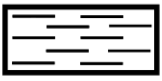




Shale



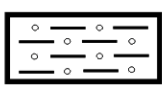
Blocky peds



Mudstone



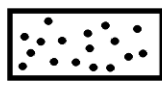
Slickensides



Interlaminated sandy shale or silty sandstone



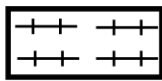
Carbonate nodules



Sandstone



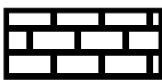
Brachiopods (whole and fragmented)



Siltstone



Crinoid fragments



Limestone



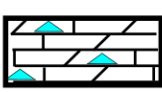
Gastropods



Shaley limestone



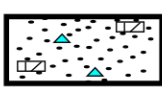
Foraminifera



Cherty dolomitic limestone



Brachiopods



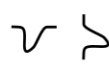
Sandy cherty dolomitic-limestone conglomerate



Bioturbation



Lithoclasts Shale Dolomite Chert



Burrowing (vertical and horizontal)



Low-angle cross beds



Organic or carbonaceous debris



Heterolithic (lenticular) laminae



Root Traces



Heterolithic (wavy) laminae



Stylolites



Heterolithic (flaser) laminae



Pyrite



Mud Drapes



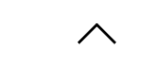
Phosphate



Asymmetric ripples



Siderite



Symmetric ripples

--- Gradational contact



Convolute laminae

— Sharp contact



Desorbed sample

2.01a

Facies photograph

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1040 - 1060 ft		PAGE 2 OF 41		
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 26-28		
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005		
DEPTH (feet)	LITHOLOGY	CARBONATES EVAP - MUDST - WCKST - POKST - GRNST - BNDST CLASTICS CLAY SAND Z V F F M C	SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
1040						Blocky greenish-gray mudstone with 2-10 mm light bluish-gray carbonate nodules.		
1042						Very light-gray wackestone. Brachiopods, bivalves, crinoids.		
1044						Shaly input.		
1046						Slickenslides.		
1048						Transitional contact.		
1050						Greenish-gray blocky mudstone to siltstone.		
1052						Light-gray and light greenish-gray mudstone to wackestone.		
1054						Calcareous light-greenish gray shale With light bluish-gray carbonate nodules.		
1056						Articulated and disarticulated bivalves.		
1058						Carbonaceous		
1060								

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1060 - 1080 ft		PAGE 3 OF 41			
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 28-30			
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005			
DEPTH (feet)	LITHOLOGY	CARBONATES		SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
		EVAP MUDST WCKST POKST GRNST BNDST	CLAY SAND Z V F F M C						
1060							Dark gray shelly lag, disarticulated brachiopods, gastropods, and crinoids.		
1062							Rooted dark-gray carbonaceous shale. Slickensides and burrows.		
							Black pyritic coal.		
1064									
1066							Rooted medium gray blocky mudstone. Carbonaceous partings.		29
1068							Sharp contact.		
1070									
1072							Light- gray bioclastic wackestone. Bioturbated.		
1074									
1076									30
1078									
1070							Silty wackestone.		

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1080 - 1100 ft		PAGE 4 OF 41		
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 30-32		
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005		
DEPTH (feet)	LITHOLOGY	CARBONATES EVAP - MUDST - WCKST - POKST - GRNST - BNDST CLASTICS CLAY SAND Z V F F M C	SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
1080						Silty greenish-gray wackestone. Mottled and complete fossils.		
1082						Greenish-gray finely laminated siltstone with light bluish-gray carbonate nodules.		
1084						Dark-gray to black sideritic shale.	Anna Shale, top of the Anna Interval	31
1086								
1088						Sharp contact.	2.05a	
1090						Very light to light-gray wackestone. Whole fossils of brachiopods, crinoids, and bivalves.		
1092						Gradational contact. Dark-gray organic-rich blocky sandstone. Burrowed, and rooted with slickenslides.		32
1094								
1096						Gradational contact. Light bluish-gray carbonate nodules.		
1098						Dark gray shale		
1100								



