corner, Sec. 2, T.28S., R.25E., Crawford Co., Kansas.
- CR-23A = Sandstone in road; near center south line SE1/4, SE1/4, Sec. 3, T.28S., R.25E., Crawford Co., Kansas.
- CR-24 = Base of Fort Scott (Blackjack Creek) Limestone in road ditch on north side of road at 968 ft; typical Blackjack Creek with low domical chaetetids in upper part of exposed limestone; good "Excello" with some Breezy Hill limestone below; along road just west of SE corner, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.
- CR-25 = Verdigris limestone concretions in fields on both sides of road; near center of south line, SW1/4, SW1/4, SE1/4, Sec. 4, T.28S., R.25E., Crawford Co., Kansas.
- CR-26 = Base of Fort Scott (Blackjack Creek) Limestone in road ditch on north side of road at 960 ft; chaetetids in upper part of Blackjack Creek are low domical forms but broad, over a decimeter across; Breezy Hill much better developed but distinctly pedogenic; approximately 100 ft east of center of south line, SW1/4, SE1/4, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.
- CR-27 = Base of Fort Scott (Blackjack Creek) Limestone in road at approximately 955 ft; approximately 200 ft east of center of south line, SE1/4, SW1/4, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.

- CR-28 = Base of Fort Scott (Blackjack Creek) Limestone in road at approximately 945 ft; approximately 300 ft west of center of south line, SW1/4, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.
- CR-29 = Base of Fort Scott (Blackjack Creek) Limestone in road and trench silo on west side of road at approximately 910 ft; domical chaetetid masses similar in size to those at CR-24; “Excello” exposed below in road ditch on west side of road; near center of south line, NW1/4, NW1/4, Sec. 36, T.27S., R.24E., Crawford Co., Kansas.
- CR-30 = Blocks of Blackjack Creek and Verdigris limestone in stream (not in place); near center of south line, SW1/4, SW1/4, SE1/4, Sec. 31, T.27S., R.25E., Crawford Co., Kansas.
- CR-31 = Large rectangular blocks of sandstone in stream and under bridge (not in place); just east of center of south line, SW1/4, SW1/4, Sec. 6, T.28S., R.25E., Crawford Co., Kansas.
- CR-32 = Close to top of Verdigris limestone at 860 ft in reclaimed field north of road (nothing in place); old strip pits must have resulted from removal of Croweburg coal; near center of south line, SE1/4, Sec. 6, T.28S., R.25E., Crawford Co., Kansas.
- CR-33 = Inferred base of Fort Scott (Blackjack Creek) Limestone at 920 ft in road and ditch north of road; typical Blackjack Creek limestone with tabular chaetetids in upper part based on float; near center of south line, SW1/4, SW1/4, Sec. 1, T.28S., R.24E., Crawford Co., Kansas.
- CR-34 = Lower Fort Scott (Blackjack Creek) Limestone in road; near center of west line, Sec. 1, T.28S., R.24E., Crawford Co., Kansas.
- CR-35 = Poor exposure of base of Fort Scott (Blackjack Creek) Limestone in road ditch east of road with “Excello” shale below; low domical to tabular chaetetids in limestone blocks at edge of field; approximately 200 ft south of center of west line, NW1/4, Sec. 1, T.28S., R.24E., Crawford Co., Kansas.
- CR-36 = Blackjack Creek limestone float; approximately 150 ft north of SW corner, Sec. 36, T.27S., R.24E., Crawford Co., Kansas.
- CR-37 = Approximately 1m of Fort Scott (Blackjack Creek) Limestone with “Excello” shale below exposed in old strip pit north of road; base of Fort Scott (Blackjack Creek) Limestone at approximately 925 ft; tabular chaetetids well exposed in upper part of limestone; 200 ft north and 400 ft west of SE corner, Sec. 35, T.27S., R.24E., Crawford Co., Kansas.

- CR-38 = Blackjack Creek limestone exposed around pond northwest of road junction; near center of SE1/4, SE1/4, SE1/4, Sec. 2, T.28S., R.24E., Crawford Co., Kansas.
- CR-39 = Base of Fort Scott (Blackjack Creek) Limestone at 910 ft in road; low domical to tabular chaetetids in upper part of limestone exposed in road; near center of south line, SE1/4, SW1/4, SE1/4, Sec. 2, T.28S., R.24E., Crawford Co., Kansas.
- CR-40 = Base of Fort Scott (Blackjack Creek) Limestone at 910 ft in road; low domical to tabular chaetetids in upper part of limestone exposed in road; near center of south line, SW1/4, SW1/4, SE1/4, Sec. 2, T.28S., R.24E., Crawford Co., Kansas.
- CR-57 = Exposure of “Excello” and all members of Fort Scott Limestone on both sides of stream where road crosses stream; base of Fort Scott (Blackjack Creek) Limestone at 910 ft with at least 16 ft (10 ft of Blackjack Creek limestone) of Fort Scott exposed with top estimated at 930 ft; Little Osage shale is exposed in road ditches; Blackjack Creek limestone with domical to tabular chaetetids in upper part; near the center, and east of center, of south line, SE1/4, SW1/4, SE1/4, Sec. 35, T.27S., R.24E., Crawford Co., Kansas.
- CR-58 = Base of Fort Scott (Blackjack Creek) Limestone at 885 ft in road ditch north of road and in old strip pit north of road; Little Osage shale and Higginsville limestone exposed in road west of this site; 6 ft of Blackjack Creek limestone with small (5x5 cm) domical to large (2.5-3 dm across by 1-1.5 dm high) chaetetid masses in upper part; approximately 0.4 mi west of Cato, near center of south line, SW1/4, NE1/4, Sec. 26, T.27S., R.24E., Crawford Co., Kansas.
- CR-83 = Breezy Hill limestone in place in road cut below soil on east side of U.S. Highway 69 at 950 ft; pedogenic limestone like Breezy Hill exposed in stream along west side of U.S. Highway 69 in Fort Scott, Kansas; blocks of Blackjack Creek limestone at top of road cut on west side of U.S. Highway 69; near center of east line of NE1/4, NE1/4, Sec. 7, and near center of west line of NW1/4, NW1/4, Sec. 8, T.28S., R.25E., Crawford Co., Kansas.
- CR-84 = L-812 = Base of Fort Scott (Blackjack Creek) Limestone at 943 ft based on KDOT profile of U.S. Highway 69; slight dip to the north/northwest; upper Cabaniss formation to Breezy Hill limestone and “Excello” shale exposed below the 6-8 ft of Blackjack Creek; upper 2.5-3 ft of Blackjack Creek with developed pedogenic features; well-developed chaetetids, tabular to low and high domical forms, best exposed in weathered surfaces on east side of road cut; some high domical forms up to 1.5 dm high and low domical forms up to 3.5 dm across; near center of west line of SE1/4, NE1/4, SE1/4, Sec. 6, and near center of east line of SW1/4, NW1/4, SW1/4, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.

- CR-85 = Sandstone in upper Cabaniss (“Lagonda”) in road cut on east side of U.S. Highway 69 at 940 ft; near center of west line SW1/4, SW1/4, SW1/4, Sec. 32, T.27S., R.25E., Crawford Co., Kansas.
- CR-86 = Base of Fort Scott (Blackjack Creek) Limestone at 950 ft on the south side of road with “Excello” shale below; Breezy Hill limestone in contact with upper Cabaniss sandstone below at 940 ft in road ditch on north side of road; near center of south line of SW1/4, SW1/4, Sec. 32, T.27S., R.25 E., and near center of north line of NW1/4, NW1/4, Sec. 5, T.28S., R.25E., Crawford Co., Kansas.
- CR-87 = Base of Fort Scott (Blackjack Creek) Limestone at 945 ft at top of hill on the west side of U.S. Highway 69; near center of west line of NE1/4, SE1/4, NE1/4, Sec. 6, T.28 S., R.25E., Crawford Co., Kansas.
- CR-88 = Limestone blocks forming dam for pond on north side of road; near center of south line of SE1/4, SE1/4, Sec. 6, T.28S., R.25E., Crawford Co., Kansas.

GARLAND QUADRANGLE

Field work was conducted during January–March of 2000.

- CR-1 = Sandstone in road along the Missouri–Kansas State line, probably Chelsea; approximately 200 ft north of SE corner, Sec. 36, T.27S., R.25E., Crawford Co., Kansas.
- CR-2 = Sandstone in road along the Missouri–Kansas State line, probably Chelsea; approximately 200 ft north of west line, NE1/4, Sec. 36, T.27S., R.25E., Crawford Co., Kansas.
- CR-3 = Sandstone in road along the Missouri–Kansas State line, probably Chelsea; approximately 600 ft north of the SE corner, Sec. 25, T.27S., R.25E., Crawford Co., Kansas.
- CR-4 = Sandstone in road along the Missouri–Kansas State line, probably Chelsea; approximately 400 ft north of CR-3 in SE1/4, Sec. 25, T.27S., R.25E., Crawford Co., Kansas.
- CR-5 = Sandstone in road along the Missouri–Kansas State line, probably Chelsea; approximately 200 ft north of CR-4 in SE1/4, Sec. 25, T.27S., R.25E., Crawford Co., Kansas.
- CR-6 = Sandstone in road along the Missouri–Kansas State line, probably Chelsea; approximately 200 ft south of center of east line, Sec. 25, T.27S., R.25E., Crawford Co., Kansas.

CR-7 = Sandy soil in fields at road intersection; near NE corner, Sec. 25, T.27S., R.25E., Crawford Co., Kansas.

CR-8 = Large limestone concretions typical of the Verdigris interval in field south of road at approximately 865 ft; approximately 1000 ft west of NE corner, Sec. 25, T.27S., R.25E., Crawford Co., Kansas.

CR-9 = Good exposure of reddish-brown sandstone in road at 860 ft; approximately 1300 ft west of NE corner along north line of Sec. 25, T.27S., R.25E., Crawford Co., Kansas.

CR-19 = Blocks of sandstone in creek; approximately 1150 ft west and 1550 ft north of SE corner, Sec. 1, T.28S., R.25E., Crawford Co., Kansas.

CR-20 = Sandstone in road; approximately 500 ft south of CR-19, Sec. 1, T.28S., R.25E., Crawford Co., Kansas.

CR-21 = Sandstone in road just north of road junction; approximately 950 ft west of SE corner, Sec. 1, T.28S., R.25E., Crawford Co., Kansas.

WALNUT QUADRANGLE

Field work was conducted during January–March of 2001.

Site 102 of Jewett (1945) = identified 6 ft of Altamont (Tina = Amoret) Limestone; near SW corner, Sec. 25, T.28S., R.21E., Crawford Co., Kansas.

Site 103 of Jewett (1945) = identified 12.5 ft of Bandera Shale and 2 ft of Altamont (Tina = Amoret) Limestone; near center, Sec. 26, T.28S., R.21E., Crawford Co., Kansas.

C-10 = Quarry on the west side of road in the upper Altamont Limestone with yellow, clay shale below according to J. M. Jewett who measured and described it in 1939 (Jewett, 1945, site 104); this location is in a floodplain and it is hard to imagine that there was ever a quarry here; however, limestones of the presumed Altamont are exposed in the bank of Walnut Creek just north of here at CR-274 at a lower elevation, and limestones are exposed along the road just south of here at CR-273 at about the same elevation; center of east line of Sec. 36, T.28S., R.21E., Crawford Co., Kansas.

C-11 = Limestone identified as Tina (Amoret) and sequence below south of Walnut, Kansas, where road makes right-angle curve; measured and described by J. M. Jewett probably in the later 1930s or early 1940s; the legal location does not correspond to a turn in today's road, but the sequence and descriptions appear

- reasonable for this legal location; see CR-266; SW corner, Sec. 26, T.28S., R.21E., Crawford Co., Kansas.
- C-12 = Cross bedded limestone identified as Tina (Amoret) and sequence below; south of first road south of Walnut, Kansas; measured and described by J. M. Jewett in 1941; this legal description is in the west bank of Little Walnut Creek where the road south of Walnut, Kansas, turns east; see CR-251; near center of NE1/4, Sec. 26, T.28S., R.21E., Crawford Co., Kansas.
- C-13 = Limestone (Altamont?) and sequence below 1 mi south of Walnut, Kansas; measured and described by J. M. Jewett probably in the later 1930s or early 1940s; location appears reasonable with limestone in road ditch on both sides of road at 920 ft and sandstone exposed below base of limestone; see CR-262; just south of NE corner, Sec. 25, T.28S., R.21E., Crawford Co., Kansas.
- C-14 = Limestone identified as basal part of upper Altamont and yellow clay shale with phosphatic concretions below; measured and described by J. M. Jewett in 1939; see CR-263 and CR-264; SE corner, Sec. 25, T.28S., R.21E., Crawford Co., Kansas.
- C-35 = Limestone identified as Tina (Amoret) with sandstones and mudrocks below; measured and described by J. M. Jewett in 1941 = site 112 of Jewett (1945); see CR-288; center of SW1/4, SW1/4, Sec. 2, T.29S., R.21E., Crawford Co., Kansas.
- CR-242 = Terrain and soils along road and surrounding area suggest bedrock of sandy, silty mudrock; approximately 300 ft south of center of west line of Sec. 14, T.28S., R.21E., Crawford Co., Kansas.
- CR-243 = Terrain and soils along road and surrounding area suggest bedrock of sandy, silty mudrock; approximately 100 ft west of center of north line of Sec. 14, T.28S., R.21E., Crawford Co., Kansas.
- CR-244 = Thin-bedded to platy, silty, sandy, carbonaceous mudrock in road ditch on north side of road; approximately 650 ft east of NW corner, Sec. 13, T.28S., R.21E., Crawford Co., Kansas.
- CR-245 = Approximately 2 dm of thin-bedded to platy, light- to medium-gray, dense, sub-lithographic, fossiliferous carbonate mudstone (Altamont?) exposed at 925 ft in stream bed on both sides of road and in field east of road; approximately 1000 ft north of SW corner, Sec. 7, T.28S., R.22E., Crawford Co., Kansas.
- CR-246 = Limestone (Altamont?) similar to that at CR-245 in creek bed north of road at approximately 928 ft; approximately 200 ft north of center of south line of SE1/4, Sec. 9, T.28S., R.22E., Crawford Co., Kansas.

- CR-247 = Thin-bedded to platy, orangish-brown sandstone with low-angle cross beds and ripple marks in west bank of creek bed on the west side of road; according to the KDOT bridge 0.59 profile over Walnut Creek along the SE1/4, SE1/4 of Sec. 17, T.28S., R.22E., this is the Bandera Sandstone; along a diagonal from southwest to northeast in center of NE1/4, SE1/4, SE1/4, Sec. 17, T.28S., R.22E., Crawford Co., Kansas.
- CR-248 = Limestone (Altamont?) like that a CR-245 exposed in bed of stream on east side of road at 928 ft; exposed from near center of west line of NW1/4 to near center of south line of NW1/4, NW1/4, NW1/4, Sec. 16, T.28S., R.22E., Crawford Co., Kansas.
- CR-249 = Approximately 1 ft of limestone (Altamont?) like that at CR-245 exposed in bed of stream on both sides of Kansas Highway 146; approximately 500 ft west of SE corner, Sec. 18, T.28S., R.22E., Crawford Co., Kansas.
- CR-250 = Limestone (Altamont?) like that at CR-245 exposed in bed of Walnut Creek slightly below an elevation of 900 ft on both sides of Kansas Highway 146 just east of Walnut, Kansas; approximately 1600 ft west of SW corner of Sec. 13, T.28S., R.21E., Crawford Co., Kansas.
- C-251 = Base of calcarenitic limestone (Altamont?) similar to that described at C-12 is at 895 ft in the west stream bank of Little Walnut Creek; just north of center of south line of SE1/4, Sec. 23 T.28S., R.21E., Crawford Co., Kansas.
- CR-252 = Top of pedogenic limestone (Altamont) like that at CR-250 at 910 ft in drainage of west side of road; approximately 200 ft west of center of N1/2, Sec. 24, T.28S., R.21E., Crawford Co., Kansas.
- CR-253 = Possible sandstone in drainage on both sides of road; approximately 200 ft east of center of south line of SW1/4, SE1/4, Sec. 19, T.28S., R.22E., Crawford Co., Kansas.
- CR-254 = Base of Altamont Limestone(?) with sandstone below in road at 920 ft; beds of limestone capping hill to the north; approximately 950 ft west of SE corner, Sec. 19, T.28S., R.22E., Crawford Co., Kansas.
- CR-255 = Same as CR-254 with contact of limestone (Altamont?) and sandstone at 920 ft; at least 12 ft of limestone to top of hill to the north; approximately 800 ft north of SE corner, Sec. 19, T.28S., R.22E., Crawford Co., Kansas.
- CR-256 = Limestone (Altamont?) in creek bed west of road; surface of limestone like that at CR-252; elevation of this limestone surface is 911 ft and is somewhere within the Altamont Limestone(?); approximately 300 ft south of center of east line of Sec. 19, T.28S., R.22E., Crawford Co., Kansas.

- CR-257 = Limestone (Altamont?) surface like that at CR-249 at 926 ft in ditch on both sides of road; approximately 400 ft south of NE corner, Sec. 19, T.28S., R.22E., Crawford Co., Kansas.
- CR-258 = Terrain and soils suggests bedrock of sandy, silty mudrock and sandstone; approximately 1100 ft south of center of east line of Sec. 20, T.28S., R.22E., Crawford Co., Kansas.
- CR-259 = Contact with limestone (Altamont?) and underlying sandstone at 942 ft; both contact and limestone are similar to those at CR-255; sandstone below the contact is well exposed; approximately 850 ft north of SE corner, Sec. 29, T.28S., R.22E., Crawford Co., Kansas.
- CR-260 = Silty, sandy mudrock exposed in drainage north of road; approximately 300 ft west of center of south line of Sec. 28, T.28S., R.22E., Crawford Co., Kansas.
- CR-261 = Contact of limestone (Altamont?) above and sandstone below in road at 925 ft with about 5 ft of limestone exposed on the east side of the road in an old trench silo; thin-bedded, platy limestone with uppermost bed similar in some ways to the calcarenite at CR-251; upper surface of bed about a 1 ft below the top looks pedogenic and similar to those noted elsewhere in stream beds; approximately 250 ft north of SW corner, Sec. 29, T.28S., R.22E., Crawford Co., Kansas.
- CR-262 = Thin-bedded, platy limestone (Altamont?) in road ditch on east side of road and in the bed of stream of east side of road at 910 ft (?); center of west line of Sec. 30, T.28S., R.22E., Crawford Co., Kansas.
- CR-263 = Limestone (Altamont?) in road at approximately 905 ft and in road ditches on both sides of road; similar to exposure at CR-262; area of section C-14; approximately 800 ft south of center of west line of Sec. 30, T.28S., R.22E., Crawford Co., Kansas.
- CR-264 = Terrain and soils suggests bedrock of sandy, silty mudrock and sandstone; area of section C-14; center of south line of SW1/4, SE1/4, Sec. 25, T.28S., R.21E., Crawford Co., Kansas.
- CR-265 = Base of thin-bedded, platy limestone (Altamont?) at approximately 896 ft in road; approximately 300 ft west of center of south line of Sec. 26, T.28S., R.21E., Crawford Co., Kansas.
- CR-266 = Similar to CR-265 with base of limestone (Altamont?) at 890 ft (?); area of section C-11; approximately 100 ft south of NW corner, Sec. 35, T.28S., R.21E., Crawford Co., Kansas.

