

KANSAS CORPORATION COMMISSION OIL & GAS CONSERVATION DIVISION 1065740

Form ACO-1 June 2009 Form Must Be Typed Form must be Signed All blanks must be Filled

WELL COMPLETION FORM

WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License #		API No. 15
Name:		Spot Description:
Address 1:		
Address 2:		Feet from North / South Line of Section
City: Sta	ate: Zip:+	Feet from East / West Line of Section
		Footages Calculated from Nearest Outside Section Corner:
		County:
		Lease Name: Well #:
		Field Name:
-		
		Producing Formation:
Designate Type of Completion:		Elevation: Ground: Kelly Bushing:
New Well Re-I	Entry Workover	Total Depth: Plug Back Total Depth:
Oil WSW	SWD SIOW	Amount of Surface Pipe Set and Cemented at: Fee
Gas D&A	ENHR SIGW	Multiple Stage Cementing Collar Used? Yes No
OG	GSW Temp. Abd.	If yes, show depth set: Fee
CM (Coal Bed Methane)		If Alternate II completion, cement circulated from:
Cathodic Other (Core,	Expl., etc.):	feet depth to:w/sx cmi
If Workover/Re-entry: Old Well Info	o as follows:	
Operator:		
Well Name:		Drilling Fluid Management Plan (Data must be collected from the Reserve Pit)
Original Comp. Date:	Original Total Depth:	
Deepening Re-perf.	Conv. to ENHR Conv. to SWD	Chloride content: ppm Fluid volume: bbls
		Dewatering method used:
Plug Back:	Plug Back Total Depth	Location of fluid disposal if hauled offsite:
Commingled	Permit #:	
Dual Completion	Permit #:	Operator Name:
	Permit #:	Lease Name: License #:
	Permit #:	Quarter Sec TwpS. R East Wes
GSW	Permit #:	County: Permit #:
Spud Date or Date Read Recompletion Date	ched TD Completion Date or Recompletion Date	

AFFIDAVIT

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

KCC Office Use ONLY
Letter of Confidentiality Received
Date:
Confidential Release Date:
Wireline Log Received
Geologist Report Received
UIC Distribution
ALT I II Approved by: Date:

	Side Two	1065740
Operator Name:	Lease Name:	Well #:
Sec TwpS. R East _ West	County:	

INSTRUCTIONS: Show important tops and base of formations penetrated. Detail all cores. Report all final copies of drill stems tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface test, along with final chart(s). Attach extra sheet if more space is needed. Attach complete copy of all Electric Wire-line Logs surveyed. Attach final geological well site report.

Drill Stem Tests Taken (Attach Additional Sh	eets)	Yes No		Log Formatic	on (Top), Depth an		Sample	
Samples Sent to Geolog	gical Survey	Yes No		name		Тор	Datum	
Cores Taken Electric Log Run Electric Log Submitted Electronically (If no, Submit Copy)		Yes Nu Yes Nu Yes Nu	D					
List All E. Logs Run:								
		CAS		New Used				
		Report all strings	set-conductor, surface	, intermediate, product	tion, etc.			
Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs. / Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives	

ADDITIONAL CEMENTING / SQUEEZE RECORD

Purpose: Perforate	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
Protect Casing Plug Back TD				
Plug Off Zone				

Shots Per Foot	PERFORATION RECORD - Bridge Plugs Set/Type Specify Footage of Each Interval Perforated				Acid, Fracture, Shot, Cement Squeeze Record (Amount and Kind of Material Used)			Depth		
TUBING RECORD:	Siz	ze:	Set At:		Packer	r At:	Liner F	Run:	No	
Date of First, Resumed	Product	ion, SWD or ENHF	λ .	Producing N	1ethod:	ping	Gas Lift	Other (Explain)		
Estimated Production Per 24 Hours		Oil Bb	ls.	Gas	Mcf	Wate	ər	Bbls.	Gas-Oil Ratio	Gravity
DISPOSITI	ON OF C	BAS:			METHOD	OF COMPLE	TION:		PRODUCTION IN	TERVAL:
Vented Solo		Jsed on Lease		Open Hole	Perf.	Dually (Submit)	Comp. AC <i>O-5)</i>	Commingled (Submit ACO-4)		
(If vented, Su	bmit ACC)-18.)		Other (Specify)						

Conservation Division Finney State Office Building 130 S. Market, Rm. 2078 Wichita, KS 67202-3802



Phone: 316-337-6200 Fax: 316-337-6211 http://kcc.ks.gov/

Mark Sievers, Chairman Ward Loyd, Commissioner Thomas E. Wright, Commissioner Sam Brownback, Governor