Cm In



Mud-supported Carbonate, Hopp, 1088.0-1088.8

Image 2.05a



Cm In



Coal, Hopp 1111-1111.6, Summit

Image 2.01b

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1120 - 1140 ft		PAGE 6 OF 41			
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 35-37			
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005			
DEPTH (feet)	LITHOLOGY	CARBONATES		SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
		EVAP MUDST WCKST POKST GRNST BNDST	CLAY SAND Z V F F M C						
1120							Light to dark-gray wackestone.		
1122							Greenish-gray shale	-----	
1124							Greenish-gray shale. Occasional faint laminations.	-----	
1126								-----	
1128								-----	
1130						Ph	Transition from limestone to siltstone to black shale. Phosphatic black shale. Phosphate is in nodular form (3-4 cm).	-----	
1132							1' black shale with disarticulated fossil fragments.	-----	
1134								-----	
1136							Medium-gray very finely-laminated shale.	-----	
1138							Shelly lag. Medium-gray blocky mudstone	-----	
1140						Light-gray mudstone.	-----		

WELL NAME				INTERVAL				PAGE				
Hopp #1-16 (15-043-20027)				1140 - 1160 ft				7 OF 41				
LOCATION								BOXES				
S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS								37-39				
COMPANY				DESCRIBED BY				DATE				
Forest City LLC				W.M. Brown				January 2005				
DEPTH (feet)	LITHOLOGY	CARBONATES				SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX	
		EVAP	MUDST	WCKST	POKST							GRNST
		CLASTICS										
		CLAY	SAND	Z	V	F	M	C				
1140									Light-gray transitioning below to darker-gray burrowed wackestone.			
1142									Greenish-gray sandy-shale.			
1144									Occasional light-bluish gray 10-30 mm carbonate nodules.			
1146									Slickenslides.			
1148									Calcareous.			
1150									Lenticular, wavy, and flaser bedded.			
1152									Light-gray, poorly laminated, wackestone.			
1154									Bivalve, brachiopod, and crinoid fossils.			
1156									Dark-gray shale underlain by dark-gray sandy shale.			
1158									Black phosphatic shale.			
1160									Excello Shale, top of the Excello Interval.			

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1180 - 1200 ft		PAGE 9 OF 41				
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 39-41				
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005				
DEPTH (feet)	LITHOLOGY	CARBONATES EVAP MUDST WCKST POKST GRNST BNDST CLASTICS CLAY SAND Z V F F M C	SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX		
1180						<ul style="list-style-type: none"> Medium-gray to dark-gray sideritic shale. 		42		
1182										
1184										
1186										
1188										
1190										
1192										
1194										Shelly lag.
1196										Phosphatic black fissile shale.
1198										Carbonaceous shale. Black coal brightly banded. Calcite and pyrite mineralization. Blocky mudstone
1200							43			

WELL NAME				Hopp #1-16 (15-043-20027)				INTERVAL				1200 - 1220 ft				PAGE				10 OF 41											
LOCATION												S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS												BOXES				43-46			
COMPANY						Forest City LLC						DESCRIBED BY						W.M. Brown						DATE				January 2005			
DEPTH (feet)		LITHOLOGY		CARBONATES		CLASTICS		SEDIMENTARY STRUCTURES		FOSSILS		POST-DEPOSITIONAL / DIAGENETIC FEATURES		DESCRIPTION - NOTES				SURFACES, FACIES, INTERVAL, and COMMENTS				BOX									
				EVAP MUDST WCKST POKST GRNST BNDST		CLAY SAND Z V F F M C								<ul style="list-style-type: none"> - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic 																	
1200														Dark-gray blocky mudstone transitioning to organic rich, lenticular fine-grained, coarsening upwards sandstone.				44													
1202								4						Heterolithic, flaser, wavy, and lenticular bedding. Ripple cross laminations. Mud drapes.																	
1204														Convolute laminations.																	
1206														Mud drapes.																	
1208														Asymmetric ripples.																	
1210										P				Bright pyritic rich coal																	
1212														Root traces and burrows.				45													
1214														Medium-gray interlaminated sandy shale and silty shale.																	
1216												S		Dark-gray to black sideritic shale.																	
1218								4																							
1220												S		Organic material				46													