- CR-267 = Base of limestone (Altamont?) at 900 ft with sandstone below in road; approximately 1000 ft north of SW corner, Sec. 35, T.28S., R.21E., Crawford Co., Kansas.
- CR-268 = Same as at CR-267 with good exposures in road and vertical exposure of sandstone in drainage north of road; limestone exposed in ditches on both sides of road; center of south line of SE1/4, SW1/4, Sec. 35, T.28S., R.21E., Crawford Co., Kansas.
- CR-269 = Excellent exposure of limestone (Altamont?) above and sandstone below at 900 ft in road; center of south line of Sec. 35, T.28S., R.21E., Crawford Co., Kansas.
- CR-270 = Sandstone well exposed in drainage on both sides of road below 900 ft; near center of NE1/4, NW1/4, NE1/4, Sec. 2, T.29S., R.21E., Crawford Co., Kansas.
- CR-271 = Limestone (Altamont?) in road at 900 ft and above; approximately 500 ft east of SW corner, Sec. 1, T.29S., R.21E., Crawford Co., Kansas.
- CR-272 = Same as CR-271; just north of center of south line of Sec. 36, T.28S., R.21E., Crawford Co., Kansas.
- CR-273 = Well-exposed, thin-bedded, platy sandstones and sandy, silty mudrocks in stream on both sides of road with limestone (Altamont?) above 900 ft in road to the north; approximately 900 ft north of SE corner, Sec. 36, T.28S., R.21E., Crawford Co., Kansas.
- CR-274 = Three + ft of thin-bedded, platy, algal, fossiliferous limestone (Altamont/Amoret?) exposed in south bank of Walnut Creek with phosphate nodules in clayey soil above; top of limestone at approximately 890 ft; along south line of NE1/4, NE1/4, NE1/4, Sec. 36, T.28S., R.21E., Crawford Co., Kansas.
- CR-275 = Limestone (Altamont?) exposed in road ditches on north side of road for about 0.1 mi; just west of the SE corner along the south line of Sec. 31, T.28S., R.22E., Crawford Co., Kansas.
- CR-276 = Base of limestone (Altamont?) at 922 ft in road ditch on east side of road; approximately 550 ft south of center of west line of Sec. 32, T.28S., R.22E., Crawford Co., Kansas.
- CR-277 = Sandstone and sandy, silty mudrock on both sides of new bridge construction; approximately 300 ft north of center of west line of Sec. 32, T.28S., R.22E., Crawford Co., Kansas.

- CR-278 = Similar to CR-277; approximately 800 ft north of SE corner, Sec. 32, T.28S., R.22E., Crawford Co., Kansas.
- CR-279 = Like CR-277 with silty, sandy mudrock exposed under the bridge; center of south line of SW1/4, Sec.33, T.28S., R.22E., Crawford Co., Kansas.
- CR-280 = Sandstone exposed in road on both sides; approximately 100 ft east of center of south line of Sec. 32, T.28S., R.22E., Crawford Co., Kansas.
- CR-281 = Limestone (Altamont?) above 942 ft in road with sandstone below; two points: one 500 ft west and the other 900 west of center of south line of Sec. 32, T.28S., R.22E., Crawford Co., Kansas.
- CR-282 = Limestone (Altamont?) above 942 ft in road with sandstone below; approximately 800 ft west of center of south line of Sec. 7, T.29S., R.22E., Crawford Co., Kansas.
- CR-283 = Silty, sandy mudrock in stream east of road; approximately 700 ft north of SW corner, Sec. 6, T.29S., R.22E., Crawford Co., Kansas.
- CR-284 = Limestone, probably float, in pond bank on south side of road and in road to the east; near center of north line of NE1/4, NW14, Sec. 1, T.29S., R.21E., Crawford Co., Kansas.
- CR-285 = Approximately 5 ft of limestone (Altamont?) in road ditch on south side of road; base is inferred at 920 ft; lithologically like other limestones in this area; approximately 450 ft east of SW corner, Sec. 1, T.29S., R.21E., Crawford Co., Kansas.
- CR-285A = Limestone in place in road ditches on both sides of road at 955 ft; approximately 400 ft south of center of east line, Sec. 11, T.29S., R.21E., Crawford Co., Kansas.
- CR-286 = Thin to platy, cross bedded sandstone in road ditch on west side of road; creek exposure extends from the center of the east line of Sec. 2 for about 0.3 mi south toward the SE corner, Sec. 2, T.29S., R.21E., Crawford Co., Kansas.
- CR-287 = Contact between limestone (Altamont) above and sandstone below at 941 ft in road; center of south line of Sec. 2, T.29S., R.21E., Crawford Co., Kansas.
- CR-288 = Limestone float at 941 ft in road; area section C-35; approximately 200 ft east of SW corner, Sec. 2, T.29S., R.21E., Crawford Co., Kansas.
- CR-288A = Limestone float in fields on both sides of road; approximately 800 ft south of NW corner, Sec. 11, T.29S., R.21E., Crawford Co., Kansas.

- CR-289 = Like CR-288 but contact is at 903 to 905 ft; NW corner, Sec. 2, T.29S., R.21E., Crawford Co., Kansas.
- CR-290 = Limestone (Altamont?) in road at 905 ft with sandstone below; approximately 1000 ft south of NW corner, Sec. 14, T.29S., R.21E., Crawford Co., Kansas.
- CR-291 = Sandstone in road; approximately 100 ft south of center of west line of Sec. 17, T.29S., R.22E., Crawford Co., Kansas.
- CR-292 = Thin-bedded, platy, sandy to silty mudrock in drainage; approximately 500 ft north of center of south line of Sec. 17, T.29S., R.22E., Crawford Co., Kansas.
- CR-293 = Thick sandstone in drainage at low-water bridge; near center of south line of SW1/4, SW1/4, SE1/4, Sec. 21, T.29S., R.22E., Crawford Co., Kansas.
- CR-294 = Sandstone in road; center of south line of SW1/4, SE1/4, Sec. 20 T.29S., R.22E., Crawford Co., Kansas.

BRAZILTON QUADRANGLE

Field work was conducted during January–March of 2001.

- C-16 = Altamont (Amoret) Limestone and mudrock below in creek bank north of bridge; measured and described by J. M. Jewett in 1941 (location not found); near center of SE1/4, SE1/4, Sec. 23, T.28S., R.22E., Crawford Co., Kansas.
- C-17 = Bandera sandstone and underlying mudrocks along banks of west-flowing creek on the east side of Kansas Highway 3; measured and described by J. M. Jewett in 1939; location found; near center of west line of NW1/4, SE1/4, Sec. 14, T.28S., R.22E., Crawford Co., Kansas.
- C-18 = Altamont Limestone in road ditch on east side of Kansas Highway 3; measured and described by J. M. Jewett in 1939; location found; inferred base of Altamont Limestone at 948 ft (2 ft of Worland limestone and 2 ft of Lake Neosho shale); 0.2 mi south of the center of north side of Sec. 14, T.28S., R.22E., Crawford Co., Kansas.
- C-37 = Exposure of mudrocks, coal, and underclay of the Labette Shale along the south bank of Lightning Creek just south of bridge over Kansas Highway 57; measured and described by J. M. Jewett in 1939; near center of north line, Sec. 21, T.29S., R.23E., Crawford Co., Kansas.
- C-38 = See CR-156 below.

- C-39 = Exposure of lower Labette Shale and upper beds of Fort Scott (Higginsville) Limestone in and along Lightning Creek on the north side of Kansas Highway 57; measured and described by J. M. Jewett, probably in 1939; location not found; near center of south line, Sec. 16, T.29S, R.23E., Crawford Co., Kansas.
- C-41 = Exposure of Pawnee Limestone where there is little or no mudrock between the two limestone members (Myrick Station limestone and Laberdie limestone) of this formation here and at nearby localities as noted by J. M. Jewett who measured and described, in 1939; rocks exposed in a WPA quarry at this site; near center of NW1/4, NW1/4, Sec. 9, T.29S., R.23E., Crawford Co., Kansas.
- CR-151 = Top of Anna, base of Pawnee (Myrick Station) Limestone in road ditch on both sides of north-south road at 960 ft; approximately 200 ft south of the center of west line, Sec. 22, T.29S., R.23E., Crawford Co., Kansas.
- CR-151A = Top of Anna, base of Pawnee (Myrick Station) Limestone in road ditch on both sides of north-south road at 960 ft; near center of west line of NW1/4, SW1/4, Sec. 22, T.29S., R.23E., Crawford Co., Kansas.
- CR-152 = Exposure in a field along north bank of Lightning Creek of interval similar to that seen at C-37 (Labette Shale); 500 ft north and 300 ft west of the SE corner, Sec. 20, T.29S., R.23E., Crawford Co., Kansas.
- CR-153 = Englevale sandstone in road ditch on north side of road; near center of south line of Sec. 20, T.29S., R.23E., Crawford Co., Kansas.
- CR-154 = Top of Anna, base of Pawnee (Myrick Station) Limestone in drainage on north side of road at 939 ft; approximately 800 ft west of the SE corner, Sec. 19, T.29S., R.23E., Crawford Co., Kansas.
- CR-155 = Loose blocks (float) of Myrick Station limestone in ditch on south side of road; near center of north line of Sec. 30, T.29S., R.23E., Crawford Co., Kansas.
- CR-156 = Top of Anna shale, base of Pawnee (Myrick Station) Limestone at change in road grade at 930 ft; same as C-38; approximately 1100 ft east of SW corner, Sec. 19, T.29S., R.23E., Crawford Co., Kansas.
- CR-157 = Pawnee (Laberdie) Limestone in road ditches on both sides of road; approximately 900 ft south of NW corner, Sec.19, T.29S., R.23E., Crawford Co., Kansas.
- CR-157A = Quarry in Pawnee (Laberdie) Limestone on west side of road; near center SE1/4, SE1/4, NE1/4, Sec. 24, T.29S., R.22E., Crawford Co., Kansas.
- CR-158 = Pawnee (Laberdie) Limestone exposed in drainage south of Kansas Highway 57, probably near the top of the Pawnee Limestone; KDOT Bridge Number 57-

- 19-7.40 profile; just south of center of NE1/4, NW1/4, Sec. 24. T.29S., R.22E., Crawford Co., Kansas.
- CR-159 = Quarry in Pawnee (Laberdie) Limestone on east side of road; near center SW1/4, NW1/4, SW1/4, Sec. 24, T.29S., R.22E., Crawford Co., Kansas.
- CR-160 = Sandstone (Bandera) in road; near center of south line of SE1/4, SW1/4, SW1/4, Sec. 22, T.29S., R.22E., Crawford Co., Kansas.
- CR-162 = Base of Altamont Limestone(?) at 1010 ft in road (capping hill) with silty, sandy mudstone below; approximately 200 ft south of center of west line of SW1/4, Sec.11, T.29S., R.22E., Crawford Co., Kansas.
- CR-163 = Loose blocks (float) of Myrick Station limestone on north side of road at 970 ft; approximately 850 ft west of SE corner, Sec. 9, T.29S., R.23E., Crawford Co., Kansas.
- CR-164 = Exposure of what appears to be Pawnee (Myrick Station) Limestone in field about 1/8 mi east of road; near center of NW1/4, SW1/4, Sec. 10, T.29S., R.23E., Crawford Co., Kansas.
- CR-165 = Similar to CR-164 (Pawnee Limestone) but exposures better and visible on both sides of road; approximately 300 ft north of center of west line, Sec. 10 and east line of Sec. 9, T.29S., R.23E., Crawford Co., Kansas.
- CR-166 = Exposure similar to that at CR-165 (Pawnee Limestone) at 990 ft; near center of south line of SW1/4, SW1/4, SE1/4, Sec. 10, T.29S., R.23E., Crawford Co., Kansas.
- CR-167 = Pawnee (Laberdie) Limestone is exposed in the drainages on both sides of the road and is lithologically like that described by Jewett for the upper Pawnee Limestone at C-41; near center of west line of NW1/4, NW1/4, Sec. 8, and near center of east line of NE1/4, NE1/4 Sec. 7, T.29S., R.23E., Crawford Co., Kansas.
- CR-168 = Similar to exposure at CR-167 but also with blocks of Myrick Station limestone; near center of NE1/4, NW1/4, NW1/4, Sec. 8, and near center of SE1/4, SW1/4, SW1/4, Sec. 5, T.29S., R.23E., Crawford Co., Kansas.
- CR-169 = Exposure similar to that at CR-168 but with approximately 2 ft of limestone in creek bank on east side of road; near center of north 1/2, Sec. 8, T.29S., R.23E., Crawford Co., Kansas.
- CR-169A = Laberdie limestone overlies directly the Myrick Station limestone with no mudrock in between; top of Anna shale/base of Pawnee (Myrick Station) Limestone at approximately 937 ft along creek bank in field on east side of road;

- slightly west of the center of NE1/4, SW1/4, NE1/4, Sec. 8, T.29S., R.23E., Crawford Co., Kansas.
- CR-170 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at approximately 950 ft in field on south side of road; good exposure of thin-bedded limestone along hillside and black mudrock (Anna) and gray mudrock (Labette) below limestone; near center of north line of NE1/4, NE1/4, Sec. 5, T.29S., R.23E., Crawford Co., Kansas.
- CR-171 = Exposure of Pawnee (Laberdie) Limestone in road at 963 ft; center of north line, Sec. 5, T.29S., R.23E., Crawford Co., Kansas.
- CR-172 = Exposure of Pawnee (Laberdie) Limestone on east side of road; center west line SW1/4, SW1/4, Sec.5, T.29S., R.23E., Crawford Co., Kansas.
- CR-173 = Limestone exposed in road, possibly Altamont(?); approximately 250 ft west of SE corner, Sec. 36, T.28S., R.22E., Crawford Co., Kansas.
- CR-174 = Limestone exposed in road, possibly near the base of the Altamont(?) at 1000 ft; approximately 100 ft west of SE corner, Sec. 35, T.28S., R.22E., Crawford Co., Kansas.
- CR-175 = Sandstone in road (Bandera); approximately 400 ft east of center of south line of Sec. 35, T.28S., R.22E., Crawford Co., Kansas.
- CR-176 = Sandstone in road (Bandera); approximately 1000 ft east of center of south line of Sec. 34, T.28S., R.22E., Crawford Co., Kansas.
- CR-177 = Exposure like that at CR-174 with possibly base of Altamont at 981 ft; approximately 500 ft west of CR-176 just west of center of south line of SW1/4, Sec. 34, T.28S., R.22E., Crawford Co., Kansas.
- CR-178 = Thin-bedded sandstone (Bandera?) in road ditch on west side of road; near center of east line of NE1/4, NE1/4, Sec. 33, T.28S., R.22E., Crawford Co., Kansas.
- CR-178A = Creek-bank exposure of lithology described at CR-178; near center of north line of NE1/4, NE1/4, Sec. 33, T.28S., R.22E., Crawford Co., Kansas.
- CR-179 = Bandera sandstone in road; near center of north 1/2, NW1/4, Sec. 27, T.28S., R.22E., Crawford Co., Kansas.
- CR-180 = Thin-bedded, sandy, silty mudrock (Bandera) in road ditch and along drainage on north side of road; approximately 100 ft east of SW corner, Sec. 25, T.28S., R.22E., Crawford Co., Kansas.

- CR-180A = Thin-bedded, sandy, silty mudrock (Bandera) in road ditch and along drainage on south side of road; approximately 100 ft east of NW corner, Sec. 36, T.28S., R.22E., Crawford Co., Kansas.
- CR-180B = Thin-bedded, sandy, silty mudrock (Bandera) in road ditch and along drainage on north side of road; center of south line SE1/4, SW1/4, Sec. 25, T.28S., R.22E., Crawford Co., Kansas.
- CR-181 = Road and surrounding topography suggest Bandera bedrock; near center of north line NW1/4, NW1/4, Sec. 32, T.28S, R.23E., Crawford Co., Kansas.
- CR-182 = Dark-gray to black, hard, dense, thin-bedded to platy limestone as sometimes seen in the lower part of the Bandera; approximately 300 ft north and 200 ft east of SW corner, Sec. 28, T.28S., R.23E., Crawford Co., Kansas.
- CR-183 = Possibly close to the top of the Pawnee (Laberdie) Limestone at 960 ft in road; approximately 900 ft south of center of west line of Sec. 34, T.29S., R.23E., Crawford Co., Kansas.
- CR-184 = Possibly close to the Altamont Limestone at 995 ft in road; approximately 100 ft west of SE corner, Sec. 8, T.29S., R.23E., Crawford Co., Kansas.
- CR-185 = Sandstone (Bandera) in road; near center of west 1/2, Sec. 29, T.28S., R.23E., Crawford Co., Kansas.
- CR-186 = Thin-bedded sandstone in drainage on both sides of road; approximately 200 ft north of center of west line of Sec. 29 and north of the center of east line of Sec. 30, T.28S., R.23E., Crawford Co., Kansas.
- CR-187 = Close to the base of the Altamont Limestone in old quarry on west side of road at approximately 981 ft; lithologically like the limestone at CR-184; near center of east line of NE1/4, NE1/4, Sec. 30, T.28S., R.23E., Crawford Co., Kansas.
- CR-188 = Sandstone (Bandera?) in road; center of west line of NE1/4, NE1/4, Sec. 20, T.28S., R.23E., Crawford Co., Kansas.
- CR-189 = Area of loose limestone blocks (float) along stream in field north of road suggesting base of Altamont Limestone; just south and along, in an east-west direction, center of SW1/4, SE1/4, Sec. 7, T.28S., R.23E., Crawford Co., Kansas.
- CR-190 = Limestone in road at 959 ft, possibly near base of Altamont Limestone; center south line of SE1/4, Sec. 12, T.28S., R.22E., Crawford Co., Kansas.
- CR-191 = Large blocks of limestone (float) like that at C-18 in road ditch on north side of road at 948 ft; approximately 400 ft west of SE corner, Sec. 11, T.28S., R.22E., Crawford Co., Kansas.

- CR-192 = Similar to exposure at CR-191; approximately 150 ft south of center of west line of Sec. 18, T.28S., R.23E., Crawford Co., Kansas.
- CR-193 = Altamont Limestone in the road and in place in road ditch on east side of road; near center of east line of NE1/4, Sec. 24, T.28S., R.22E., Crawford Co., Kansas.
- CR-194 = Limestone in road at 990 ft, possibly top of Altamont Limestone; center of east line of Sec. 24, T.28S., R.22E., Crawford Co., Kansas.
- CR-195 = Limestone blocks in road ditch north of road, looks like Altamont Limestone the base of which may be near 976 ft; approximately 450 ft east of center of south line of Sec. 24, T.28S., R.22E., Crawford Co., Kansas.
- CR-196 = Sandstone float in road (Bandera); approximately 300 ft west of center of south line of Sec. 24, T.28S., R.22E., Crawford Co., Kansas.
- CR-197 = Exposure (two limestones with no intervening mudrock) similar to the one at CR-195 with the base of the Altamont Limestone inferred to be near 976 ft; approximately 600 ft west of center of south line of Sec. 24, T.28S., R.22E., Crawford Co., Kansas.
- CR-198 = Sandstone (Bandera) exposed on both sides of road under the bridge on the south side of the stream with approximately 6 ft of Altamont Limestone exposed southward in road ditch along the east side of the road; base of Altamont Limestone between 925 and 930 ft; approximately 100 ft north of center of Sec. 22, T.28S., R.22E. Crawford Co., Kansas.
- CR-295A = Sandstone (Bandera) in KDOT borehole on bridge profile on Kansas Highway 146; near SE corner, Sec. 15, T.28S., R.22E., Crawford Co., Kansas.
- CR-295B = Base of limestone (Altamont?) in KDOT borehole at 918 ft on bridge profile on Kansas Highway 146; near SW corner, SE1/4, SW1/4, Sec. 15, T.28S., R.22E., Crawford Co. Kansas.