October 20, 2011

Leon Rodak Murfin Drilling Co., Inc. 250 N WATER STE 300 WICHITA, KS 67202-1216

Re: ACO1 API 15-171-20824-00-00 Minnix 1-7 NW/4 Sec.07-20S-34W Scott County, Kansas

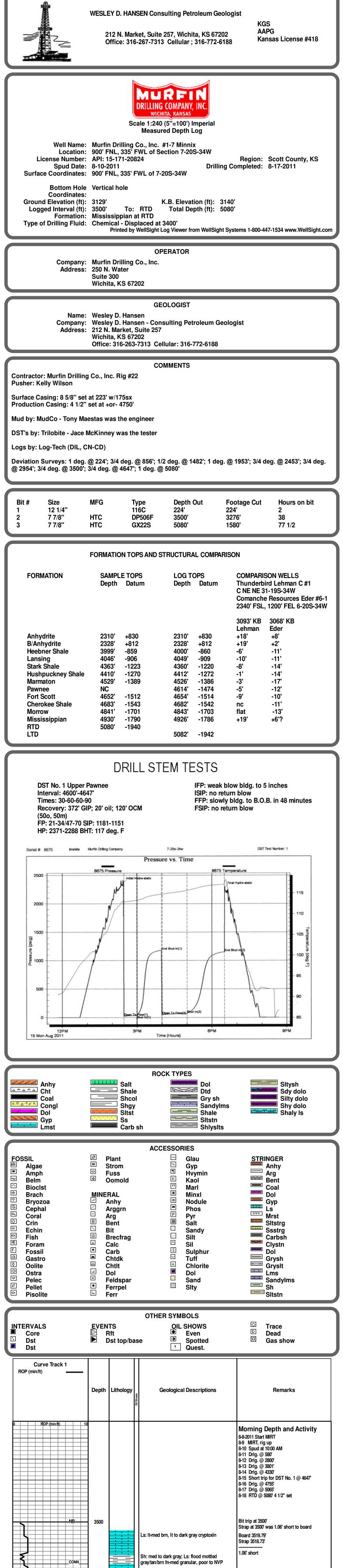
Dear Production Department:

We are herewith requesting that the Well Completion Form ACO-1 and attached information for the subject well be held confidential for a period of two years.

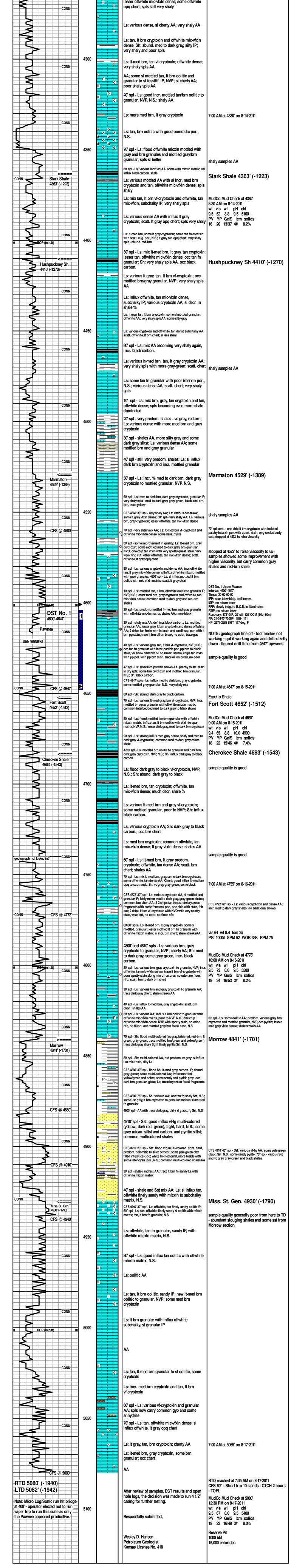
Should you have any questions or need additional information regarding subject well, please contact our office.

Respectfully, Leon Rodak

		Thunderbird Drlg. Lehman 'C' #1 4620' FSL 660' FEL Sec. 31-T19S-R34W 3093' KB						
Formation	Sample Top	Datum	Ref	Log tops	Datum	Ref	Log Top	Datum
Anhydrite	2310	+830	+18	2311	+829	-17	2281	+812
B/Anhydrite	2328	+812	+19	2328	+812	-19	2300	+793
Neva				3228	-88	+1	3182	-89
Heebner	3999	-859	-5	3999	-859	-5	3947	-854
Lansing	4046	-906	-7	4049	-909	-10	3992	-899
Stark	4363	-1223	-9	4359	-1219	-5	4307	-1214
Pawnee				4614	-1474	+5	4572	-1479
Ft. Scott	4652	-1512	+11	4655	-1515	+8	4616	-1523
Johnson				4738	-1598	+4	4695	-1602
Mississippi	4930	-1790	+15	4928	-1788	+17	4898	-1805
RTD	5080						5021	
LTD				5082			5021	