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1220 - 1240 ft		PAGE 11 OF 41			
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 46-48			
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005			
DEPTH (feet)	LITHOLOGY	CARBONATES EVAP MUDST WCKST POKST GRNST BNDST	CLASTICS CLAY SAND Z V F F M C	SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
1220							Dark gray to grayish-black very finely laminated shale.		
1222							5-50 mm siderite bands throughout.		
1224							3" pyritic and calcite rich coal.		
1226							Medium gray blocky mudstone.		
1228							Root casts, slickenslides, burrows and prismatic pedogenic features.		47
1230									
1232									
1234							Pale yellowish-brown carbonate nodules.		
1236									
1238							Weak relict bedding.		
1240							Weakly preserved laminations, heavy burrowing, rooting, and slickenslides.		
							Change at 1240', more blocky below, more relict above.		48



Cm In



Sandstone Hopp 1260.6-1260.9

Image 2.08c



Coal Facies. Sample from 1288.6-1291.2' in Forest City LLC, Hopp #1-16
Image 2.01d



Cm In



Sandstone Hopp 1310.8-1311.3

Image 2.08b



Cm In



Heterolithic, Hopp #1-16, 1314.9-1315.7

Image 2.11d

WELL NAME		Hopp #1-16 (15-043-20027)			INTERVAL		1460 - 1480 ft		PAGE		23 OF 41				
LOCATION		S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS							BOXES			72-75			
COMPANY		Forest City LLC					DESCRIBED BY		W.M. Brown			DATE		January 2005	
DEPTH (feet)	LITHOLOGY	CARBONATES					SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX			
		EVAP	MUDST	WCKST	POKST	GRNST							BNDST	CLAY	SAND
1460															
1462										Ripple cross-laminated fine grained poorly sorted and rounded sandstone. Micaceous, arkosic.		73			
1464										Gradational contact. Medium-gray interlaminated shale and sandstone.					
1466										Flaser beds, lenticular and wavy bedding.					
1468															
1470															
1472									Dark-gray to black banded sideritic shale. Siderite is in 5-40mm bands.		74				
1474										Occasional carbonaceous layers and organic debris.					
1476															
1478										Black coal with calcite and some pyrite in cleats. Black carbonaceous shale overlying and underlying coal.					
1480										Dark-gray blocky very fine grained sandstone. Organic rich.		75			

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1480 - 1500 ft		PAGE 24 OF 41		
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 75-77		
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005		
DEPTH (feet)	LITHOLOGY	CARBONATES EVAP MUDST WCKST POKST GRNST BNDST CLASTICS CLAY SAND Z V F F M C	SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
1480						Medium-gray blocky very fine-grained poorly sorted and poorly rounded sandstone. Rooted and burrowed throughout.		
1482						Gradational contact with underlying medium gray laminated and lenticular shaley sandstone. Wavy beds and ripple-cross laminations.		
1484								
1486						Black sideritic shale.		
1488						Dark-gray to black carbonaceous shale. Slickenslides. 1" coal.		
1490						Black sideritic shale with slickenslides.		76
1492						Large 30mm siderite nodules. Blocky lt-medium gray very fine grained sandstone.		
1494						Siderite nodules. Gradational contact.		
1496						Gradational contact.		
1498						Dark-gray to black carbonaceous shale. Slickenslides, roots, and burrows. Black dull coal. Calcite with pyrite mineralization.		
1500						Medium-gray blocky siltstone. Organic material.		77