GIRARD QUADRANGLE

Field work was conducted during January–March of 2000.

- C-19 = Upper Cabaniss “Squirrel” sandstone to Fort Scott (Blackjack Creek) Limestone (contains chaetetids); interval between black shale (“Excello”) and sandstone covered; exposure in strip pit and creek bank; measured and described by W. Howe, July 1948; center NW1/4, NE1/4, Sec. 15, T.28S., R.24E., Crawford Co., Kansas.

- C-20 = Myrick Station and Laberdie limestones; measured and described by J. M. Jewett, 1940 = Jewett (1945), site 110; road cut near center south line, Sec. 33, T.28S., R.24E., Crawford Co., Kansas.
- C-21 = Little Osage shale to Higginsville limestone; road cut west of Englevale, Kansas; measured and describe by J. Jewett, 1940 = Jewett (1945), site 109; near center of south line, Sec. 15, T.28S., R.24E., Crawford Co., Kansas.
- C-22 = Fort Scott Limestone with chaetetids in Blackjack Creek limestone; measured and describe by J. M. Jewett, 1939 = Jewett (1945), site 108; Sec. 11, T.28S., R.24E., Crawford Co., Kansas.
- C-23 = Sandstone below Breezy Hill limestone to Higginsville limestone, chaetetids in Blackjack Creek and Higginsville limestones (Fort Scott is 35.21 ft thick) sandstone surface in creek; measured and described by J. M. Jewett, 1941 = Jewett (1945), site 108; Sec. 11, T.28S., R.24E., Crawford Co., Kansas.
- C-40 = Pawnee Limestone in WPA quarry north of road; measured and describe by J. M. Jewett, 1939 = Jewett (1945), site 116; SE corner, Sec. 11, T.29S., R.23E., Crawford Co., Kansas.
- C-42 = “Houx” limestone (within Little Osage shale) and Higginsville limestones with some black shale below; chaetetids in Higginsville; measured and described by J. M. Jewett, 1939; quarry 0.5 mi east of Girard, Kansas, on south side of U.S. Highway 57; center of north line, Sec. 19, T.29S., R.24E., Crawford Co., Kansas.
- L-705 = Exposure of Mulky coal, “Excello” shale up to upper beds of Blackjack Creek limestone with tabular to low domical chaetetids in road cut on north side of road; poorly exposed when visited in 1985; Moore (1949), locality 2 = Jewett (1945), site 108; site now isolated by two inlets of Bone Creek Reservoir; near SW corner, Sec. 11, T.28S., R.24E., Crawford Co., Kansas.
- CR-89 = Limestone like Myrick Station in road at 1000 ft; center south line of SW1/4, SW1/4, SW1/4, Sec. 15, T.28S., R.24E., Crawford Co., Kansas.
- CR-90 = Top of Fort Scott (Higginsville) Limestone at 935 ft in field on south side of road; Little Osage shale in creek on south side of road with about 12 ft of Higginsville limestone above; lower 6 ft is a thin, wavy-bedded, light-gray, fossiliferous, algal limestone, upper 6 ft partially covered with upper part containing tabular to low domical chaetetids; = L-765, Jewett (1945) site 109, and C-21; just south of center of north line of NW1/4, NW1/4, NE1/4, Sec. 22, T.28S., R.24E., Crawford Co., Kansas.
- CR-91 = Top of Fort Scott (Higginsville) Limestone at 940 ft in road based on an old map of this area (Pierce and Courtier, 1937); no exposure, but a reasonable point;

- near center of south line of SW1/4, Sec. 14, T.28S., R.24E., Crawford Co., Kansas.
- CR-92 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone in road at 1000 ft; center of west line of SW1/4, SW1/4, Sec. 15, T.28S., R.24E., Crawford Co., Kansas.
- CR-93 = Sandstone in road at 970 ft (probably Englevale); center of west line of SW1/4, NW1/4, SW1/4, Sec. 15, T.28S., R.24E., Crawford Co., Kansas.
- CR-94 = Top of Fort Scott (Higginsville) Limestone well exposed in road at 933 ft; upper part like that at CR-90 with tabular to low domical chaetetids; same limestone also exposed below barn in field west of road; center of west line of Sec. 15, T.28S., R.24E., Crawford Co., Kansas.
- CR-95 = Top of Fort Scott (Higginsville) Limestone at 933 ft in partial exposure in pond east of road; similar to exposure at CR-94; center of west line of SW1/4, NW1/4, NW1/4, Sec. 15, T.28S., R.24E., Crawford Co., Kansas.
- CR-96 = Thin limestone probably in place in road in the Labette Shale; center of west line of NW1/4, NW1/4, SW1/4, Sec. 10, T.28S., R.24E., Crawford Co., Kansas.
- CR-97 = Base of Fort Scott (Blackjack Creek) Limestone at 910 ft just above lake level at Leaning Tree Boat Ramp; tabular to low domical chaetetids in thin-bedded, dense, fossiliferous, reddish-brown limestone; "Excello" shale exposed below; approximately 300 ft SE of the center of SW1/4, SE1/4, Sec. 10, T.28S., R.24E., Crawford Co., Kansas.
- CR-98 = L-813 = Base of Fort Scott (Blackjack Creek) Limestone at 910 ft just above lake (Bone Creek Reservoir) level; tabular to low domical chaetetids in thin-bedded, dense, fossiliferous, reddish-brown limestone; "Excello" shale exposed below with Breezy Hill limestone at lake level (900 ft); also locality 813, Roth (1991); center of south line of SW1/4, SW1/4, SE1/4, Sec. 10., T.28S., R.24E., Crawford Co., Kansas.
- CR-99 = Thin bed of light gray, dense limestone in Labette Shale like that at CR-96 at 955 ft in road; center of south line of SE1/4, SE1/4, Sec. 9, T.28S., R.24E., Crawford Co., Kansas.
- CR-99A = Thin bed of dark gray to black, clayey, fossiliferous (abundant linoproductid brachiopods) limestone in Labette Shale at 970 ft in road; like blocks seen in fill used near CR-98; near center of south line of SW1/4, SE1/4, SE1/4, Sec. 9, T.28S., R.24E., Crawford Co., Kansas.
- CR-100 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 995 ft in road ditch on north side of road; limestone is thin beds of light-brownish-gray,

- sandy carbonate with very thin, 2-3-mm-thick, tabular chaetetids; large blocks of vuggy, algal limestone (Laberdie) exposed in field north of road; approximately 150 ft east of center of south line of SE1/4, SW1/4, Sec. 9, T.28S., R.24E., Crawford Co., Kansas.
- CR-101 = Pawnee (Laberdie) Limestone in fields on both sides of road at 1025 ft; center of south line of SW1/4, SW1/4, Sec. 9, T.28S., R.24E., Crawford Co., Kansas.
- CR-102 = Pawnee (Laberdie) Limestone in fields on both sides of road at 1010 ft; approximately 400 ft north of center of west line of Sec. 9, T.28S., R.24E., Crawford Co., Kansas.
- CR-103 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 995 ft in road ditch on west side of road; limestone is thin beds of light-brownish-gray, sandy carbonate; approximately 300 ft south of center of east line of NE1/4, Sec. 17, T.28S., R.24E., Crawford Co., Kansas.
- CR-104 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 996 ft in road ditch on east side of road; limestone is thin beds of light-brownish-gray, sandy to clayey carbonate with tabular chaetetids; similar to CR-103 but the exposure is better; near center of west line of SW1/4, NW1/4, SW1/4, Sec. 16, T.28S., R.24E., Crawford Co., Kansas.
- CR-105 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1000 ft in field northwest of section corner and on west side of road going north from the section corner; Anna and Myrick Station are lithologically the same as at CR-103, but both are thin and the Mine Creek is very thin or absent; SE corner, Sec. 17, T.28S., R.24E., Crawford Co., Kansas.
- CR-106 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1000 ft in road, same as at CR-105 but newer exposure; center of south line of SW1/4, SE1/4, Sec. 16, T.28S., R.24E., Crawford Co., Kansas.
- CR-107 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1000 ft in road as at CR-106; center of west line of NE1/4, NE1/4, Sec. 21, T.28S., R.24E., Crawford Co., Kansas.
- CR-108 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1000 ft in road around top of hill, as at CR-106; two points along west line of SE1/4, NE1/4, Sec. 21, T.28S., R.24E., Crawford Co., Kansas.
- CR-109 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1010 ft in road, like CR-106; approximately 300 ft south of center of east line of SE1/4, Sec. 21, T.28S., R.24E., Crawford Co., Kansas.

- CR-110 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1015 ft in road, like CR-106; approximately 100 ft east of center of north line of NW1/4, Sec. 27, T.28S., R.24E., Crawford Co., Kansas.
- CR-111 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1015 ft in road, like CR-106; center of north line of NW1/4, Sec. 26, T.28S., R.24E., Crawford Co., Kansas.
- CR-112 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1015 ft in road; poor contact but usable; agrees with old map of this area (Pierce and Courtier, 1937); two points along east end of north line of NE1/4, Sec. 34, T.28S., R.24E., Crawford Co., Kansas.
- CR-113 = Inferred top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1010 ft in road, like CR-112; center of north line of NW1/4, NW1/4, Sec. 34, T.28S., R.24E., Crawford Co., Kansas.
- CR-114 = Inferred top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1010 ft in road, like CR-112; approximately 200 ft east of center of north line of NE1/4, Sec. 33, T.28S., R.24E., Crawford Co., Kansas.
- CR-115 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1012 ft in road ditch south of road, both appear to be quite thin with Laberdie limestone in field north of road; approximately 500 ft east of NW corner of Sec. 3, T.29S., R.24E., Crawford Co., Kansas.
- CR-116 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1025 ft in road and fields on both sides of road; poor exposure but usable; center of north line of NE1/4, Sec. 3, T.29S., R.24E., Crawford Co., Kansas.
- CR-117 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1025 ft in road with Myrick Station limestone also exposed in pond bank in field east of road; similar to CR-116; approximately 350 ft south of center of west line of NW1/4, SW1/4, Sec. 35, T.28S., R.24E., Crawford Co., Kansas.
- CR-118 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1022 ft in road; poor exposure but usable; blocks of limestone in field south of road; center of north line of NE1/4, NW1/4, Sec. 35, T.28S., R.24E., Crawford Co., Kansas.
- CR-119 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1002 ft in road; poor exposure like at CR-118, but usable; approximately 100 ft west of center of north line of NE1/4, NE1/4, Sec. 5, T.29S., R.24E., Crawford Co., Kansas.

- CR-120 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1010 ft in road; poor exposure like at CR-118, but usable; approximately 400 ft west of center of north line of Sec. 33, T.28S., R.24E., Crawford Co., Kansas.
- CR-121 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1000 ft in road; fairly good exposure of lower Pawnee Limestone in old road cut east of county road, also exposed in field west of road and south of pond; typical Myrick Station limestone with thin (2-3 mm) tabular chaetetids; center of west line of NW1/4, SW1/4, NW1/4, Sec. 21, T.28S., R.24E., Crawford Co., Kansas.
- CR-122 = Pawnee (Laberdie) Limestone in fields on both sides of road at 990 ft; approximately 100 ft west of center of north line of Sec. 18, T.28S., R.24E., Crawford Co., Kansas.
- CR-123 = Top of Pawnee (Laberdie) Limestone at 980 ft, 6-8 ft of medium- to thin-bedded, vuggy, algal limestone forms a waterfall below dam of Frisco Lake just north of Farlington, Kansas; uppermost beds similar to Myrick Station limestone with few thin tabular chaetetids; approximately 200 ft NW of center of N1/2 of SW1/4, Sec. 7, T.28S., R.24E., Crawford Co., Kansas.
- CR-124 = Thin-bedded to platy, light-gray to brownish, silty mudrocks and clayey siltstones of Bandera Shale in road ditch on north side of road at 1010 ft; center of south line of SE1/4, SW1/4, Sec. 12, T.28S., R.23E., Crawford Co., Kansas.
- CR-125 = Thin limestone in road that looks like Altamont (Worland?) Limestone suggesting base of Altamont Limestone at 1060 ft; two points north and south of center of west line of SW1/4, SW1/4, Sec. 12, T.28S., R.23E., Crawford Co., Kansas.
- CR-126 = Bandera Shale below house at 1030+ ft; just east of center of west line of SW1/4, Sec. 11, T.28S., R.23E., Crawford Co., Kansas.
- CR-127 = Reddish-brown, ferruginous sandstone of Bandera Shale at 1055 ft; near center of north line of NE1/4, Sec. 23, T.28S., R.23E., Crawford Co., Kansas.
- CR-128 = Sandstone of Bandera Shale in road ditch on north side of road to 1030 ft; approximately 400 ft west of center of south line of SE1/4, Sec. 23, T.28S., R.23E., Crawford Co., Kansas.
- CR-129 = Near top of Pawnee (Laberdie) Limestone in field south of road at 999 ft; approximately 200 ft west of center of north line of NE1/4, Sec. 35, T.28S., R.23E., Crawford Co., Kansas.
- CR-130 = Near top of Pawnee (Laberdie) Limestone in road at 995 ft (?); near center of north line of NW1/4, NE1/4, Sec. 36, T.28S., R.23E., Crawford Co., Kansas.

- CR-131 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone poorly exposed in road ditch on west side of road at 990 ft; center of east line of Sec. 31, T.28S., R.24E., Crawford Co., Kansas.
- CR-132 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone poorly exposed in road at 985 ft, similar to CR-131; near center of east line of SE1/4, NE1/4, SE1/4, Sec. 31, T.28S., R.24E., Crawford Co., Kansas.
- CR-133 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone poorly exposed in road at 980 ft, similar to CR-131; center of east line of SE1/4, SE1/4, Sec. 31, T.28S., R.24E., Crawford Co., Kansas.
- CR-136 = Base of Fort Scott (Blackjack Creek) Limestone at 965 ft based on topography and old geologic map of area (Pierce and Courtier, 1937); soils map of county indicates a narrow linear band of limestone oriented northwest-southeast; approximately 200 ft north of center of east line of NE1/4, Sec. 21, T.29S., R.24E., Crawford Co., Kansas.
- CR-137 = Base of Fort Scott (Blackjack Creek) Limestone estimated at 980 ft; thin Blackjack Creek limestone covered by a thin soil, "Excello" shale below based on a recent excavation; approximately 100 ft south of center of east line of SE1/4, SE1/4, Sec. 15, T.29S., R.24E., Crawford Co., Kansas.
- CR-138 = No exposure, but reasonable base of Fort Scott (Blackjack Creek) Limestone at 995 ft using old geologic map of area (Pierce and Courtier, 1937) and float associated with old strip pits where Mulky coal was removed; near center of south line of SW1/4, SW1/4, Sec. 11, T.29S., R.24E., Crawford Co., Kansas.
- CR-139 = Limestone and black shale float in stream on north side of road, probably Higginsville limestone and Little Osage shale; probably near the top of Fort Scott (Blackjack Creek) Limestone at 965 ft based on old geologic map of area (Pierce and Courtier, 1937); approximately 200 ft east of center of north line of NW1/4, NW1/4, Sec. 9, T.29S., R.24E., Crawford Co., Kansas.
- CR-140 = Possibly base of Fort Scott (Blackjack Creek) Limestone at 960 ft based on float and soils map; very poor exposure; center of south line of SW1/4, Sec. 9, T.29S., R.24E., Crawford Co., Kansas.
- CR-141 = Possibly base of Fort Scott (Blackjack Creek) Limestone at 960 ft along stream on south side of road, based on float and soils map; very poor exposure; approximately 200 ft east and 200 ft south of center of north line of Sec. 17, T.29S., R.24E., Crawford Co., Kansas.
- CR-142 = Exposure of Higginsville limestone and Little Osage shale in road ditch along south side of road (3.5 ft of Little Osage and 6.0 ft of Higginsville algal limestone); along the west side of stream SE of CR-142, approximately 3.0 ft of

- Blackjack Creek limestone exposed with tabular to low domical chaetetids; top of Blackjack Creek limestone at 953 ft; assuming a total thickness for the Fort Scott Limestone of 36.7 ft (Higginsville limestone = 22.4 ft, Little Osage shale = 3.5 ft, and Blackjack Creek limestone = 10.8 ft) based on KDOT profile just east of Girard, Kansas, along Kansas Highway 57 (base of the Fort Scott Limestone is at 942.2 ft and top is at 978.9 ft); along north side of NW1/4, NE1/4, NE1/4, Sec. 18, T.29S., R.24E., and diagonally across NE1/4, NE1/4, NE1/4, Sec. 18, T.29S., R.24E., Crawford Co., Kansas.
- CR-143 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1000 ft based on float in field on north side of road; near center of south line of SW1/4, SW1/4, SE1/4, Sec. 1, T.29S., R.23E., Crawford Co., Kansas.
- CR-144 = Limestone exposed in field NE of section corner, probably a limestone in the Labette Shale; SW corner, Sec. 11, T.29S., R.23E., Crawford Co., Kansas.
- CR-145 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at 1000 ft in road; center of east line of SE1/4, SE1/4, Sec. 11, T.29S., R.23E., Crawford Co., Kansas.
- CR-146 = Possibly Pawnee (Myrick Station) Limestone in stone fences in field on east side of road; center of west line of NW1/4, SW1/4, Sec. 2, T.29S., R.23E., Crawford Co., Kansas.
- CR-147 = Pawnee (Laberdie) Limestone exposed in road ditch on south side of road at 980 ft; near center of north line of NW1/4, NW1/4, NE1/4, Sec. 11, T.29S., R.23E., Crawford Co., Kansas.
- CR-148 = Pawnee (Laberdie) Limestone in field east of road at 995 ft and stone fences made of what appears to be Myrick Station limestone in field on west side of road; center of west line of NW1/4, Sec. 1, T.29S., R.23E., Crawford Co., Kansas.
- CR-149 = Pawnee (Laberdie) Limestone in field east of road at 1002 ft; just east of center of west line of Sec. 36, T.28S., R.23E., Crawford Co., Kansas.
- CR-150 = Pawnee (Myrick Station) Limestone (?) in pond bank south of road at 980 ft; diagonally SE of center of north line of NW1/4, NW1/4, Sec. 31, T.28S., R.24E., Crawford Co., Kansas.
- CR-587 = L-814 = Base of Fort Scott (Blackjack Creek) Limestone is approximately 11 ft above lake level of 900 ft, thus at 911 ft; sequence from "Excello" shale to near top of Fort Scott (Higginsville) Limestone (poorly exposed); chaetetids in Blackjack Creek limestone; near center of south line of Sec. 11, and near center of north line of Sec. 14, T.28S., R.24E., Crawford Co., Kansas.