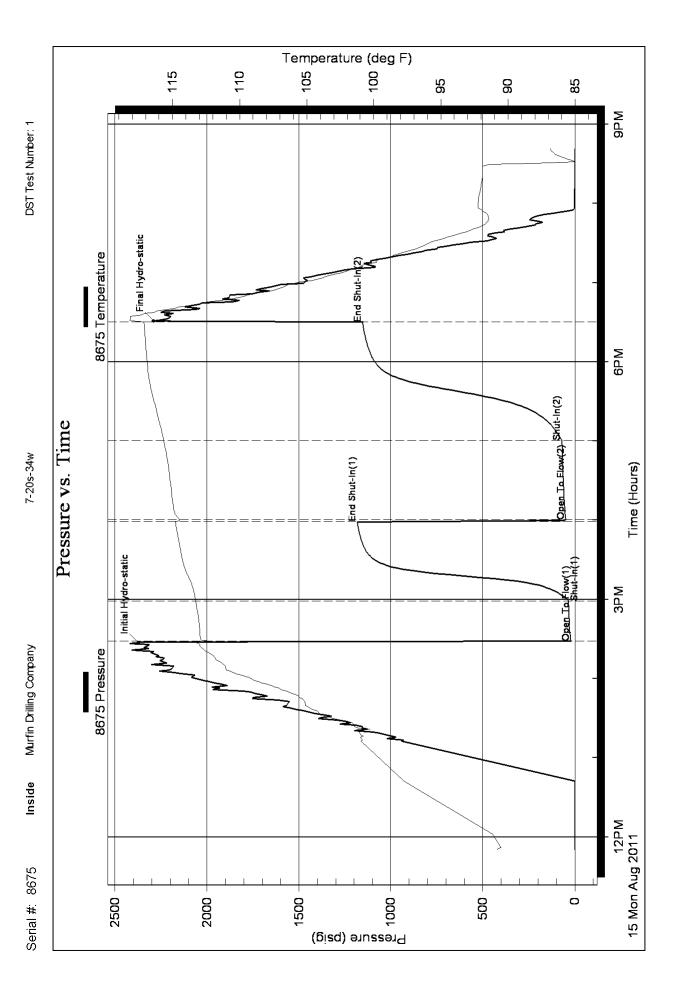


Ę				Sh: med to dark gray; Ls: flood mottled gray/tan/brn fn-med granular, poor to NVP	1.06' short
2				Ls: mixed and mottled AA, some It-med gray vf-cryptoxln; interbedded med to dark gray	
5		-		shales, some red-brn Ls: mix It-med gray vf-cryptoxim; med brn cryptoxin, sl influx	
5				sl mottled tan/lt brn fn granular and fossilif. with inter and intra-particle por.; Sh: It-med gray, some gray-green	
ξ		3550		Sh: influx med to dark gray in 80' spl	
\				Ls: gray, It brn cryptoxin	Geologist on location at 3556
Ş				Sh: vc gray with common red-brn, some brick	
Ł				red	sample quality fair at best - plagued by sloughing gray and red-brown shales
\mathbf{Z}		-		Ls: mottled tan/brn/gray granular, NVP; tan, offwhite, It gray mic-vfxIn dense; very shaly spls - It-med gray, some It gray, offwhite micac. siltst;	
				trace gray/brn chert	
S				Ls: various mottled granular, occ fossilif. and oolitic, NVP; shales and scatt. siltst AA	
	P (min/ft) 10	3600	¢ F		
			¢	Ls: more tan, It brn fn granular and vf-cryptoxin; trace crinoid fragments; shaly spls AA	
		-		Ls: various tan, brn, gray mottled granular, sl	
		-	F.	oolitic and fossilif., NVP; vc gray and red-brn shales	
$\left \right\rangle$				50' spl - Ls: flood tan, lt brn, lt gray predom. vfxln, dense; scatt. tan, offwhite subchalky to occ chalky; decr. shale $\%$	
				Ls: predom. tan, It brn, It gray mic-vfxln dense; some mic-fnxln with poor pp por., occ subchalky; lesser gray, gray-brn vf-cryptoxln; shaly spls AA, some dark gray to black	
4				Ls: mix AA, more It-med brn xin dense	
		3650		Ls: influx tan, It brn cryptoxin and tan, offwhite	shaly samples AA
		-		micxin subchalky to chalky Ls: common offwhite, tan subchalky to chalky	
		-		IP; tan, It-med brn, some It gray vf-cryptoxin	
	CONN			Ls: flood It-med brn, gray-brn vf-cryptoxin, mottled granular IP, NVP	
				Sh: med to dark gray	
				Ls: tan, offwhite mic-fnxln and It brn mic-vfxln dense	
\mathbf{S}		3700	F	Ls: mix AA with influx It-med gray cryptoxIn, sl fossilif. IP; mottled brn/gray granular NVP; vc	
		0/00		gray shales Ls: various tan, brn, gray vf-cryptoxin and	
Z		-		mottled dense AA; vc gray shales	
				Ls: tan, It brn mic-vfxln; It-med gray vfxln to occ cryptoxln; some tan mic-fnxln with poor interxln	
				por., N.S.; shaly AA, sl influx dark gray to black	
				Ls: offwhite, tan mic-fnxln, some poor pp por., subchalky IP and tan, It brn fnxln with poor	
				interxIn por., N.S.	shalu camples AA
		3750		Sh: med to dark gray, some black Ls: mix AA with more It-med brn sl mottled,	shaly samples AA
				granular	
				Ls: various tan, It brn, It gray vfxin dense; very shaly spis, influx red-brn	
	ight CONN			very shaly spls AA; Ls: various dense AA; one chip tan cryptoxln with good vug. por., N.S.; some tan, It brn vfxln dolomite, NVP, N.S.	tight connection
				Ls: scatt. It brn cryptoxin with good vug. por. and offwhite,	
				tan mic-vfxln, subchalky to chalky; some tan, It brn mic-vfxln, gen. dense, some poor pp por., N.S.	MudCo Mud Check at 3800' 6:30 AM on 8-13-2011 wt vis wl pH chl
				Ls: influx med brn, gray mottled and granular, NVP; Sh: vc gray, red-brn; trace dark gray mottled chert	9.4 61 10.4 10.0 9000 PV YP GelS Icm solids 18 22 15/45 2# 7.3%
very		3800		Ls: tan, it brn vf-cryptoxin, gen. NVP, some scatt. good vug por. AA; mottled med to dark gray, brn dense AA; tan, offwhite mic-vfxin dense, subchalky to chalky IP; Sh: med to	7:00 AM at 3801' on 8-13-2011
S		-		dark gray Ls: influx med to dark gray, mottled IP, dense,	tight connection, worked pipe
				shaly; It-med brn vfxIn dense; shales AA	
E				Ls: mottled dense shaly AA; mottled gray, brn granular NVP; It-med brn, tan vf-cryptoxin; Sh:	
Ş				med to dark gray, sl influx black	