WELL NAME		Hopp #1-16 (15-043-20027)			INTERVAL		1500 - 1520 ft		PAGE		25 OF 41				
LOCATION		S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS							BOXES			77-79			
COMPANY		Forest City LLC					DESCRIBED BY		W.M. Brown			DATE		January 2005	
DEPTH (feet)	LITHOLOGY	CARBONATES		SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES		SURFACES, FACIES, INTERVAL, and COMMENTS	BOX					
		EVAP MUDST WCKST POKST GRNST BNDST	CLAY SAND Z V F F M C				CLASTICS	CLAY SAND Z V F F M C			CLASTICS	CLAY SAND Z V F F M C	CLASTICS	CLAY SAND Z V F F M C	
1500								Medium-gray blocky siltstone.							
1502								Gradational contact. Silty sandstone, lenticular and wavy bedding, medium-gray with blocky features and some relic bedding. Black silty sandstone, carbonaceous. Sharp contact.							
1504								Fine-grained low-angle cross-bedded, poorly sorted, and poorly rounded sandstone. Micaceous							
1506															
1508															
1510								Sharp contact.		78					
1512								Medium-gray to medium dark gray shaley sandstone, with lenticular, wavy and flaser bedding. Mud drapes and double mud drapes, ripple-cross lamination.							
1514								Sharp contact. Black shale with 10-50mm siderite bands.							
1516								Fissile							
1518								Sharp contact.		79					
1520								Silty sandstone, wavy but not lenticular bedding. Parallel laminae 1-2mm thick.							

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1540 - 1560 ft		PAGE 27 OF 41			
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 81-83			
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005			
DEPTH (feet)	LITHOLOGY	CARBONATES EVAP - MUDST - WCKST - POKST - GRNST - BNDST	CLASTICS CLAY SAND Z V F F M C	SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
1540									
1542							Dark-gray finely laminated sideritic shale.		
1544							Siderite is ~5% of total thickness and nodular (20-50mm in diameter) or laminar (2-20mm in thickness).		82
1546							2.13c		
1548									
1550									
1552									
1554									83
1556							Sharp contact with underlying interlaminated shaley sandstone. Ripple cross laminae.		
1558							4" coal		
							Blocky medium-gray silty sandstone.		
							Carbonaceous shale		
1560							Black coal, pyrite and calcite.		



Cm In



Sideritic dark gray shale, Hopp 1544.5-1544.9

Image 2.13c

WELL NAME				Hopp #1-16 (15-043-20027)				INTERVAL				1600 - 1620 ft				PAGE				30 OF 41											
LOCATION												S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS												BOXES				87-89			
COMPANY						Forest City LLC						DESCRIBED BY						W.M. Brown						DATE				January 2005			
DEPTH (feet)		LITHOLOGY		CARBONATES		CLASTICS		SEDIMENTARY STRUCTURES		FOSSILS		POST-DEPOSITIONAL / DIAGENETIC FEATURES		DESCRIPTION - NOTES				SURFACES, FACIES, INTERVAL, and COMMENTS				BOX									
				EVAP MUDST WCKST POKST GRNST BNDST		CLAY SAND Z V F F M C								<ul style="list-style-type: none"> - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic 																	
1600										C5C5				Dark-gray shale with light-gray disarticulated brachiopod and bivalve fossil fragments. Shelly lag.																	
1602										C5C5				Medium-gray interlaminated sandstone and shale. Gradational contact.								88									
1604														Very light-gray, poorly-sorted, moderately well-rounded sandstone. Flaser bedded. 2.11a																	
1606														Muddy drapes.																	
1608																															
1610																															
1612														Shaley partings. 2.11b								89									
1614												P		Black banded coal with calcite mineralization in cleats. Medium light-gray blocky mudstone. Rooted and burrowed with slickenslides.																	
1616																															
1618																															
1620														Dark-gray blocky mudstone. Very carbonaceous.																	