ARMA QUADRANGLE

Field work was conducted during January–March of 2003.

- C-24 = Exposure at small isolated hill about 0.75 mi west of Mulberry, Kansas, of 16 inch coal (Mineral?) with overlying black, fissile shale, thin, fossiliferous limestone (caprock) followed by more black, fissile shale with variegated mudrock and then 5+ ft of sandstone with 3+ ft of red clay soil; measured and described by W. Howe 10 June 1948; SW1/4, NE1/4, Sec. 35, T.28S., R.25E., Crawford Co., Kansas; based on present topography the small isolated hill is near the center SE1/4, NE1/4, Sec. 35, T.28S., R.25E.
- C-25 = Exposure in strip pit in the corner just northeast of main junction at Croweburg, Kansas, of coal (Croweburg) to the lower beds of Ardmore (Verdigris) limestone above; suggested as the type section of Croweburg coal when measured and described by W. Howe 10 June 1948; SW corner Sec. 34, T.28S., R.25E., Crawford Co., Kansas.
- C-27 = C-28 = C-29 = Exposure in abandoned strip pit about 2.5 mi north of Mulberry, Kansas, of a thick coal below the Tebo coal to beds associated with the Verdigris limestone above the Croweburg coal; one of the most complete sections available at the time; measured and described by W. Howe 11 June 1948; on or near the Arma/Liberal quadrangles line; NE1/4, NW1/4, Sec. 24, T.28S., R.25E., Crawford Co., Kansas.
- C-47 = Exposure in active strip pit of Mackie–Clemens Company, approximately 4 mi north of main junction at Frontenac, Kansas, of thin limestone (probably upper part of Verdigris) below coal (Bevier) into a claystone in the “Lagonda formation” (upper Cabaniss); measured and described by W. Howe 10 June 1948; SW1/4, SW1/4, Sec. 16, T.29S., R.25E., Crawford Co., Kansas.
- C-48 = Exposure in active (in 1948) strip pit of Mackie–Clemens south of Breezy Hill area of Ardmore (Verdigris) limestone through coal (Bevier) into a claystones in the upper Cabaniss “Lagonda formation;” measured and describe by W. Howe 17 June 1948; blocks of what appear to be Verdigris limestone occur (7 January 2004) in the banks of these now-abandoned strip pits NE1/4, NE1/4, Sec. 15, T.29S., R.25E., Crawford Co., Kansas.
- C-49 = Exposure in abandoned strip pit on west side of road of coal (Mineral) upward through sandstone; mudrock; a thinner coal bed; black, fissile shales; thin-bedded, fossiliferous limestones; channel-like sandstone; claystone; coal; to thick (3-4 ft) of soil; measured and describe by W. Howe 27 June 1948; SE1/4, NW1/4, Sec. 14, T.29S., R.25E., Crawford Co., Kansas.
- C-50 = Exposure in abandoned strip pit on hilltop of coal (Mulky) overlain by “Excello” shale and 10 ft of Blackjack Creek limestone with numerous flat (tabular)

- chaetetid masses; measured and describe by W. Howe 17 June 1948 (Howe, 1956, section 77); SE1/4, NE1/4, Sec. 10, T.29S., R.25E., Crawford Co., Kansas.
- C-79 = Exposure in highwall of Clemens Mine 22 extending from coal (Mineral) at base through Fleming, Croweburg, and Bevier coals with clay soil at top; measured and described by L. Brady 24 March 1976; SW1/4, SW1/4, NW1/4, Sec. 15, T.28S., R.25E., Crawford Co., Kansas;
- L-706 = Exposures in abandoned quarries (Cukjati quarries) of Higginsville limestone with chaetetids, also KGS core documented in Roth (1991) MS thesis that began in the Higginsville limestone at a surface elevation of 968 ft and extended into the Breezy Hill limestone; the Blackjack Creek limestone contains low domical to tabular chaetetids; based on this core the base of the Fort Scott (Blackjack Creek) Limestone is at 953 ft; Roth (1991), locality 706c; NW1/4, NW1/4, Sec. 25, T.28S., R.24E., Crawford Co., Kansas
- CR-519 = Sandstone exposed in road at 972 ft, possibly the Englevale, and extends east from this point for 0.6 mi near CR-546; above sandstone is a black, platy shale with a thin, fossiliferous (numerous shells of *Derbyia* sp.), soft, black limestone containing pieces of black mudrock/shale; center of north line NW1/4, NE1/4, Sec. 24, T.28S., R.24E., Crawford Co., Kansas.
- CR-520 = Limestone float in field north of road; limestone is thin and resembles the lower bed of the Blackjack Creek limestone; approximately 250 ft west of center of south line SE1/4, SW1/4, Sec. 13, T.28S., R.24E., Crawford Co., Kansas.
- CR-521 = Limestone in place at 930 ft under bridge, possibly the Higginsville limestone; approximately 200 ft west of center of south line SW1/4, SE1/4, Sec. 14, T.28S., R.24E., Crawford Co., Kansas.
- CR-522 = Exposure of mudrock and several thin sandy limestones to calcareous sandstones; limestones occur as float in field east of road and appear similar to those at CR-520; along west line of NW1/4, SW1/4, SW1/4, Sec. 13, T.28S., R.24E., Crawford Co., Kansas.
- CR-523 = L-704 = Base of Fort Scott (Blackjack Creek) Limestone exposed at 915 ft in road with “Excello” shale, Mulky coal, and upper Cabaniss “Lagonda” exposed below in creek; Blackjack Creek limestone in road contains domical chaetetid masses 1-2 dm in diameter; near center of south line SE1/4, SE1/4, Sec. 11, T.28S., R.24E., Crawford Co., Kansas.
- CR-523A = Blackjack Creek limestone on south side of road and west side of stream contains large domical chaetetid masses > 3 dm across; approximately 100 ft west of CR-523 and approximately 100 ft west of center of north line NE1/4, NE1/4, Sec. 14, T.28S., R.24E., Crawford Co., Kansas.

- CR-524 = Higginsville limestone exposed in road and in pond bank north of road at 928 ft; approximately 250 ft west of center of south line SE1/4, Sec. 11, T.28S., R.24E., Crawford Co., Kansas.
- CR-525 = Base of Fort Scott (Blackjack Creek) Limestone at 915 ft with “Excello” shale exposed below at Rocky Point Boat Ramp on Bone Creek Lake; chaetetid masses in Blackjack Creek limestone 5 dm wide and 4 dm high; approximately 150 ft north of center of west line SE1/4, Sec. 11, T.28S., R.24E., Crawford Co., Kansas.
- CR-526 = Exposure of Higginsville limestone and Little Osage shale along both sides of road below about 932 ft with base of Fort Scott (Blackjack Creek) Limestone exposed on both sides of road at 900 ft, with “Excello” shale exposed below; Blackjack Creek limestone contains very large (6-7 dm by 8 dm) smooth domical chaetetid masses, some with multithecoporid corals attached; from approximately 1000 ft east and 750 ft south of NW corner Sec. 13 to near center of N1/2 of NW1/4, Sec. 13, T.28S., R.24E., Crawford Co., Kansas.
- CR-527 = Higginsville limestone in field east of road at 940 ft; approximately 200 ft west of center of north line, Sec. 13, T.28S., R.24E., Crawford Co., Kansas.
- CR-528 = Base of Pawnee (Myrick Station) Limestone exposed in road at 1020 ft with Anna shale in place (dug out) below in road ditch on east side of road; approximately 200 ft south of center of west line, Sec. 24, T.28S., R.24E., Crawford Co., Kansas.
- CR-529 = Base of Pawnee (Myrick Station) Limestone with Anna shale below in road ditch on north side of road (not a very good point, but usable); approximately 100 ft west of center of south line SE1/4, SE1/4, Sec. 23, T.28S., R.24E., Crawford Co., Kansas.
- CR-530 = Sandstone in road at 940 ft, possibly Englevale; approximately 250 ft south of center of east line SE1/4, Sec. 13, T.28S., R.24E., Crawford Co., Kansas.
- CR-531 = Base of Fort Scott (Blackjack Creek) Limestone at 920 ft with “Excello” shale exposed below, Blackjack Creek limestone with smooth domical chaetetid masses with a very wide base; approximately 250 ft north of center of east line SE1/4, Sec. 13, T.28S., R.24E., Crawford Co., Kansas.
- CR-532 = Base of Fort Scott (Blackjack Creek) Limestone exposed at 914 ft with thin, poorly exposed “Excello” shale, and top of Breezy Hill limestone well exposed in road ditch on east side of road; tabular to domical chaetetids in Blackjack Creek limestone; center of west line, Sec. 18, T.28S., R.25E., Crawford Co., Kansas.

- CR-533 = Sandstone in road at 910 ft, either Englevale or a sandstone in the upper Cabaniss; approximately 800 ft north of center of east line, Sec. 13, T.28S., R.24E., Crawford Co., Kansas.
- CR-534 = Base of Fort Scott (Blackjack Creek) Limestone at 920 ft with “Excello” shale below exposed in road ditch on east side of road; approximately 900 ft south of NW corner, Sec. 18, T.28S., R.25E., Crawford Co., Kansas.
- CR-535 = Base of Fort Scott (Blackjack Creek) Limestone at 920 ft with “Excello” shale below exposed in road ditch on east side of road near NW corner, Sec. 18, T.28S., R.25E., Crawford Co., Kansas.
- CR-536 = Sandstone and siltstone exposed in road at 910 ft like at CR-533 with “Excello” shale above; approximately 100 ft north of center of east line SE1/4, Sec. 12, T.28S., R.24E., Crawford Co., Kansas.
- CR-537 = Mudrock of upper Cabaniss exposed in stream bank east of road with thin, dark, fossiliferous limestone exposed in stream bed; center of west line SW1/4, NW1/4, Sec. 7, T.28S., R.25E., Crawford Co., Kansas.
- CR-538 = Upper Cabaniss exposed on both sides of U.S. Highway 69; near center of west line, SW1/4, SW1/4, NW1/4, Sec. 8, T.28S., R.25E., Crawford Co., Kansas.
- CR-539 = Upper Cabaniss “Lagonda” with sandstone through the Breezy Hill limestone, Mulky coal, and “Excello” shale into the Blackjack Creek limestone in road cut exposures on both sides of U.S. Highway 69, base of Fort Scott (Blackjack Creek) Limestone close to 950 ft; tabular to small and very large (several decimeters high and wide) chaetetid masses in upper Blackjack Creek limestone; near center of east line SE1/4, Sec. 7, T.28S., R.25E., Crawford Co., Kansas.
- CR-540 = Base of Fort Scott (Blackjack Creek) Limestone at 970 ft with “Excello” shale and Breezy Hill limestone below in road ditch on west side of road; large domical chaetetid masses close to 1 m across in Blackjack Creek limestone; approximately 250 ft south of center of east line of Sec. 8, T.28S., R.25E., Crawford Co., Kansas.
- CR-541 = Sandstone in road at 960 ft; approximately 200 ft west of center of south line SE1/4, SE1/4, Sec. 8, T.28S., R.25E., Crawford Co., Kansas.
- CR-542 = Base of Fort Scott (Blackjack Creek) Limestone at 974 ft in road with “Excello” shale and Breezy Hill limestone exposed below in road ditch on north side of road; center of south line, SE1/4, Sec. 8, T.28S., R.25E., Crawford Co., Kansas.
- CR-543 = L-703 = Base of Fort Scott (Blackjack Creek) Limestone at 960 ft in road and road ditches on both sides of north-south drainage with “Excello” shale and

- Breezy Hill limestone exposed below (good exposure); domical chaetetids in upper Blackjack Creek limestone; at center of south line of SW1/4 and center of south line of SE1/4, SW1/4, SW1/4, Sec. 8, T.28S., R.25E., Crawford Co., Kansas.
- CR-544 = Limestone in road ditch on south side of road and on east side of U.S. Highway 69 at 969 ft, contains chaetetids similar to those in Blackjack Creek limestone; NE corner, Sec. 19, T.28S., R.25E., Crawford Co., Kansas.
- CR-545 = Base of Fort Scott (Blackjack Creek) Limestone at 953 ft along U.S. Highway 69, not a very good exposure; near center of east line NE1/4, Sec. 19, T.28S., R.25E., Crawford Co., Kansas.
- CR-546 = Base of Fort Scott (Blackjack Creek) Limestone at 940 ft in road with “Excello” exposed below; an old quarry where the Mulky coal was removed is north of road; very large chaetetid masses in Blackjack Creek limestone; near center of south line SW1/4, Sec. 18, T.28S., R.25E., Crawford Co., Kansas.
- CR-547 = Sandstone and siltstone in road ditch east of road; approximately 100 ft north of center of west line SW1/4, Sec. 19, T.28S., R.25E., Crawford Co., Kansas.
- CR-548 = Base of Fort Scott (Blackjack Creek) Limestone at 930 ft on both sides of stream; large domical chaetetid masses in Blackjack Creek limestone exposed in road and in spoil piles on both sides of road; no “Excello” shale seen; Mulky coal was mined here; along north half of west line of SW1/4, SW1/4, SW1/4, Sec. 19, T.28S., R.25E., Crawford Co., Kansas.
- CR-549 = Limestone in road and fields on both sides of road, probably Blackjack Creek, but no contact observed; approximately 250 ft north of center of west line SW1/4, Sec. 30, T.28S., R.25E., Crawford Co., Kansas.
- CR-550 = Active quarry (Englevale Quarry of the Mulberry Limestone Quarry Company, Mulberry, Kansas); base of Fort Scott (Blackjack Creek) Limestone in floor of quarry at 960 ft at top of “Excello” shale; Blackjack Creek limestone is 10-12 ft thick with abundant chaetetid masses (tabular to large and small domical forms in upper part of unit); covers most of the area bounded by the S1/2, NW1/4, and N1/2, SW1/4, in SW1/4, Sec. 25, T.28S., R.24E., Crawford Co., Kansas.
- CR-551 = Base of Fort Scott (Blackjack Creek) Limestone estimated at 966 ft with “Excello” shale exposed below along both sides of U.S. Highway 69; center of east line, Sec. 30, T.28S., R.25E., Crawford Co., Kansas.
- CR-552 = Base of Fort Scott (Blackjack Creek) Limestone estimated at 965 ft with “Excello” shale exposed below along both sides of U.S. Highway 69; SE corner, Sec. 30, T.28S., R.25E., Crawford Co., Kansas.

CR-553 = Base of Fort Scott (Blackjack Creek) Limestone at 960 ft with no clear contact; chaetetid masses typical of Blackjack Creek limestone in this area; approximately 200 ft east of SE corner, Sec.28, T.28S., R.25E., Crawford Co., Kansas.

CR-553A = Sequence exposed in strip pit being reclaimed at the time it was measured and described extended from the Croweburg coal to the mudrock above the Bevier coal; measured and described by R. West with USGS colleagues (B. Cecil & F. Dulong) 7 June 1993; near SW corner Sec. 27, T.28S., R.25E., Crawford Co., Kansas.

CR-554 = Sandstone in road; near center of south line, Sec. 27, T.28S., R.25E., Crawford Co., Kansas.

CR-555 = Mulberry limestone quarry, 10 to 12 ft of Blackjack Creek limestone with "Excello" shale in quarry floor, base of Fort Scott (Blackjack Creek) Limestone estimate at 1000 ft in road cut just south of entrance to quarry; near center of east line NE1/4, SE1/4, SE1/4, Sec. 2, T.29S., R.,25E., Crawford Co., Kansas.

CR-555A = Base of Fort Scott (Blackjack Creek) Limestone at 1000 ft with "Excello" shale poorly exposed below, along both sides of road; center of east line, Sec. 30, T.28S., R.25E., Crawford Co., Kansas.

CR-556 = Base of Fort Scott (Blackjack Creek) Limestone at 1000 ft with "Excello" shale exposed below, along both sides of road; approximately 400 ft west of SE corner, Sec. 2, T.29S., R.25E., Crawford Co., Kansas.

CR-557 = Base of Fort Scott (Blackjack Creek) Limestone at 1000 ft with "Excello" shale exposed below along both sides of road, poorly exposed; center of south line, SW1/4, NE1/4, Sec. 1, T.29S., R.25E., Crawford Co., Kansas.

CR-558 = Sandstone in road; near center of east line, SE1/4, SE1/4, Sec. 11, T.29S., R.25E., Crawford Co., Kansas.

CR-559 = Sandstone in road; near center of east line, Sec. 14, T.29S., R.25E., Crawford Co., Kansas.

CR-560 = Base of Fort Scott (Blackjack Creek) Limestone at 1000 ft with "Excello" shale poorly exposed below, along east side of road; just south of C-50 (Howe, 1956; Sec. 77); approximately 400 ft south of center of west line, Sec. 11, T.29S., R.25E., Crawford Co., Kansas.

CR-561 = Exposure of black, platy, fissile shale with limestone blocks above on south side of road; limestone looks like the basal bed of Blackjack Creek limestone at CR-511; approximately 200 ft west and 150 ft south of center of north line, NW1/4, SE1/4, Sec. 9, T.29S., R.25E., Crawford Co., Kansas.

- CR-562 = Base of Fort Scott (Blackjack Creek) Limestone inferred at 1020 ft in road, underlying unit not seen; approximately 300 ft west of center, Sec. 9, T.29S., R.25E., Crawford Co., Kansas.
- CR-563 = Base of Fort Scott (Blackjack Creek) Limestone at 1000 ft in road with “Excello” shale exposed below; typical Blackjack Creek limestone chaetetid masses in limestone; approximately 400 ft east of center of north line, Sec. 9, T.29S., R.25E., Crawford Co., Kansas.
- CR-564 = Limestone in road ditch on east side of road; approximately 500 ft south of center of west line, Sec. 4, T.29S., R.25E., Crawford Co., Kansas.
- CR-565 = Limestone shale contact exposed in road at 975 ft with limestone blocks in fields; approximately 600 ft south of NW corner Sec. 4, T.29S., R.25E., Crawford Co., Kansas.
- CR-566 = Sandstone, siltstone, and mudrock in road cut on north side of road at 970 ft; approximately 200 ft east of center of south line SW1/4, Sec. 33, T.28S., R.25E., Crawford Co., Kansas.
- CR-567 = Base of Fort Scott (Blackjack Creek) Limestone at 975 ft with limestone exposed in road, but underlying unit not seen; approximately 200 ft east of center of south line SE1/4, Sec. 32, T.28S., R.25E., Crawford Co., Kansas.
- CR-567A = Excavation in field that appears to exposed a limestone (Blackjack Creek) and an underlying black shale (“Excello”); approximately 500 ft south and 200 ft east of center SE1/4, Sec. 32, T.28S., R.25E., Crawford Co., Kansas.
- CR-568 = Sandstone in road with limestone above, possibly Breezy Hill; approximately 400 ft south of NW corner, Sec. 33, T.28S., R.25E., Crawford Co., Kansas.
- CR-569 = Base of Fort Scott (Blackjack Creek) Limestone at 974 ft with very thin “Excello” shale and Breezy Hill limestone below in road; latter two units underlain by thin, platy, sandy, silty beds in road ditch on north side of road; center of south line, Sec. 9, T.28S., R.25E., Crawford Co., Kansas.
- CR-570 = Estimated top of Verdigris limestone at 895 ft exposed in west face of two old strip pits on both sides of east-west road; pit on north side of road is approximately 800 ft east of center of south line, Sec. 9, T.28S., R.25E., Crawford Co., Kansas.
- CR-571 = Three or possibly four thin limestone beds separated by black shales/mudrocks well exposed in west face of old strip pit south of road (possibly Verdigris limestone); just east of the center of N1/2, NE1/4, Sec. 21, T.28S., R.25E., Crawford Co., Kansas.

CR-572 = Basal beds of Blackjack Creek limestone in fields on both sides of road; near center of south line, Sec. 17, T.28S., R.25E., Crawford Co., Kansas.

CR-573 = Sandstone in road; near center of south line, SE1/4, Sec. 23, T.28S., R.25E., Crawford Co., Kansas.

CR-574 = Sandstone in road; approximately 200 ft west of SE corner, Sec. 22, T.28S., R.25E., Crawford Co., Kansas.

CR-575 = Sandstone in road; approximately 200 ft north of center of N1/2, NE1/4, Sec. 27, T.28S., R.25E., Crawford Co., Kansas.

CR-584 = Blocks of Verdigris limestone occur on spoil piles of abandoned strip pits on south side of road; near center of NW1/4, NE1/4, NW1/4, Sec. 22, T.29S., R.25E., Crawford Co., Kansas.

CR-585 = Blocks of Verdigris limestone occur on spoil piles of abandoned strip pits on west side of road; approximately 150 ft south and 150 ft west of center of east line of Sec. 21, T.29S., R.25E., Crawford Co., Kansas.

CR-588 = L-986 = Exposure from upper Cabaniss into Fort Scott (Higginsville) Limestone in road cuts on both sides of U.S. Highway 69; base of Fort Scott (Blackjack Creek) Limestone at 950 ft; domical chaetetids in Blackjack Creek limestone; SE1/4, SE1/4, Sec. 19, T.28S., R.25E., Crawford Co., Kansas.

LIBERAL QUADRANGLE

Field work was conducted during January–March of 2003.

C-26 = Exposure in road ditch and railroad cut of gray mudrock through a thin coal (Tebo) and thin limestone to a mudrock siltstone totaling about 35.5 ft; measured and described by W. Howe, 28 July 1948; near center SW1/4, SE1/4, Sec. 25., T.28S., R.25E., Crawford Co., Kansas.

MCCUNE NE QUADRANGLE

Field work was conducted during January–March of 2002.

C-34 = CR-295 = Limestone identified as Tina (Amoret) with mudrocks below; measured and described by J. M. Jewett; along the Neosho–Crawford County line near the center of east line of NE1/4, NE1/4, Sec. 27, T.29S., R.21E., Neosho Co., Kansas.

- C-51 = Exposure on north side of creek east of road; Pawnee Limestone (Anna to Laberdie) according to Jewett (1945), site 119; excellent exposure (see CR-341); near center of north line, Sec. 23, T.30S., R.21E., Crawford Co., Kansas.
- CR-293 = Thick sandstone in drainage at low-water bridge; near center of south line of SW1/4, SW1/4, SE1/4, Sec. 21, T.29S., R.22E., Crawford Co., Kansas.
- CR-294 = Sandstone in road; center of south line, SW1/4, SE1/4, Sec. 20, T.29S., R.22E., Crawford Co., Kansas.
- CR-295 = Base of limestone (Altamont?) in road at 890 ft, with sandstone in creek west of road; near top of hill 1.15 mi south of U.S. Highway 57 on road between Sections 26 and 27, T.29S., R.21E., Crawford/Neosho Co., Kansas.
- CR-296 = Limestone float in field west of road at top of hill; near center of west line, NW1/4, SW1/4, Sec. 26, T.29S., R.21E., Crawford Co., Kansas.
- CR-297 = Altamont Limestone at 943 ft in road; near center of south line, SW1/4, SE1/4, Sec. 26, T.29S., R.21E., Crawford Co., Kansas.
- CR-298 = Altamont Limestone at 942 ft in road; near center of south line, SE1/4, SW1/4, SW1/4, Sec. 25, T.29S., R.21E., Crawford Co., Kansas.
- CR-299 = Fields with Bandera-type terrain and soil along both sides of the road for 1/2 mi both north and south of this point; center of east line, Sec. 25, T.29S., R.21E., Crawford Co., Kansas.
- CR-300 = Limestone float in field north of road, probably near the base of the Altamont Limestone at 950 ft; center of north line, Sec. 25., T.29S., R.21E., Crawford Co., Kansas.
- CR-301 = Altamont Limestone at 943 ft in road; near center of east line, SW1/4, NE1/4, NE1/4, Sec. 26, T.29S., R.21E., Crawford Co., Kansas.
- CR-302 = Very similar to CR-301, but less well exposed; center of east line, Sec. 26, T.29S., R.21E., Crawford Co., Kansas.
- CR-303 = Bandera Shale; thin-bedded, platy sandstone with mudrock in drainage on both sides of road; near center of south line, SW1/4, SW1/4, SW1/4, Sec. 36, T.29S., R.21E., Crawford Co., Kansas.
- CR-304 = Bandera Shale exposed in bank of Hickory Creek on the south side of road; slightly east and south of the center of the north line of Sec. 1, T.30S., R.22E., Crawford Co., Kansas.

- CR-305 = Sandstone float dumped in as part of bridge work in drainage west of road; near center of east line, SE1/4, SE1/4, Sec. 1, T.30S., R.22E., Crawford Co., Kansas.
- CR-305A = Orange-colored, sandy soil suggesting sandstone; near center of south line, SE1/4, SW1/4, SW1/4, Sec. 6, T.30S., R.22E., Crawford Co., Kansas.
- CR-306 = Fields with Bandera-type terrain and soil along both sides of the road for 1/2 mi both north and south of this point; center of west line, Sec. 1, T.30S., R.21E., Crawford Co., Kansas.
- CR-307 = Poor exposure, but possibly near top of Altamont Limestone at 935 ft in road with the possibility of the lower Altamont (Amoret) Limestone near the SW corner of Sec. 35; near center of south line, SW1/4, SW1/4, Sec. 35, T.29S., R.21E., Crawford Co., Kansas.
- CR-308 = Limestone float (Altamont?) on both sides of the road for about 1/8 mi; along east line, NE1/4, NE1/4, NE1/4, Sec. 3, T.30S., R.21E., Crawford Co., Kansas.
- CR-309 = Limestone float in road at 873 ft; near center of south line, SW1/4, SE1/4, SE1/4, Sec. 11, T.30S., R.21E., Crawford Co., Kansas.
- CR-310 = Probable top of Pawnee (Laberdie) Limestone at 898 ft in field north of road; near center of south line, Sec. 7, T.30S., R.22E., Crawford Co., Kansas.
- CR-311 = Limestone (Pawnee) float in road north of old quarry and in fields around old quarry; near center of south line, SW1/4, SE1/4, SE1/4, Sec. 7, T.30S., R.22E., Crawford Co., Kansas.
- CR-312 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 885 ft in creek bank south of road and east of old quarry; approximately 3 ft of Laberdie limestone and about a 1 ft of Myrick Station limestone exposed near old quarry; about 300 ft south of the center of north line, NE1/4, NE1/4, Sec. 18, T.30 S., R.22E., Crawford Co., Kansas.
- CR-313 = Excellent base of Pawnee (Myrick Station) Limestone/top of Anna shale at 860 ft in bank of Hickory Creek north of road; near center of SW1/4, SE1/4, SW1/4, Sec. 12, T.30S., R.21E., Crawford Co., Kansas.
- CR-314 = Thin-bedded sandstone exposed in drainage west of road (Bandera Shale); approximately 150 ft north and 100 ft west of the center of east line, Sec. 29, T.29S., R.22E., Crawford Co., Kansas.
- CR-315 = Pawnee (Laberdie) Limestone at 900 ft; in field approximately 1000 ft due west of center of east line, Sec. 8, T.30S., R.22E., Crawford Co., Kansas.

- CR-316 = Pawnee (Laberdie) Limestone in road at 910 ft; approximately 300 ft due south of center of east line, Sec. 8, T.30S., R.22E., Crawford Co., Kansas.
- CR-316A = Pawnee (Laberdie) Limestone in road at 915 ft; near center of east line, SE1/4, Sec. 8, T.30S., R.22E., Crawford Co., Kansas.
- CR-317 = Limestone (Pawnee?) in road at 910 ft; near center of east line, SE1/4, SE1/4, Sec. 8, T.30S., R.22E., Crawford Co., Kansas.
- CR-318 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 910 ft in creek bank north of road (good point); approximately 300 ft west and 100 ft north of center of south line, SW1/4, Sec. 9, T.30S., R.22E., Crawford Co., Kansas.
- CR-319 = Blocks of Myrick Station limestone in pond bank; pond probably built on Anna shale; approximately 300 ft north and 50 ft west of SE corner, Sec. 8, T.30S., R.22E., Crawford Co., Kansas.
- CR-320 = Pawnee (Laberdie) Limestone in road at 922 ft; approximately 400 ft due west of SE corner, Sec. 8, T.30S., R.22E., Crawford Co., Kansas.
- CR-321 = Pawnee (Laberdie) Limestone in barnyard north of road at 895 to 900 ft; near center of south line, SW1/4, SW1/4, Sec. 8, T.30S., R.22E., Crawford Co., Kansas.
- CR-322 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 885 ft in creek on both sides of road; near center of west line, SW1/4, NW1/4, NW1/4, Sec. 7, T.30S., R.22E., Crawford Co., Kansas.
- CR-323 = Pawnee (Myrick Station) Limestone in place under bridge and in creek on west side of road at 890 ft (no contact); just west of center of east line, NE1/4, NE1/4, SE1/4, Sec. 18, T.30S., R.22E., Crawford Co., Kansas.
- CR-324 = Large blocks of Pawnee (Myrick Station?) Limestone in road ditch on south side of road; near center of north line, NE1/4, NE1/4, Sec. 19, T.30S., R.22E., Crawford Co., Kansas.
- CR-325 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 900 ft based on water seepage along south side of road (poor exposure); near center of north line, NE1/4, Sec. 19, T.30S., R.22E., Crawford Co., Kansas.
- CR-326 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 900 ft in road (excellent point); approximately 150 ft west of center of north line, Sec. 19, T.30S., R.22E., Crawford Co., Kansas.
- CR-327 = Labette Shale exposed in creek bank at 870 ft in old oil field north of road; coaly layer with underclay-like lithology below and a thin, platy-bedded, clayey,

- fossiliferous limestone above; approximately 800 ft north and 100 ft west of center of south line, Sec. 18, T.30S., R.22E., Crawford Co., Kansas.
- CR-328 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 892 ft in road (like CR-326 but not as well exposed); near center of south line, SE1/4, SW1/4, Sec. 18, T.30S., R.22E., Crawford Co., Kansas.
- CR-329 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 892 ft in drainage south of road; Myrick Station limestone well exposed along the road with what looks like Laberdie limestone above, Mine Creek shale appears to be absent here; approximately 100 ft due south and 150 ft east of center of north line, NW1/4, Sec. 19, T.30S., R.22E., Crawford Co., Kansas.
- CR-330 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 870 ft in road ditch on east side of road; weathered exposure, but reliable; approximately 200 ft south of center of west line, NW1/4, SW1/4, Sec. 18, T.30S., R.22E., Crawford Co., Kansas.
- CR-331 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 950 ft in road (good point); near center of west line, NW1/4, SW1/4, SW1/4, Sec. 21, T.30S., R.22E., Crawford Co., Kansas.
- CR-332 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 915 ft in bank of nearly dried-up pond; exposure would be underwater if pond were full; viewed from road; near center SE1/4, Sec. 17, T.30S., R.22E., Crawford Co., Kansas.
- CR-333 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 910 ft in field west of road; well exposed in pond bank; viewed from road; approximately 200 ft west and 300 ft south of center of east 1/2, Sec. 19, T.30S., R.22E., Crawford Co., Kansas.
- CR-333A = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 912 ft in road (poor exposure); approximately 250 ft south of center of east line, Sec. 19, T.30S., R.22E., Crawford Co., Kansas.
- CR-334 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 950 ft on both sides of road; approximately 100 ft north of center of east line, NE1/4, Sec. 30, T.30S., R.22E., Crawford Co., Kansas.
- CR-335 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 942 ft in road ditch on south side of road; approximately 150 ft west of NE corner, Sec. 30, T.30S., R.22E., Crawford Co., Kansas.
- CR-336 = Limestone (Myrick Station) in place in road at 935 ft, close to the base of the Myrick Station limestone and top of Anna shale; approximately 300 ft west of

- center of north line, NW1/4, NE1/4, Sec. 30, T.30S., R.22E., Crawford Co., Kansas.
- CR-337 = Limestone (Myrick Station) in place in road at 935 ft, close to the base of the Myrick Station limestone and top of Anna shale; contact not exposed; approximately 250 ft west of center of north line, Sec. 30, T.30S., R.22E., Crawford Co., Kansas.
- CR-338 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 930 ft in road and in field west of road; poor exposure; Anna shale not seen but observed seep at presumed contact; approximately 400 ft south and 200 ft west of NE corner, Sec. 25, T.30S., R.21E., Crawford Co., Kansas.
- CR-339 = Limestone (Pawnee) in road at 902 ft; near center of north line, NW1/4, NE1/4, NE1/4, Sec. 24, T.30S., R.21E., Crawford Co., Kansas.
- CR-340 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 860 ft in ditch on north side of road; approximately 150 ft east of SW corner, Sec. 13, T.30S., R.21E., Crawford Co., Kansas.
- CR-341 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 850 ft in west bank of Hickory Creek east and north of road; limestone also in road to the west; excellent exposure of Pawnee Limestone; see Jewett (1945), site 119 (C-51); approximately 100 ft north of center of south line, Sec. 14, T.30S., R.21E., Crawford Co., Kansas.
- CR-342 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 870 ft in hillside along old road; approximately 200 ft west of center of north line, NE1/4, NW1/4, Sec. 26, T.30S., R.21E., Crawford Co., Kansas.
- CR-343 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 885 ft in road; approximately 100 ft east of center of north line, NW1/4, NW1/4, Sec. 25, T.30S., R.21E., Crawford Co., Kansas.
- CR-344 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 910 ft in road; approximately 420 ft south of center of west line, Sec. 25, T.30S., R.21E., Crawford Co., Kansas.
- CR-345 = Base of Pawnee (Myrick Station) Limestone/top of Anna shale at 910 ft in road; approximately 200 ft north of center of west line, SW1/4, Sec. 25, T.30S., R.21E., Crawford Co., Kansas.
- CR-346 = Limestone (Myrick Station) in road and fields on both sides of road at the top of hill above 910 ft, and over hill to the south; approximately center of SE 1/4, Sec. 26, T.30S., R.21E., Crawford Co., Kansas.

CR-347 = Sandy terrain along both sides of the road for 0.5mi both east and west of this point; center of north line, Sec. 31, T.30S., R.22E., Crawford Co., Kansas.

CR-348 = Sandstone (probably Englevale) well exposed in road at 900 ft; near center of east line, NE1/4, SE1/4, NE1/4, Sec. 31, T.30S., R.22E., Crawford Co., Kansas.

CR-349 = Thin to platy bedded, yellowish brown sandstone (probably Englevale) exposed on both sides of the road at the top of the hill; near center of east line, SE1/4, SE1/4, NE1/4, Sec. 31, T.30S., R.22E., Crawford Co., Kansas.

CR-350 = Limestone slabs and mudrock in pond bank at farm on west side of road; approximately 150 ft south and 50 west of center of east line, Sec. 35, T.30S., R.21E., Crawford Co., Kansas.

GRINDSTONE CREEK QUADRANGLE

Field work was conducted during January–March of 2002.

C-36 = Pawnee Limestone, probably the same as site 114 in Jewett (1945); SW1/4, SW1/4, SE1/4, Sec. 36, T.29S., R.22E., Crawford Co., Kansas.

C-52 = Breezy Hill limestone and underlying sandstone according to measured section by Howe in 1949; SE1/4, Sec. 36, T.30S., R.22E., Crawford Co., Kansas.

C-53 = C-54 = L-700 = Stark's quarry; same quarry where Suchy (1987) did his M.S. thesis; Fort Scott Limestone, chaetetids in Higginsville; SE1/4, SE1/4, Sec. 12, T.30S., R.22E., Crawford Co., Kansas.

C-55 = Sandstone with black limestone septarian concretions according to 1949 measured section by Howe; SE1/4, NE1/4, Sec. 27, T.30S., R.23E., Crawford Co., Kansas.

CR-152 = Exposure in a field along north bank of Lightning Creek of interval similar to that seen at C-37 in Brazilton quadrangle (Labelle Shale); 500 ft north and 300 ft west of the SE corner, Sec. 20, T.29S., R.23E., Crawford Co., Kansas.

CR-153 = Sandstone (Englevale) in road ditch on north side of road; near center of south line of Sec. 20, T.29S., R.23E., Crawford Co., Kansas.

CR-154 = Top of Anna/base of Pawnee (Myrick Station) Limestone in drainage on north side of road at 939 ft; approximately 800 ft west of the SE corner, Sec. 19, T.29S., R.23E., Crawford Co., Kansas.

CR-155 = Loose blocks (float) of Myrick Station limestone in ditch on south side of road; near center of north line of Sec. 30, T.29S., R.23E., Crawford Co., Kansas.

- CR-156 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone at change in road grade at 930 ft; same as Jewett's C-38 (see Brazilton quadrangle); approximately 1100 ft east of SW corner, Sec. 19, T.29S., R.23E., Crawford Co., Kansas.
- CR-160 = Sandstone (Bandera) in road; near center of south line of SE1/4, SW1/4, SW1/4, Sec. 22, T.29S., R.22E., Crawford Co., Kansas.
- CR-161 = Sandstone (Bandera) in road; approximately 400 ft south of NW corner, Sec. 27, T.29S., R.22E., Crawford Co. Kansas.
- CR-295 = Base of limestone (Altamont?) in road near top of hill 1.15 mi south of U.S. Highway 57, with sandstone in creek west of road; between Sections 26 and 27, T.29S., R.21E., Crawford Co., Kansas.
- CR-372 = Sandstone (Bandera) in road; near SW corner, Sec. 27, T.29S., R.22E., Crawford Co., Kansas.
- CR-373 = Sandstone (Bandera) in drainage west of road; approximately 400 ft north and 200 ft west of center of east line, Sec. 28, T.29S., R.22E., Crawford Co., Kansas.
- CR-374 = Sandstone (Bandera) just west of road; near center of east line, NE1/4, SE1/4, Sec. 28, T.29S., R.22E., Crawford Co., Kansas.
- CR-375 = Sandstone (Bandera) in road at 1000 ft; approximately 100 ft west of center of south line, Sec. 27, T.29S., R.22E., Crawford Co., Kansas.
- CR-376 = Mudrock (Labette?) in road and drainage north of road; approximately 300 ft east of center of south line, SW1/4, SE1/4, Sec. 30, T.29S., R.23E., Crawford Co., Kansas.
- CR-377 = Thin-bedded, in situ sandstone (Labette?) in stream just south of road; approximately 800 ft west and 200 ft south of center of north line, Sec. 31, T.29S., R.23E., Crawford Co., Kansas.
- CR-377A = Limestone blocks from Pawnee (Myrick Station) Limestone used as fill along road ditch on north side of road; near center of south line, SE1/4, SW1/4, Sec. 30, T.29S., R.23E., Crawford Co., Kansas.
- CR-377B = Sandy to silty mudrock (Labette?) in road ditch on south side of road; approximately 300 ft east of center of north line, NE1/4, NW1/4, Sec. 31, T.29S., R.23E., Crawford Co., Kansas.
- CR-378 = Sandstone in place in field on east side of road; just east of center of west line, NW1/4, SW1/4, Sec. 30, T.29S., R.23E., Crawford Co., Kansas.