Cm In

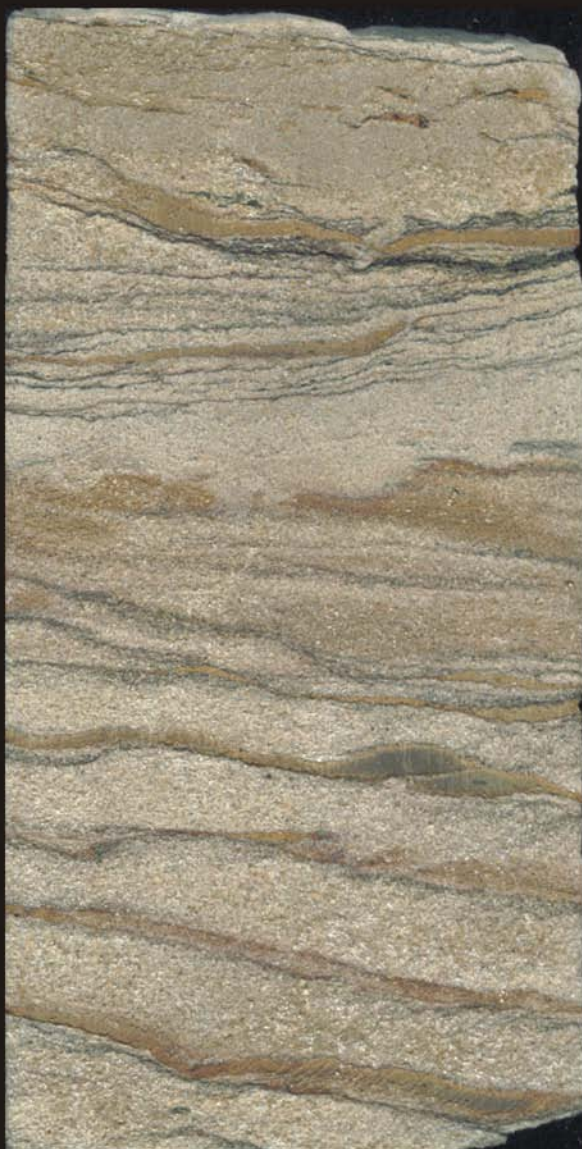


Heterolithic Flaser bedded facies. Hopp1605.10-1616.5

Image 2.11a



Cm In



Heterolithic Hopp 1611.4-1611.9

Image 2.11b



Cm In



Coal, Hopp 1635-1635.5, Riverton

Image 2.01c

WELL NAME				Hopp #1-16 (15-043-20027)		INTERVAL		1640 - 1660 ft		PAGE		32 OF 41								
LOCATION				S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES				91-94						
COMPANY				Forest City LLC						DESCRIBED BY		W.M. Brown				DATE		January 2005		
DEPTH (feet)	LITHOLOGY	CARBONATES			CLASTICS			SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES				SURFACES, FACIES, INTERVAL, and COMMENTS		BOX			
		EVAP	MUDST	WCKST	POKST	GRNST	BNDST				<ul style="list-style-type: none"> - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic 									
		CLAY	SAND	Z	V	F	F	M	C											
1640	[Lithology pattern]																			
1642	[Lithology pattern]																		92	
1644	[Lithology pattern]																			
1646	[Lithology pattern]																			
1648	[Lithology pattern]																			
1650	[Lithology pattern]																			
1652	[Lithology pattern]																			
1654	[Lithology pattern]																			
1656	[Lithology pattern]																			
1658	[Lithology pattern]																			
1660	[Lithology pattern]																			94

S

S

S

S

SSS

H

7

Dark-gray laminated sandy shale with lenticular beds. Generally coarsening upwards. Siderite rich.

Dark-gray sideritic shale.

Sharp contact
Dark-gray shale with lt gray disarticulated bivalve fossil fragments.
Sharp contact

Dark-gray silty-shale. Lenticular and wavy beds of silt in muddy matrix. Occasional ripples within silty laminae (4-5mm thick).

Coarsening upwards

Carbonaceous.

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1680 - 1700 ft		PAGE 34 OF 41				
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 96-98				
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005				
DEPTH (feet)	LITHOLOGY	CLASTICS			SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
		CLAY Z	SAND V F F M C	CARBONATES EVAP MUDST WCKST POKST GRNST BNDST						
1680										96
1682										
1684										
1686										
1688										
1690										97
1692										
1694										
1696										
1698										98
1700										

CARBONATES

EVAP
MUDST
WCKST
POKST
GRNST
BNDST

CLASTICS

CLAY
Z
SAND
V F F M C

- DESCRIPTION - NOTES
- Thickness
 - Color
 - Lithology (Grain Size, Sorting, Roundness)
 - Composition
 - Sedimentary Structures
 - Contacts
 - Body / Trace Fossils
 - Post-Depositional and Diagenetic

S

Fissile very dark-gray to black shale.
Siderite rich.

6080

Shelly layer of disarticulated bivalve and brachiopod fragments in a black shale matrix.
1" coal layer.

4

Strongly carbonaceous

4

4

S

Dark-gray to very dark-gray sideritic fissile shale

S

WELL NAME		Hopp #1-16 (15-043-20027)			INTERVAL		1700 - 1720 ft		PAGE		35 OF 41					
LOCATION		S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS							BOXES			98-100				
COMPANY		Forest City LLC					DESCRIBED BY		W.M. Brown				DATE		January 2005	
DEPTH (feet)	LITHOLOGY	CARBONATES					SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX				
		EVAP	MUDST	WCKST	POKST	GRNST							BNDST			
		CLASTICS														
		CLAY	SAND													
		Z	V	F	M	C										
1700																
1702									Very finely laminated black fissile sideritic shale.							
1704																
1706																
1708									Blocky-medium gray mudstone.							
1710									Sharp contact with underlying fine-grained light-gray sandstone. Organics with carbonaceous shale partings and thin (1-3mm) laminae.							
1712									Rooted and burrowed.							
1714									Interlaminated shale and sandstone, lenticular, wavy, and flaser bedded.							
1716									Ripple-cross laminae.							
1718									Shale laminations are dark-gray, sand laminations are light-gray.							
1720									Mud drapes.							
									Occasional low-angle cross-bedding.							
									Asymmetric ripples throughout.							

99

100

WELL NAME		Hopp #1-16 (15-043-20027)			INTERVAL		1720 - 1740 ft		PAGE		36 OF 41				
LOCATION		S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS							BOXES			100-102			
COMPANY		Forest City LLC					DESCRIBED BY		W.M. Brown			DATE		January 2005	
DEPTH (feet)	LITHOLOGY	CARBONATES					SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX			
		EVAP	MUDST	WCKST	POKST	GRNST							BNST		
		CLASTICS													
		CLAY	SAND	Z	V	F	F	M	C						
1720															
1722										Thin coal laminae (2-3mm) in interlaminated shale and sandstone.					
1724										20 mm siderite nodules, organic rich.					
1726										Siderite.		101			
1728										Sharp concontact.					
1730										Lenticular and wavy-bedded, organic-rich, fine-grained, poorly-sorted and moderately well-rounded sandstone.					
1732										Micaceous, arkosic.					
1734										Mud Drapes					
1736										Fairly sharp contact.		102			
1738										Heavy bioturbation.					
1740										Sharp contact					
										Fissile very finely-laminated black shale.					

WELL NAME				Hopp #1-16 (15-043-20027)				INTERVAL				1760 - 1780 ft				PAGE				38 OF 41											
LOCATION												S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS												BOXES				104-107			
COMPANY						Forest City LLC						DESCRIBED BY						W.M. Brown						DATE				January 2005			
DEPTH (feet)		LITHOLOGY		CARBONATES		CLASTICS		SEDIMENTARY STRUCTURES		FOSSILS		POST-DEPOSITIONAL / DIAGENETIC FEATURES		DESCRIPTION - NOTES				SURFACES, FACIES, INTERVAL, and COMMENTS				BOX									
				EVAP MUDST WCKST POKST GRNST BNDST		CLAY SAND Z V F F M C								<ul style="list-style-type: none"> - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic 																	
1760																						105									
1762												S		Dark-gray to black fissile sideritic shale.																	
1764								H						Light-gray very-fine grained sandstone, flaser bedded with mud drapes and ripple-cross laminae.																	
1766																															
1768																															
1770												S		Gradational contact.								106									
														2.03b																	
1772														Burrowed, lenticular and wavy-bedded, fine grained sandstone.																	
														Ripple-cross laminated with flaser beds.																	
1774														Mud drapes.																	
1776																															
1778														2.10																	
1780																						107									