- CR-379 = Sandy to silty mudrock (Labette?) in creek bank on east side of road; approximately 400 ft north and 50 ft east of center of west line, Sec. 30, T.29S., R.23E., Crawford Co., Kansas.
- CR-380 = Sandy to silty mudrock (Labette?) in drainage on west side of road; near NW corner, Sec. 31, T.29S., R.23E., Crawford Co., Kansas.
- CR-381 = Possible contact between Anna shale and Pawnee (Myrick Station) Limestone at 940 ft in road ditch and field on both sides of road; approximately 200 ft south of center of west line, SE1/4, NE1/4, Sec. 36, T.29S., R.22E., Crawford Co., Kansas.
- CR-382 = Limestone float, probably Pawnee (Laberdie) Limestone in fields on both sides of road; along west line SE1/4, NE1/4, SE1/4, Sec. 36, T.29S., R.22E., Crawford Co., Kansas.
- CR-383 = Pawnee (Laberdie) Limestone in place on north side of road at 959 ft; approximately 450 ft east of center of south line, Sec. 36, T.29S., R.22E., Crawford Co., Kansas.
- CR-384 = Top of Anna shale/ base of Pawnee (Myrick Station) Limestone contact at 940 ft in pond bank east of road; approximately 350 ft east and 100 ft south of center of west line, SW1/4, SW1/4, Sec. 36, T.29S., R.22E., Crawford Co., Kansas.
- CR-385 = Pawnee (Laberdie) Limestone in place at 950 ft in road ditch on west side of road; approximately 100 ft north of center of east line, SE1/4, SE1/4, Sec. 35, T.29S., R.22E., Crawford Co., Kansas.
- CR-386 = Top of Anna shale/ base of Pawnee (Myrick Station) Limestone contact at 930 ft in drainage in field on north side of road; area of C-36; approximately 350 ft east and 150 ft north of center of south line, Sec. 35, T.29S., R.22E., Crawford Co., Kansas.
- CR-387 = Pawnee (Laberdie) Limestone in place along drainage on south side of road; just south of center of north line, NE1/4, NW1/4, Sec. 2, T.30S., R.22E., Crawford Co., Kansas.
- CR-388 = Pawnee (Laberdie) Limestone in place along road and in field west of road; just north and west of SE corner, Sec. 4, T.30S., R.22E., Crawford Co., Kansas.
- CR-389 = Pawnee (Laberdie) Limestone in place in field west of road; approximately 1000 ft north of SE corner, Sec. 9, T.30S., R.22E., Crawford Co., Kansas.

- CR-390 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone contact at 940 ft in road ditch on both sides of road; approximately 500 ft east of center of south line, Sec. 10, T.30S., R.22E., Crawford Co., Kansas.
- CR-391 = Pawnee (Laberdie) Limestone in place in road; near SW corner, Sec. 11, T.30S., R.22E., Crawford Co., Kansas.
- CR-392 = Thin-bedded sandstone in Labette Shale in creek on south side of road; just south and west of NE corner, Sec. 14, T.30S., R.22E., Crawford Co., Kansas.
- CR-393 = Top of Anna shale/base of Pawnee (Myrick Station) Limestone contact at 950 ft in road; just north of center of east line SE1/4, Sec. 14, T.30S., R.22E., Crawford Co., Kansas.
- CR-394 = Top Anna shale/base Pawnee (Myrick Station) Limestone at 950 ft in road and field south of road; approximately 400 ft west of center of south line, SE1/4, Sec. 15, T.30S., R.22E., Crawford Co., Kansas.
- CR-395 = Pawnee (Myrick Station) Limestone float in field north of road at 950 ft and above; near center of south line, SW1/4, SE1/4, SW1/4, Sec. 15, T.30S., R.22E., Crawford Co., Kansas.
- CR-396 = Limestone (a few small pieces) float in pond bank east of road at 915 ft; just east of center of west line, NW1/4, SW1/4, Sec. 22, T.30S., R.22E., Crawford Co., Kansas.
- CR-397 = Limestone slabs above large pieces of black platy shale in creek bank west of road; contact at 880 ft; nothing observed in place; possibly Higginsville and Little Osage; approximately 200 ft south and 100 ft west of NE corner, Sec. 34, T.30S., R.22E., Crawford Co., Kansas.
- CR-397A = Limestone in road at 890 ft; approximately 150 ft south of center of east line, NE1/4, Sec. 34, T.30S., R.22E., Crawford Co., Kansas.
- CR-398 = Fort Scott (Higginsville) Limestone with black, platy shale (Little Osage) exposed below in creek north of road; contact at 880 ft; approximately 6 ft of limestone (Higginsville) exposed in old quarry south of road; old quarry is approximately 200 ft south and 150 ft east of creek bank exposure; creek exposure is near center of north line NW1/4, NW1/4, Sec. 35, T.30S., R.22E., Crawford Co., Kansas.
- CR-399 = Limestone in place along both sides of road from CR-398 to this site at 890 ft; center north line, Sec. 35, T.30S., R.22E., Crawford Co., Kansas.

- CR-400 = Limestone float in drainage west of road, near the top of limestone unit(?), at an elevation of 903 ft; just south of center of west line SW1/4, NW1/4, NW1/4, Sec. 36, T.30S., R.22E., Crawford Co., Kansas.
- CR-401 = Mudstone and siltstone (Labette) float in drainage east of road; near center of west line, NW1/4, Sec. 2, T.31S., R.22E., Crawford Co., Kansas.
- CR-402 = Thin-bedded limestone (Higginsville) in place in stream in field north of Kansas Highway 126 (excavations for new box culvert confirms this interpretation 2 August 2004); tabular chaetetids in slabs south of road in drainage; just north of center of SW1/4, SW1/4, SE1/4, Sec. 23, T.30S., R.22E., Crawford Co., Kansas.
- CR-403 = Fort Scott (Higginsville?) Limestone float in drainage on both sides of road and outcrop on east side of road in wooded area just below an elevation of 900 ft; approximately 200 ft south of center of N1/2, NE1/4, Sec. 25, T.30S., R.22E., Crawford Co., Kansas.
- CR-404 = Limestone in place on both sides of road; near center of east 1/2, Sec. 25, T.30S., R.22E., Crawford Co., Kansas.
- CR-405 = Sandy, silty mudrock (upper Cabaniss) at Osage Cemetery; center NE1/4, SE1/4, Sec. 25, T.30S., R.22E., Crawford Co., Kansas.
- CR-406 = Base of Fort Scott (Blackjack Creek) Limestone at 905 ft with “Excello” shale, Breezy Hill limestone, and silty, sandy mudrock of the upper Cabaniss below in road cut east of road and in field west of road (near C-52); along south half of east line and south line, SW1/4, NE1/4, SE1/4, Sec. 36, T.30S., R.22E., Crawford Co., Kansas.
- CR-407 = Base of Fort Scott (Blackjack Creek) Limestone at approximately 920 ft; approximately 350 ft east of center of north line, NE1/4, Sec. 36, T.30S., R.22E., Crawford Co., Kansas.
- CR-408 = Base of thick, massive limestone (Higginsville) at 890 ft in road cut on north side of Kansas Highway 126; chaetetids as at L-700; Little Osage shale thin(?), Blackjack Creek limestone covered, thin(?); near center of south line, SE1/4, SE1/4, Sec. 24, T.30S., R.22E., Crawford Co., Kansas.
- CR-409 = Base of Fort Scott (Blackjack Creek) Limestone at 900 ft with “Excello” shale and upper Cabaniss below in road ditch; near center east line NE1/4, NE1/4, SE1/4, Sec. 24, T.30S., R.22E., Crawford Co., Kansas.
- CR-410 = Mudrock (Labette?) at 927 ft in road; near center of east line SE1/4, NE1/4, Sec. 24, T.30S., R.22E., Crawford Co., Kansas.

- CR-411 = Base of Fort Scott (Blackjack Creek) Limestone at 902 ft in road with “Excello” shale and upper Cabaniss exposed in drainage east of road; near center of east line NE1/4, NE1/4, Sec. 24, T.30S., R.22E., Crawford Co., Kansas.
- CR-412 = Base of Fort Scott (Blackjack Creek) Limestone at 886 ft; sequence measured from upper Cabaniss into Higginsville with 1.5 ft of Breezy Hill limestone, 4.0 ft of “Excello” shale, and 12+ ft of Fort Scott Limestone with the top near an elevation of 898 ft; estimate the Little Osage and Blackjack Creek to be 1-1.5 ft thick; chaetetids in Higginsville as at L-700; approximately 500 ft south of center of west line Sec. 18, T.30S., R.23E., Crawford Co., Kansas.
- CR-413 = Limestone exposed in field east of road at 898 ft; near center of west line NW1/4, NW1/4, SW1/4, Sec. 18, T.30S., R.23E., Crawford Co., Kansas.
- CR-414 = Fort Scott (Higginsville) Limestone with chaetetids as at L-700 forms bed of stream at an elevation of 880 ft and lower; near center of NE1/4, NW1/4, NW1/4, Sec. 18, T.30S., R.23E., Crawford Co., Kansas.
- CR-415 = Top of Fort Scott (Higginsville) Limestone at 900 ft in abandoned quarry; same as localities C-53, C-54, and L-700; quarry covers most of the S1/2, SE1/4, Sec.12, T.30S., R.22E., Crawford Co., Kansas.
- CR-416 = Fort Scott (Higginsville) Limestone in west bank of Lightning Creek on east side of road between an elevation of 880 and 885 ft; chaetetids as at L-700; near center SE1/4, SE1/4, NE1/4, Sec. 6, T.30S., R.23E., Crawford Co., Kansas.
- CR-417 = Fort Scott (Higginsville) Limestone outcrop in drainage on west side of road at approximately 890 ft; exposure is continuous from CR-416 to this site along the bank of Lightning Creek; approximately 100 ft south and 200 ft east of NW corner, NE1/4, NE1/4, SE1/4, Sec. 6, T.30S., R.23E., Crawford Co., Kansas.
- CR-418 = Fort Scott (Higginsville) Limestone outcrop in drainage on west side of road at approximately 890 ft; near center east line, SW1/4, NE1/4, SE1/4, Sec. 6, T.30S., R.23E., Crawford Co., Kansas.
- CR-419 = Limestone (possibly Blackjack Creek and Higginsville) with base(?) of Fort Scott (Blackjack Creek) Limestone at 900 ft (?) in road and in field north of road; near SE corner, Sec. 6, T.30S., R.23E., Crawford Co., Kansas.
- CR-420 = Fort Scott (Higginsville) Limestone in road from near CR-419 to the top of the hill to the west at an elevation of 920± ft; from just west of CR-419 westward along south line SE1/4, SE1/4 to just west of center of south line of SE1/4, Sec. 6, T.30S., R.23E., Crawford Co., Kansas.
- CR-421 = Silty, sandy mudrock and thin-bedded, platy sandstone in drainage south of road; also exposed in west bank of Lightning Creek north of road; along south and

- southern half of east line SW1/4, SW1/4, NW1/4, Sec. 8, T.30S., R.23E., Crawford Co., Kansas.
- CR-422 = Base of Fort Scott (Blackjack Creek) Limestone in road cuts on both sides of road at 910 ft; near center Sec. 8, T.30S., R.23E., Crawford Co., Kansas.
- CR-423 = Fort Scott (Higginsville) Limestone with chaetetids as seen at L-700 exposed in drainage on both sides of road at 913 ft; approximately 150 ft west and 100 ft south of center of east line, Sec. 5, and approximately 150 ft south and 100 ft east of center of west line Sec. 4, T.30S., R.23E., Crawford Co., Kansas.
- CR-424 = Limestone (Higginsville?) float in drainage on both sides of road; approximately 100 ft north of center east line SE1/4, SE1/4, Sec. 31, T.29S., R.23E., Crawford Co., Kansas.
- CR-425 = Sandy, silty mudrock (Labette) in road at 932+ ft; approximately 200 ft north of SE corner, Sec. 32, T.29S., R.23E., Crawford Co., Kansas.
- CR-426 = Limestone (Higginsville) in road ditch east of road, close to top of Fort Scott limestone at 915 ft; approximately 500 ft north of center of east line Sec. 32, T.29S., R.23E., Crawford Co., Kansas.
- CR-427 = Fort Scott (Higginsville?) Limestone in road and fields on both sides of road at 910 ft; near center of north line NW1/4, NE1/4, Sec. 32, T.29S., R.23E., Crawford Co., Kansas.
- CR-428 = Fort Scott (Higginsville) Limestone in bed of Lightning Creek with chaetetids like those at L-700; near center of north line of NE1/4, NE1/4, NE1/4, Sec. 29, T.29S., R.23E., Crawford Co., Kansas.
- CR-429 = Base of Pawnee (Myrick Station) Limestone at 960 ft in road with Anna shale below; approximately 150 ft north of center of west line of NW1/4, Sec. 27, T.29S., R.23E., Crawford Co., Kansas.
- CR-430 = Possible base of Pawnee (Myrick Station) Limestone at 962 ft in road, not well exposed; approximately 200 ft east of center of north line of NW1/4, Sec. 27, T.29S., R.23E., Crawford Co., Kansas.
- CR-431 = Pawnee (Laberdie) Limestone in road at 970 ft; approximately 300 ft west of center of north line Sec. 27, T.29S., R.23E., Crawford Co., Kansas.
- CR-432 = Pawnee (Laberdie) Limestone in road at an elevation greater than 980 ft; approximately 1000 ft east of center of north line Sec. 27, T.29S., R.23E., Crawford Co., Kansas.

- CR-433 = Possible base of Pawnee (Myrick Station) Limestone at 980 ft in road, not well exposed; approximately 200 ft east of center of south line Sec. 27, T.29S., R.23E., Crawford Co., Kansas.
- CR-433A = Same as CR-443 on west side of hill; approximately 300 ft west of center of south line Sec. 27, T.29S., R.23E., Crawford Co., Kansas.
- CR-434 = Sandstone (Labette) in stream on east side of road; approximately 200 ft east and 200 ft south of center of west line of SW1/4, Sec. 27, T.29S., R.23E., Crawford Co., Kansas.
- CR-435 = Base of Pawnee (Myrick Station) Limestone at 971 ft in road ditch on east side of road; approximately 350 ft north of center of west line Sec. 34, T.29S., R.23E., Crawford Co., Kansas.
- CR-436 = Sandstone (Labette) in road at 948 ft; near center of west line NW1/4, SW1/4, Sec. 3, T.30S., R.23E., Crawford Co., Kansas.
- CR-437 = Base of Fort Scott (Blackjack Creek) Limestone with “Excello” shale below forming the bed of Thunderbolt Creek at 900 ft; exposed in eroded creek bank on north side of road; near center of south line of SE1/4, NW1/4, Sec. 10, T.30S., R.23E., Crawford Co., Kansas.
- CR-439 = Fort Scott (Higginsville) Limestone in place in road at 910 ft; approximately 700 ft south of center Sec. 10, T.30S., R.23E., Crawford Co., Kansas.
- CR-440 = Fort Scott (Higginsville) Limestone in place at 890 ft in north bank of creek west of the road; tabular chaetetids in limestone; just south of Meyers Cemetery near center of east line of SE1/4, NE1/4, SE1/4, Sec. 9, T.30S., R.23E., Crawford Co., Kansas.
- CR-441 = Fort Scott (Higginsville) Limestone in place in road at 905 ft; approximately 200 ft south of center of east line of SE1/4, Sec. 9, T.30S., R.23E., Crawford Co., Kansas.
- CR-442 = Fort Scott (Higginsville) Limestone in road and drainage on both sides of road; near center of east line of NE1/4, NE1/4, NE1/4, Sec. 16, T.30S., R.23E., Crawford Co., Kansas.
- CR-443 = Base of Fort Scott (Blackjack Creek) Limestone at 900 ft with “Excello” shale below in road ditch on west side of road; approximately 350 ft south of center of east line of Sec. 17, T.30S., R.23E., Crawford Co., Kansas.
- CR-444 = Fort Scott (Blackjack Creek) Limestone in place in north bank of creek west of road with Higginsville limestone in place in northeast bank of creek on east side of road; float blocks of Higginsville limestone are like those at L-700 with

chaetetids; near center of east line of NE1/4, SE1/4, NE1/4, Sec. 20, and near center of west line of NW1/4, SW1/4, NW1/4, Sec. 21, T.30S., R.23E., Crawford Co., Kansas.

CR-445 = Base of Fort Scott (Blackjack Creek) Limestone in road ditch on both sides of road at 900 ft (?), contact not seen; near center of north line of NE1/4, Sec. 20, T.30S., R.23E., Crawford Co., Kansas.

CR-446 = Base of Fort Scott (Blackjack Creek) Limestone in road at 910 ft (?), contact not seen; approximately 400 ft west of center of south line Sec. 2, T.30S., R.23E., Crawford Co., Kansas.

CR-447 = Sandy, silty mudrock (upper Cabaniss) in road ditch on south side of road at 928 ft; approximately 500 ft west of SE corner, Sec. 32, T.30S., R.23E., Crawford Co., Kansas.

CR-448 = Sandy, silty mudrock (upper Cabaniss) in road ditch on north side of road; approximately 100 ft west of center of south line of SE1/4, Sec. 33, T.30S., R.23E., Crawford Co., Kansas.

CR-449 = Fort Scott (Blackjack Creek) Limestone in road, close to base at about 900 ft; near center of east line of SE1/4, Sec. 33, T.30S., R.23E., Crawford Co., Kansas.

CR-450 = Fort Scott (Higginsville?) Limestone in south bank of creek on west side of road below 900 ft, chaetetids in float; near center of east line of NE1/4, NE1/4, Sec. 33, T.30S., R.23E., Crawford Co., Kansas.

CR-451 = Base of Fort Scott (Blackjack Creek) Limestone at 895 ft (?) on west side of road; near center of east line of SE1/4, SE1/4, Sec. 28, T.30S., R.23E., Crawford Co., Kansas.

CR-452 = Sandy, silty mudrock and sandstone (upper Cabaniss) in creek bank on south side of Kansas Highway 126; approximately 200 ft east of center of north line Sec. 27, T.30S., R.23E., Crawford Co., Kansas.

RADLEY QUADRANGLE

Field work was conducted during January–March of 2003.

C-43 = Higginsville limestone with black shale below in old quarry; measured and described by W. Ives 12 August 1952; our efforts indicate that this is the Blackjack Creek limestone with the “Excello” shale below; near center north line SW1/4, SW1/4, Sec. 29, T.29S., R.24E., Crawford Co., Kansas.

- C-57 = Exposure in abandoned strip pit from a thin coal (Fleming) through thin beds of fossiliferous mudrocks and limestone into a black, platy, fissile shale to claystone with 1-4 ft of sandstone at the top; measured and described by W. Howe 6 August 1948; Sec. 34, T.30S., R.24E., Crawford Co., Kansas.
- C-58 = Exposure of claystone with overlying coal (Fleming) through a black, platy, fissile shale to a gray mudrock unit with approximately 8 ft of sandstone at the top; measured and described by W. Howe 13 June 1950 with note that Mineral coal was removed from below this exposure; SW1/4, SW1/4, Sec. 34, T.30S., R.24E., Crawford Co., Kansas.
- C-59 = Exposure from sandstone below thin coal (Croweburg) with black, platy, fissile shale and 16+ ft of gray mudrock and approximately 4 ft of black, fissile shale with phosphate nodules [unit below Ardmore (Verdigris) limestone]; measured and described by W. Howe 13 June 1950; near center NW1/4, SW1/4, Sec. 27, T.30S., R.24E., Crawford Co., Kansas.
- C-60 = C-61 = Exposure in abandoned strip pit partially full of water, from sandstone at base through thin coal (Fleming), overlaid by fossiliferous limestone, followed by mudrock, limestone, claystone, black, fissile shale to a claystone with basal gravel; measured and described by W. Howe 18 June 1948; near center NE1/4, NW1/4, Sec. 27, T.30S., R.24E., Crawford Co., Kansas.
- C-62 = Fort Scott (Higginsville) Limestone with black, fissile shale below in road ditch on north side of road; measured and described by J. Jewett in 1940 [same as Jewett (1945), site 121]; our efforts indicate that this is the Blackjack Creek limestone with the "Excello" shale below; SW corner Sec. 19, T.30S., R.24E., Crawford Co., Kansas.
- C-63 = Exposure in active pit of Eagle-Cherokee Coal Company from Ardmore (Verdigris) limestone through Bevier coal and thin, very fossiliferous limestone into a claystone at the top; measured and described by W. Howe 18 June 1948; near center NW1/4, NE1/4, Sec. 10, T.30S., R.24E., Crawford Co., Kansas.
- C-64 = Exposure of Bevier coal along Cow Creek; SE1/4, SE1/4, Sec. 9, T.30S., R.24E., Crawford Co., Kansas
- C-77 = Exposure in abandoned strip pit nearly full of water of coal (Fleming), black, fissile shale, and a thin, fossiliferous limestone overlain by mudrock with a channel-like sandstone at the top; measured and described by W. Howe 17 August 1948 who noted that the Mineral coal below this sequence was the object of the mining; SW1/4, NW1/4, Sec. 4, T.31S., R.24E., Crawford Co., Kansas.
- CR-134 = Base of Fort Scott (Blackjack Creek) Limestone in road at 960 ft, Blackjack Creek limestone and "Excello" shale poorly exposed in road ditch; fits with old geologic map of area (Pierce and Courtier, 1937); domical chaetetids up to 1.5-2.0

- dm in diameter in float west of site; approximately 100 ft west of center of south line of SE1/4, SW1/4, Sec. 21, T.29S., R.24E., Crawford Co., Kansas.
- CR-135 = Base of Fort Scott (Blackjack Creek) Limestone in road at 960 ft, Blackjack Creek limestone and “Excello” shale poorly exposed in road ditch; fits with old geologic map of area (Pierce and Courtier, 1937); approximately 200 ft west of center of south line of SW1/4, SE1/4, Sec. 21, T.29S., R.24E., Crawford Co., Kansas.
- CR-438 = Limestone in drainage on east side of road; near center of east line, SW1/4, NW1/4, SW1/4, Sec. 11, T.30S., R.23E., Crawford Co., Kansas.
- CR-453 = Large, hard, dense, dark-gray to black limestone septarian concretions in a light-chocolate-brown, silty mudrock in creek on west side of road, possibly “Excello” shale; compare with C-55; near center of west line, SE1/4, SE1/4, NE1/4, Sec. 27, T.30S., R.23E., Crawford Co., Kansas.
- CR-454 = Reddish sandstone in road; near center of west line, NE1/4, NE1/4, SE1/4, Sec. 27, T.30S., R.23E., Crawford Co., Kansas.
- CR-455 = Fort Scott Limestone in quarry from presumed “Houx” limestone bed (in Little Osage shale) to base of Blackjack Creek limestone and top of “Excello” shale; at the north end of the quarry the Blackjack Creek is approximately 3 ft thick; near the center of the west line of Sec. 30 it is 15-18 ft thick; and at the south end it is approximately 19 ft thick (it is at the south end that the Little Osage shale and “Houx” limestone are exposed); approximately the northern third of the quarry is an algal limestone with approximately 2 ft of thin, platy, argillaceous limestone with domical chaetetids; at the southern end the limestone is all algal; base of Fort Scott (Blackjack Creek) Limestone is at an elevation of 968 ft; exposed in Midwest Minerals quarry (quarry extends from NE corner of Sec. 30 south approximately 0.7mi) along west side of Sec. 30, T.30S., R.24E., Crawford Co., Kansas.
- CR-456 = Exposure of thick sandstone along west side of abandoned strip pit on east side of road; area of sections C-57 and C-58; near center of west line SW1/4, SW1/4, Sec. 34, T.30S., R.24E., Crawford Co., Kansas.
- CR-457 = Exposure of thick sandstone, same as at CR-307, along west bank of abandoned strip pit on west side of road; approximately 200 ft west and 100 ft south of center of east line SE1/4, NE1/4, SE1/4, Sec. 33, T.30S., R.24E., Crawford Co., Kansas.
- CR-458 = Upper 5-6 ft of Fort Scott (Blackjack Creek) Limestone (similar to CR-306); the upper approximately 2 ft is thin-bedded, argillaceous limestone with domical chaetetids, the lower 3-4 ft is an algal limestone; exposed in old quarry mostly full of water south of Kansas Highway 126 in NW corner, NE1/4, NE1/4, NW1/4,

- Sec. 30, T.30S., R.24E., Crawford Co., Kansas; a similar sequence of limestone is exposed in a quarry, also nearly full of water, on the north side of Kansas Highway 126 in west 1/2, SE 1/4, SW1/4, Sec. 19, T.30S., R.24E., Crawford Co., Kansas.
- CR-459 = Pawnee (Myrick Station) Limestone float in road ditch on east side of road; estimate base of Pawnee (Myrick Station) Limestone at approximately 980 ft; NW corner, Sec. 26, T.29S., R.23E., Crawford Co., Kansas.
- CR-460 = Limestone float in stream bed on north side of road; possible top of Fort Scott (Higginsville) Limestone at 920 ft; near center of south line SW1/4, SW1/4, Sec. 35, T.29S., R.23E., Crawford Co., Kansas.
- CR-461 = Sandstone (possibly Englevale) in road at 962 ft; near center south line SW1/4, SE1/4, Sec. 26, T.29S., R.23E., Crawford Co., Kansas.
- CR-462 = Top of limestone (Blackjack Creek) in drainage on both sides of road and under bridge with Little Osage shale in place above in drainage ditch on west side of road; top of limestone very irregular with many pits and/or borings (subaerial exposure surface?); top of Blackjack Creek limestone at 918 ft; near center of west line NW1/4, Sec. 23, T.30S., R.23E., Crawford Co., Kansas.
- CR-463 = Limestone, possibly Blackjack Creek, in drainage north of road; near center of south line, SW1/4, Sec. 14, T.30S., R.23E., Crawford Co., Kansas.
- CR-463A = Fort Scott Limestone in place in road ditch south of road; near center of north line NE1/4, NE1/4, NW1/4 (0.4mi east of NW corner) Sec. 23, T.30S., R.23E., Crawford Co., Kansas.
- CR-463B = Limestone float in field east of road; SW1/4, SW1/4, Sec. 13, T.30S., R.23E., Crawford Co., Kansas.
- CR-463C = Limestone float around pond in field east of road; NW1/4, NW1/4, Sec. 24, T.30S., R.23E., Crawford Co., Kansas.
- CR-463D = Limestone float around pond in field west of road; NE1/4, NE1/4, Sec. 23, T.30S., R.23E., Crawford Co., Kansas.
- CR-464 = Black shale ("Excello") in road ditch on east side of road; SW corner, Sec. 25, T.30S., R.23E., Crawford Co., Kansas.
- CR-465 = Black shale ("Excello") with Blackjack Creek limestone in road ditch on south side of road; base of Fort Scott (Blackjack Creek) Limestone at 940 ft; near center of south line SE1/4, SE1/4, Sec. 26, T.30S., R.23E., Crawford Co., Kansas.

- CR-466 = Black shale (“Excello”) in place with Blackjack Creek limestone above; base of Fort Scott (Blackjack Creek) Limestone at 920 ft; limestone float around pond in field east of road; limestone is also exposed in drainage in field north of Kansas Highway 126; tabular to low domical chaetetids in lower Blackjack Creek; just south of center of north line of NE1/4, Sec. 26, T.30S., R.23E., Crawford Co., Kansas.
- CR-467 = Limestone in drainages in fields on both sides of road with limestone, possibly Higginsville, at 945 ft in road; approximately 100 ft south of center of west line NW1/4, Sec. 13, T.30S., R.23E., Crawford Co., Kansas.
- CR-468 = Limestone in field south of road, possibly Higginsville, at 950 ft; approximately 400 ft east of center of north line NW1/4, Sec. 13, T.30S., R.23E., Crawford Co., Kansas.
- CR-469 = Limestone in drainage under bridge and in field east of road; large domical chaetetids in pool of water under bridge; occurrence similar those in two upper beds of Higginsville limestone at other localities; near center of west line SW1/4, NW1/4, Sec. 1, T.30S., R.23E., Crawford Co., Kansas.
- CR-470 = Exposure similar to that at CR-469 in stream under bridge and in drainage east of road with large domical chaetetids approximately 3 dm in diameter; just north of center of west line Sec. 36, T.29S., R.23E., Crawford Co., Kansas.
- CR-471 = Sandstone in place in drainage under road bridge of Kansas Highway 7 at about 945 ft; approximately 200 ft south of center of west line NW1/4, Sec. 19, T.30S., R.24E., Crawford Co., Kansas.
- CR-472 = Exposure in field west of Kansas Highway 7 of thin, chaetetid-bearing (large, 2-3 dm in diameter, domical forms) limestone and thin-bedded sandstone in place in field at the same elevation of about 940 ft; possibly the Englevale valley-fill sandstone of the Labette Shale cutting out part of the Fort Scott (Higginsville) Limestone; near center of NE1/4, Sec. 24, T.30S., R.23E., Crawford Co., Kansas.
- CR-473 = Limestone with black shale below in pond bank south of road; shale is in place but limestone blocks resembling the lower beds of the Blackjack Creek limestone are not in place, base of Fort Scott (Blackjack Creek) Limestone estimated at 958 ft; just south of center of north line NE1/4, NE1/4, Sec. 36, T.30S., R.23E., Crawford Co., Kansas.
- CR-474 = Limestone in place in drainage north of road; thin, platy limestone that lithologically looks like the lower beds of the Blackjack Creek in this area; chaetetid float in road ditch south of road and east of bridge over drainage at a slightly higher elevation; 300 ft north and 200 ft west of center of south line Sec. 25, T.30S., R.23E., Crawford Co., Kansas.

- CR-475 = Limestone in drainage on both sides of road; near center of east line NE1/4, NE1/4, NE1/4, Sec. 31, T.30S., R.24E., Crawford Co., Kansas.
- CR-476 = Limestone blocks in pond bank in field east of road; near center of west 1/2, SW1/4, Sec. 20, T.30S., R.24E., Crawford Co., Kansas.
- CR-476A = Base of Fort Scott (Blackjack Creek) Limestone at 970 ft near northeast corner of Nelson quarry; 18 ft of limestone with large domical chaetetids in the upper beds; approximately 350 ft west of center of N1/2, Sec. 20, T.30S., R.24E., Crawford Co., Kansas.
- CR-477 = Sandstone/siltstone/mudstone in road ditch on west side of road at approximately 960 ft; approximately 200 ft south of center of east line SE1/4, SE1/4, Sec. 17, T.30S., R.24E., Crawford Co., Kansas.
- CR-478 = As at CR-477 in road ditch on west side of road; near NE corner, Sec. 20, T.30S., R.24E., Crawford Co., Kansas.
- CR-479 = Mudrock and thin beds of sandstone/siltstone in pond bank in field west of road; approximately 200 ft west and 250 ft south of center of east line, Sec. 20, T.30S., R.24E., Crawford Co., Kansas.
- CR-480 = Platy limestone, possibly in place, in field north of road; just north of center of south line, Sec. 7, T.30S., R.24E., Crawford Co., Kansas.
- CR-481 = Limestone and black shale along pond bank west of road, possibly in place; could be Blackjack Creek limestone and "Excello" shale; near center SE1/4, SE1/4, Sec. 7, T.30S., R.24E., Crawford Co., Kansas.
- CR-482 = Thin-bedded, platy limestone (Blackjack Creek) and black shale ("Excello") in place in drainage west of road; base of Fort Scott (Blackjack Creek) Limestone at 938 ft; approximately 300 ft south and 150 ft west of NE corner, Sec. 7, T.30S., R.24E., Crawford Co., Kansas.
- CR-483 = Black shale ("Excello") well exposed in drainage south of road; approximately 400 ft east and 100 ft south of NW corner, Sec. 8, T.30S., R.24E., Crawford Co., Kansas.
- CR-484 = Limestone exposed in drainage south of road (probably lower beds of Blackjack Creek limestone); upper bedding surface pitted and bored, large chaetetid masses occur as float; just south of center of north line of NE1/4, Sec. 7, T.30S., R.24E., Crawford Co., Kansas.
- CR-485 = Limestone (lower beds of Blackjack Creek) exposed in drainage east of road; approximately 300 ft east of center of west line of NW1/4, SW1/4, Sec. 5, T.30S., R.24E., Crawford Co., Kansas.

- CR-486 = Base of Fort Scott (Blackjack Creek) Limestone at 940 ft in field south of road with “Excello” shale exposed below; approximately 10 ft of Blackjack Creek limestone exposed in ditch south of road and west of drainage; occasional tabular chaetetids were encountered; approximately 800 ft east and 100 ft south of NW corner, Sec. 5, T.30S., R.24E., Crawford Co., Kansas.
- CR-487 = Limestone in drainage on both sides of road at 950 ft, probably Blackjack Creek; near center of west line SW1/4, SW1/4, Sec. 32, T.29S., R.24E., Crawford Co., Kansas.
- CR-488 = Limestone blocks and black shale in pond bank east of road; approximately 300 ft east of center of west line of NW1/4, NW1/4, Sec. 32, T.29S., R.24E., Crawford Co., Kansas.
- CR-489 = Limestone exposed in old quarry east of road; section C-43 indicates approximately 10 ft of limestone identified as Higginsville, but it is Blackjack Creek; near center of S1/2, NW1/4, SW1/4, Sec. 29, T.29S., R.24E., Crawford Co., Kansas.
- CR-490 = Limestone exposed in drainage on both sides of road, probably the upper beds of Blackjack Creek limestone; near center of west line of NW1/4, SW1/4, NW1/4, Sec. 29, T.29S., R.24E., Crawford Co., Kansas.
- CR-491 = Mudrock exposed in creek north of road; approximately 400 ft north of center of south line, Sec. 20, T.29S., R.24E., Crawford Co., Kansas.
- CR-492 = Limestone exposed in pond bank south of road at 946 ft, probably Blackjack Creek; approximately 1000 ft east and 100 ft south of NW corner, Sec. 29, T.29S., R.24E., Crawford Co., Kansas.
- CR-493 = Base of Fort Scott (Blackjack Creek) Limestone exposed at 940 ft with “Excello” shale, Breezy Hill limestone, and thick sequence of upper Cabaniss “Lagonda” below, along road ditch on south side of road; lower beds of Blackjack Creek limestone contain very large (5-6+ dm across) domical masses of chaetetids; approximately 100 ft west of center of north line of NW1/4, Sec. 32, T.29S., R.24E., Crawford Co., Kansas.
- CR-494 = Cross bedded sandstones exposed in stream north of road; approximately 150 ft north of center of south line of SW1/4, SE1/4, SE1/4, Sec. 32, T.29S., R.24E., Crawford Co., Kansas.
- CR-495 = Base of Fort Scott (Blackjack Creek) Limestone exposed at 950 ft with black shale (“Excello”) below in drainage west of Kansas Highway 7; occasional tabular to very low, broad domical chaetetid masses in lower 2.0 ft of Blackjack

- Creek; approximately 100 ft north of center of east line of SE1/4, Sec. 25, T.30S., R.23E., Crawford Co., Kansas.
- CR-496 = Pieces of thin, platy limestone in drainage on west side of Kansas Highway 7, probably close to the base of the Fort Scott (Blackjack Creek) Limestone; approximately 150 ft south and 100 ft west of center of east line of NE1/4, SE1/4, Sec. 36, T.30S., R.23E., Crawford Co., Kansas.
- CR-497 = Limestone (Blackjack Creek) in place in drainage west of Kansas Highway 7; approximately 300 ft west of center of east line of SE1/4, SE1/4, Sec. 36, T.30S., R.23E., Crawford Co., Kansas.
- CR-498 = Thin-bedded, dark-gray to black, hard, dense limestone exposed in drainage west of Kansas Highway 7, possibly the Verdigris(?); approximately 350 ft west of center of east line of SE1/4, NE1/4, Sec. 1, T.31S., R.23E., Crawford Co., Kansas.
- CR-499 = Limestone exposed in road at 1000 ft; approximately 150 ft west of NE corner, Sec. 27, T.29S., R.24E., Crawford Co., Kansas.
- CR-500 = Limestone/black shale contact exposed at 990 ft in road; chaetetid float in field north of road; near center of north line of NE1/4, NE1/4, Sec. 27, T.29S., R.24E., Crawford Co., Kansas.
- CR-501 = Limestone in road from an elevation of 969 ft to top of hill at 981 ft; near center of north line of NE1/4, NW1/4, NE1/4, Sec. 28, T.29S., R.24E., Crawford Co., Kansas.
- CR-502 = Mudrock in drainage north of road, either upper beds of Little Osage or upper Cabaniss; near center of south line of SW1/4, SW1/4, Sec. 21, T.29S., R.24E., Crawford Co., Kansas.
- CR-503 = Limestone exposed in road and capping hill above 970 ft; near center of west line of SW1/4, NW1/4, Sec. 27, T.29S., R.24E., Crawford Co., Kansas.
- CR-504 = Top of Verdigris limestone exposed in bed of Second Cow Creek at 898 ft across the road south of section C-64; just west and south of NE corner, Sec. 16, T.30S., R.24E., Crawford Co., Kansas.
- CR-505 = Thin bed of limestone possibly in place in pond bank west of Kansas Highway 126; possibly the base of Fort Scott (Blackjack Creek) Limestone; near center of NE1/4, NE1/4, NE1/4, Sec. 29, T.30S., R.24E., Crawford Co., Kansas.
- CR-506 = Thick bed of hard sandstone exposed in stream bed east of road at 920 ft; near section C-77; approximately 400 ft north and 150 ft east of center of west line of NW1/4, NW1/4, Sec. 4, T.31S., R.24E., Crawford Co., Kansas.