Cm In



Blocky, Hopp1770.3-1770.9

Image 2.03b



Cm In



Siltstone, Hopp 1777.3-1777.10

Image 2.10

WELL NAME		Hopp #1-16 (15-043-20027)			INTERVAL		1780 - 1800 ft		PAGE		39 OF 41				
LOCATION		S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS							BOXES			107-109			
COMPANY		Forest City LLC					DESCRIBED BY		W.M. Brown			DATE		January 2005	
DEPTH (feet)	LITHOLOGY	CARBONATES					SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX			
		EVAP	MUDST	WCKST	POKST	GRNST							BNDST	CLAY	SAND
		Z	V	F	M	C									
1780															
1782							~ ~ ⚡	○ S	Interlaminated shale and siltstone. Thin (2-3mm) coal laminations throughout.						
1784							⚡	○ S	Wavy and convolute bedding, lenticular and flaser bedding.						
1786							⚡		Carbonaceous shale partings (again, 2-3mm in thickness).						
1788								○ S	10 mm siderite nodules at base. Sharp contact.		108				
1790								○ P	Fissile dark-gray to black shale.						
1792									Pyrite and siderite common, both in nodule form (siderite and pyrite) and banded form (siderite only).						
1794								○ S							
1796															
1798								○ P							
1800								○ S			109				

WELL NAME Hopp #1-16 (15-043-20027)				INTERVAL 1800 - 1820 ft		PAGE 40 OF 41			
LOCATION S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS						BOXES 109-111			
COMPANY Forest City LLC				DESCRIBED BY W.M. Brown		DATE January 2005			
DEPTH (feet)	LITHOLOGY	SEDIMENTARY STRUCTURES			FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic	SURFACES, FACIES, INTERVAL, and COMMENTS	BOX
		CLAY Z	SAND V F F M C	EVAP MUDST WCKST POKST GRNST BNDST					
1800									
1802					S	Fissile dark-gray to black shale.			
1804					P	Pyrite and siderite common. Pyrite is nodular, siderite is nodular and banded.			
1806					S				110
1808					S				
1810									
1812					P				
1814					S				
1816									111
1818					P				
1820					S				

WELL NAME		Hopp #1-16 (15-043-20027)			INTERVAL		1820 - 1831 ft		PAGE		41 OF 41				
LOCATION		S16-T2S-R19E, N-1/2, SW-SE-SE, Doniphan Co., KS							BOXES			111-112			
COMPANY		Forest City LLC					DESCRIBED BY		W.M. Brown			DATE		January 2005	
DEPTH (feet)	LITHOLOGY	CARBONATES			CLASTICS	SEDIMENTARY STRUCTURES	FOSSILS	POST-DEPOSITIONAL / DIAGENETIC FEATURES	DESCRIPTION - NOTES			SURFACES, FACIES, INTERVAL, and COMMENTS			
		EVAP	MUDST	WCKST	POKST	GRNST	BNDST			<ul style="list-style-type: none"> - Thickness - Color - Lithology (Grain Size, Sorting, Roundness) - Composition - Sedimentary Structures - Contacts - Body / Trace Fossils - Post-Depositional and Diagenetic 					
		CLAY	SAND												
		Z	V	F	F	M	C								
1820										Dark-gray siderite rich shale. Gradational contact.					
1822										Medium-gray very fine-grained structureless sandstone matrix with 1-5 cm clasts of light-gray chert and light-gray dolomitic limestone.					
1824										Burrowed with organic debris throughout.					
										2.18c					
1826										Extremely sharp contact. (Top Mississippian, 1824'-6")					Mississippian
1828										Very light-gray mudstone.					
1830										Cherty dolomitic limestone.					
1832										Well and Core TD, 1831.					



Cm In



Conglomerate, Hopp 1823.4-1823.7

Image 2.18c