CR-507 = Top of Verdigris limestone in bed of a tributary of Brush Creek at 928 ft south of road; approximately 100 ft south of center of north line of NE1/4, NE1/4, Sec. 5, T.31S., R.24E., Crawford Co., Kansas.

CR-508 = Sandstone similar to that exposed at CR-506 in drainage south of road; approximately 300 ft west and 100 ft south of center of north line of NW1/4, NW1/4, Sec. 4, T.31S., R.24E., Crawford Co., Kansas.

CR-509 = Sandstone exposed in west wall of old strip pit on north side of road and in drainage on south side of road; near center of north line of NW1/4, NW1/4, NE1/4, Sec. 33, T.30S., R.24E., Crawford Co., Kansas.

PITTSBURG QUADRANGLE

Field work was conducted during January–March of 2004.

C-44 = C-45 = Exposure of sequence from the Mineral coal through the Fleming, Croweburg, and Bevier coals to the mudrocks above the Bevier in an operating strip pit of the Mackie-Clemens Coal Company; measured and described by W. Howe 13 June 1949 but no longer accessible; SE1/4, NW1/4, Sec. 28, T.29S., R.25E., Crawford Co., Kansas.

C-46 = Exposure of sequence from gray mudrock below the Mineral coal through the Mineral, Fleming, and Croweburg coals to the mudrock interval above the Verdigris limestone in a strip pit (possibly pit #13) of the Mackie-Clemens Coal Company approximately 2.5 mi north of main junction at Frontenac, Kansas; measured and described by W. Howe 9 June 1949 but no longer accessible; center NW1/4, Sec. 28, T.29S., R.25E., Crawford Co., Kansas.

C-56 = Exposure of sandstones (probably the Chelsea or other sandstone between Tebo and Weir–Pittsburg coals) in road cut approximately 0.4 mi north of Chicopee, Kansas; measured and described by W. Howe 11 August 1948; accessed 7 January 2004 along west side of road in Sec. 35, T.30S., R.24E.; near center of west line, NW1/4, SW1/4, Sec. 36, T.30S., R.24E., Crawford Co., Kansas.

C-65 = Exposure of sequence from Mineral (?) through overlying fossiliferous limestone into a claystone interval above a thin coal (Fleming?) in a strip pit just north of airport; measured and described by W. Howe 11 June 1948 but no longer accessible; NE1/4, SW1/4, Sec. 1, T.30S., R.24E., Crawford Co., Kansas.

C-66 = Exposure of the sequence from Rowe coal through the Dry Wood coal to a 6-ft-thick sandstone above in a small strip pit; measured and described by W. Howe 12 June 1948 but no longer accessible; center, SW1/4, Sec. 36, T.30S., R.25E., Crawford Co., Kansas.

- C-67 = Exposure of sequence from a black, fissile shale through three thin coal beds (possibly the interval of Rowe coal) and associated siliciclastics to a sandstone in an abandoned strip pit; measured and described by W. Howe 25 July 1948 but no longer accessible; SE1/4, NW1/4, Sec. 35, T.30S., R.25E., Crawford Co., Kansas.
- C-68 = Exposure of sequence from Weir–Pittsburg coal to a massive sandstone in a road cut near where old stripping operations crossed the present road; measured and described by W. Howe 25 July 1948 but no longer accessible; NE1/4, NW1/4, Sec. 31, T.30S., R.25E., Crawford Co., Kansas.
- C-69 = Exposure of sequence just below and above Drywood coal in road ditch and adjacent abandoned strip pit; measured and described by W. Howe 25 July 1948 but no longer accessible; near center of SE1/4, NE1/4, Sec. 27, T.30S., R.25E., Crawford Co., Kansas.
- C-70 = Exposure of sequence from underclay below the Mineral coal through a dark, laminated shale and a limestone “caprock” and overlying mudrock to a massive sandstone in a fresh road cut; measured and described by W. Howe 25 July 1948; near center of north 1/2, NW1/4, Sec. 6, T.30S., R.25E., Crawford Co., Kansas.
- CR-576 = Large float blocks of Verdigris limestone in spoil piles along abandoned, unreclaimed strip pits along east side of road; near center of west line of SW1/4, SW1/4, SW1/4, Sec. 21, T.29S., R.25E., Crawford Co., Kansas.
- CR-577 = Large float blocks of Verdigris limestone in spoil piles along abandoned, unreclaimed strip pits along both sides of road along the north side of Sec. 21 and south side of Sec. 28. This limestone and associated black, fissile shale with hard, dense limestone concretions is in place in the road ditch on the south side of the road at an elevation of approximately 950 ft; approximately 0.2 mi east of NW corner Sec. 28, T.29S., R.25E., Crawford Co., Kansas.
- CR-579 = Exposure of mudrock on north side of road and in drainage north of the road; near C-70 and possibly the mudrock described as unit 6 at that locality; near center of south line SW1/4, SW1/4, Sec. 31, T.29S., R.25E., Crawford Co., Kansas.
- CR-581 = Large block of massive sandstone used in landscaping along south side of road, possibly the Bluejacket sandstone from nearby abandoned strip pits; along north line of NE1/4, NE1/4, Sec. 2, T.31S., R.25E., Crawford Co., Kansas.
- CR-583 = Sandstone exposed in road; near center of north line of NW1/4, NE1/4, Sec. 26, T.29S., R.25E., Crawford Co., Kansas.

CR-583A = Exposure of sandstone, possibly Chelsea, along west side of railroad cut; near center of south 1/2, SW1/4, SE1/4, Sec. 23, T.29S., R.25E., Crawford Co., Kansas.

CR-586 = Coal (probably the Mineral) in stream bed in Crawford County State Park No. 1; just north and a bit west of center, Sec. 32, T.29S., R.25E., Crawford Co., Kansas.

MINDENMINES QUADRANGLE

Field work was conducted during January–March of 2004.

CR-578 = Exposure in a drainage into an abandoned strip pit along the south side of road of black, fissile shale with hard, dense, black limestone concretions and a thin, black, fossiliferous limestone (probably the interval of the Tiawah limestone bed) at an elevation of about 910 ft; near center NE1/4, NW1/4, NE1/4, Sec. 25, T.30S., R.29E., Crawford Co., Kansas.

MCCUNE QUADRANGLE

Field work was conducted during January–March of 2004.

CR-351 = Base of Fort Scott (Blackjack Creek) Limestone/top of “Excello” shale at 877 ft in road and in field west of road; near center of west line, SW1/4, NW1/4, SW1/4, Sec. 18, T.31S., R.22E., Crawford Co., Kansas.

CR-352 = Limestone in road and fields on both sides of road at 910 ft; near center of west line, SW1/4, SW1/4, Sec. 17, T.31S., R.22E., Crawford Co., Kansas.

CR-353 = Limestone in road at 914 ft, looks in place; approximately 150 ft south of center of west line, NW1/4, SW1/4, Sec. 17, T.31S., R.22E., Crawford Co., Kansas.

CR-354 = Base of Fort Scott (Blackjack Creek) Limestone at 900 ft in road and on both sides of road; along center of west line, NW1/4, SW1/4, NW1/4, Sec. 17, T.30S., R.22E., Crawford Co., Kansas.

CR-355 = Base of Fort Scott (Blackjack Creek) Limestone/top of “Excello” shale at 912 ft as revealed by water seepage and black soil in field north of road; very poor exposure; silicified chaetetids as float; near center of north line NW1/4, NW1/4, NE1/4, Sec. 9, T.30S., R.22E., Crawford Co., Kansas.

CR-356 = Limestone (float) in field south of road at 904 ft; approximately 200 ft east of center of south line, SW1/4, Sec. 9, T.30S., R.22E., Crawford Co., Kansas.

CR-357 = CH-1 = Base of Fort Scott (Blackjack Creek) Limestone/top of “Excello” shale at 895 ft in road, Blackjack Creek limestone well exposed above contact and sandstone (upper Cabaniss) equally well exposed below “Excello” shale in road and road ditches on both sides of hill; tabular to low domical chaetetids in float blocks used to construct fence; near center of south line, SW1/4, Sec. 20, T.31S., R.22E., Cherokee Co., Kansas.

CR-358 = CH-2 = Base of Fort Scott (Blackjack Creek) Limestone/top of “Excello” shale at 905 ft, similar sequence exposed along both sides of road; tabular to low domical chaetetids in float blocks used to construct fence; approximately 300 ft south of center of west line, NW1/4, SW1/4, Sec. 20, T.31S., R.22E., Cherokee Co., Kansas.

CR-359 = CH-3 = Base of Fort Scott (Blackjack Creek) Limestone/top of “Excello” shale at 900 ft, similar sequence exposed along both sides of road, but not as well exposed; near center of south line, SW1/4, SW1/4, SW1/4, Sec. 19, T.31S., R.22E., Cherokee Co., Kansas.

CR-360 = Limestone at 885 ft in culvert under U.S. Highway 400, limestone well exposed in creek bed on the north side of highway; two specimens of low domical to tabular chaetetids, very similar to those seen as float at the two Cherokee sites [CR-357 (CH-1) and CR-358 (CH-2)]; near center of south line, SE1/4, SW1/4, Sec. 18, T.31S., R.22E., Crawford Co., Kansas.

WEST MINERAL QUADRANGLE

Field work was conducted during January–March of 2002.

C-71 = Road cut on highway west of Cherokee, Kansas; Breezy Hill to Blackjack Creek limestone measured by Howe in 1949; SW1/4, SW1/4, Sec. 16, T.31S., R.23E., Crawford Co., Kansas.

C-72 = Apex Coal Company pit near Monmouth, Kansas; Bevier coal and interval above according to Howe’s 1948 measured section; north 1/2, SE1/4, Sec. 7, T.31S., R.23E., Crawford Co., Kansas,

CR-355A = Fort Scott (Blackjack Creek) Limestone in road above 900 ft; near center of east line, NE1/4, Sec. 9, T.31S., R.22E., Crawford Co., Kansas.

CR-361 = Limestone (Blackjack Creek) in road at 920 ft capping hill; near center of west line NW1/4, Sec. 17, T.31S., R.23E., Crawford Co., Kansas.

CR-362 = Base of Fort Scott (Blackjack Creek) Limestone/top of “Excello” shale at 930 ft on both sides of U.S. Highway 400; approximately 200 ft east of center of south line, SW1/4, SE1/4, Sec. 17, T.31S., R.23E., Crawford Co., Kansas.

CR-363 = Base of Fort Scott (Blackjack Creek) Limestone/top of “Excello” shale at approximately 935 ft on both sides of U.S. Highway 400; area of C-71; near center of south line, SE1/4, SW1/4, Sec. 16, T.31S., R.23E., Crawford Co., Kansas.

CR-364 = Top of Verdigris limestone at about 880 ft in old road just north of Wolf Creek; near center of east line, SE1/4, SE1/4, SE1/4, Sec. 16, T.31S., R.23E., Crawford Co., Kansas.

CR-365 = Hard, black, dense, nodular limestone about 10 cm thick exposed in bed of stream with dark-gray to black mudrock above overlain by yellowish-brown mudrock with thin ferruginous limestone lenses/layers; elevation of stream bed is about 860 ft; approximately 100 ft west and 200 ft south of NE corner, Sec. 17, T.31S., R.23E., Crawford Co., Kansas.

CR-366 = Limestone (Blackjack Creek) (in place?) in road at 925 ft; limestone continues to the top of the hill to the east; old stone farm buildings appear to have been constructed, without mortar, from slabs of this limestone; the slabs in the buildings look much like slabs of Higginsville; approximately 300 ft west of center of south line, Sec. 10, T.31S., R.23E., Crawford Co., Kansas.

CR-369 = Possible base of Fort Scott (Blackjack Creek) Limestone at 910 ft in road and along both sides of road; dense, hard, dark-gray, massive limestone that weathers to dark-yellowish-orange-brown in road and road ditch on east side of road below Fort Scott looks like Verdigris, but cannot be sure it is in place; near center of north line, NE1/4, Sec. 9, T.31S., R.23E., Crawford Co., Kansas.

CR-370 = Mudrock, gray and yellow-brown, exposed in south-facing stream bank east of road; near center of west line, NW1/4, SW1/4, SW1/4, Sec. 3, T.31S., R.23E., Crawford Co., Kansas.

CR-371 = Sequence of limestone, sandstone, and mudrock along road ditch on east side of road; from SW corner Sec. 3 northward for about 400 ft, T.31S., R.23E., Crawford Co., Kansas.

CHEROKEE QUADRANGLE

Field work was conducted during January–March of 2003.

C-73 = Exposure in Sterling Coal Company pit just north of Scammon, Kansas, from Mineral coal to claystone above Fleming coal; measured and described by W.

- Howe 14 July 1948; S1/2, SE1/4, SW1/4, Sec. 30., T.31S., R.24E., Cherokee Co., Kansas.
- C-74 = Exposure in Chero-Ka Coal Company pit of Fleming coal through 8-10 ft of black, platy, fissile shale with hard, black, dense, fossiliferous (marginiferid brachiopods) limestone concretions, into a thick (6-ft) sandstone; measured and described by W. Howe 13 June 1950; near center SE1/4, SE1/4, Sec. 19, T.31S., R.24E., Cherokee Co., Kansas.
- C-75 = Exposure in Barbero Coal Company pit of coal and overlying mudrock; measured and described by W. Howe 17 August 1948; SW1/4, NW1/4, Sec. 14, T.31S., R.24E., Crawford Co., Kansas.
- L-766 = Exposure in abandoned quarry of Blackjack Creek limestone with tabular chaetetids; also KGS core documented in Roth (1991), core locality 766c that began in the Blackjack Creek limestone at a surface elevation of 898 ft and extended into a laminated siltstone below the Breezy Hill limestone; based on this core the base of the Fort Scott (Blackjack Creek) Limestone is at 892.5 ft; Knight (1985), section SQ; NW1/4, SW1/4, NE1/4, Sec. 13, T.32S., R.21E., Cherokee Co., Kansas.
- CR-367 = Fort Scott Limestone (in place?) in road; near center of east line, NE1/4, SE1/4, NE1/4, Sec. 10, T.31S., R.23E., Crawford Co., Kansas.
- CR-368 = Hard, dense, fossiliferous, dark-gray fresh, weathers yellowish-brown limestone less than 1 ft thick in ditch on north side of bridge on the east side of road; elevation about 900 ft; approximately 300 ft south of NW corner Sec. 11, T.31S., R.23E., Crawford Co., Kansas.
- CR-510 = Limestone float, possibly Blackjack Creek, in field south of road at 938 ft; near center of north line, NE1/4, Sec. 15, T.31S., R.23E., Crawford Co., Kansas.
- CR-511 = Two limestone beds separated by approximately 4 ft of mostly covered mudrock; the upper bed is 2.5 dm thick and the lower bed is 3.5 dm thick; both are hard, dense, dark-gray to black and sparsely fossiliferous; below the lower bed are several feet of dark-gray to black, fossiliferous mudrock; elevation of the base of the lower limestone is 915 ft; looks like the Verdigris limestone, but the Verdigris is usually 70 to 80 ft below the base of the Fort Scott, not 20 ft like here; exposure in road ditch on east side of road just south of stream approximately 100 ft north of center of west line NW1/4, SW1/4, Sec. 1, T.31S., R.23E., Crawford Co., Kansas.
- CR-511A = Float of Blackjack Creek limestone in plowed field; SE1/4, SE1/4, Sec. 2, T.31S., R.23E., Crawford Co., Kansas.

- CR-512 = Exposure similar to the lower mudrock and limestone at CR-511, with the limestone only 1.5 dm thick and a grayish mudrock separating it from the underlying dark-gray to black, platy mudrock; elevation at base of limestone is 900 ft; exposed in stream bank on north side of road with the second limestone as seen at CR-511 under the bridge and underwater; approximately 1000 ft east of SW corner Sec. 2, T.31S., R.23E., Crawford Co., Kansas.
- CR-513 = Exposure of sequence similar to that at CR-512 in Wolf Creek west of road; limestone is thin (1.5 dm thick) and dense with a black shale in place in stream bed; elevation of base of limestone is approximately 890 ft; near center of east line SE1/4, NE1/4, Sec. 22, T.31S., R.23E., Cherokee Co., Kansas.
- CR-514 = Exposure similar to that at CR-513 on both sides of road in drainage, with large black limestone concretions below 4 dm of dark-gray to black, hard, dense limestone with concentrations of marginiferid brachiopods; elevation at the top of limestone bed is 890 ft; probably the Verdigris limestone; approximately 1500 ft east of NW corner Sec. 23, T.31S., R.23E., Cherokee Co., Kansas.
- CR-515 = Exposure similar to that at CR-514 on north side of U.S. Highway 400 with top of thick massive limestone at 895 ft; probably the Verdigris limestone; near center of south line of Sec. 14, T.31S., R.23E., Crawford Co., Kansas.
- CR-516 = Limestone in place in road and in fields on both sides of road at 970 ft; near center of W1/2, Sec. 7, T.31S., R.24E., Crawford Co., Kansas.
- CR-517 = Limestone, similar to that at CR-516, in fields on both sides of road at approximately 970 ft; approximately 900 ft north of center of Sec. 7, T.31S., R.24E., Crawford Co., Kansas.
- CR-518 = Limestone like that at CR-368 in road at 950 ft; approximately 400 ft west of center of south line, Sec. 1, T.31S., R.23E., Crawford Co., Kansas.

KIRKWOOD QUADRANGLE

Field work was conducted during January–March of 2004.

- C-76 = Exposure from Weir–Pittsburg coal through a thick shale and sandstone sequence into a clay bed and soil in an abandoned strip pit; measured and described by W. Howe 9 November 1948, no longer accessible; NE1/4, Sec.13, T.31S., R.24E., Crawford Co., Kansas.
- C-78 = Exposure of thin coal with underclay and overlying gray mudrock in abandoned strip pit on south side of creek; measured and described by W. Howe 24 July 1948, no longer accessible; center NW1/4, Sec. 15, R.31S., R.25E., Crawford Co., Kansas.

C-80 = Exposure from Rowe coal to approximately 5 ft of soil in highwall of Clemens #25 mine; measured and described by L. Brady; no longer accessible, reclaimed; SE1/4, SE1/4, Sec. 10, T.31S., R.25E., Crawford Co., Kansas.

CR-582 = Sandstone outcrop in drainage and road cut on west side of road at about 890 ft; probably the Bluejacket Sandstone Member; near center of east line, NE1/4, NE1/4, SE1/4, Sec. 4, T.31S., R.25E., Crawford Co., Kansas.

ASBURY QUADRANGLE

Field work was conducted during January–March of 2004.

CR-580 = Sandstone float blocks in drainage south of road; near NE corner Sec. 12, T.31S., R.25E., Crawford Co., Kansas.

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