				Ls: various It-med gray, It-med brn, tan predom. vfxln dense; Sh: vc gray, caving red-brn	
				Ls: various dense AA; lesser mottled brn fn granular and tan, offwhite micxln dense	
3		3850			
2				Ls: various dense AA; mottled brn/gray granular, NVP; Sh: med to dark gray, occ black	shaly samples AA
$\boldsymbol{\varsigma}$				very shaly mix AA with more dark gray to black shale; Ls: sl influx med to dark brn, med gray	anay sampica AA
2				cryptoxin	
\langle				Ls: influx It-med brn, tan cryptoxin; shaly spis AA	
\mathbf{z}				Ls: tan, It brn fn granular with some poor pp and interxIn por.; offwhite, It gray, tan mic-vfxIn	
	CONN			dense, subchalky IP with some pp por., N.S.	
		3900			
		3900		Ls: It gray, It-med brn cryptoxin; incr. med to	
		3900			
		3900		Ls: It gray, It-med brn cryptoxin; incr. med to	
		3900		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some si mottled tan, granular, si oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various	
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				Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldic por., N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark	shaly samples AA
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		3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldic por., N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some	
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		3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldic por., N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn,	
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	CONN CON CO	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxln dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxln; scatt. tan fossilif./oolitic with fair-goodiue, and moldic por., N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spls AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxln dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxln with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxln, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert	
	CONN CONN	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif/oolitic with fair-good vug. and moldic por., N.S.; It-med brn vf-cryptoxin, sl mottled IP, very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert	
		3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good wig. and moldic por, N.S.; it-med brn vf-cryptoxin, sl mottled IP; very shaly spls AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite mic.n, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to	Heebner Shale 3999' (-859)
	CONN CONN	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldie por., N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert	Heebner Shale 3999' (-859)
	CONN CONN	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldic por, N.S.; it-med brn vf-cryptoxin, sl mottled IP; very shaly spls AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite mic.n, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CONN	3950		Ls: It gray, It-med brn cryptoxln; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxln; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxln dense; various gray, brn cryptoxln; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxln Ls Ls: offwhite, tan mic-vfxln; scatt. tan fossilif/colitic with fair-good vug. and moldic por, N.S.; it-med brn vf-cryptoxln, sl mottled IP; very shaly spls AA Ls: It-med brn, It gray cryptoxln; tan, It brn, offwhite vfxln dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxln with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxln, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxln Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxln Ls: flood offwhite, tan vf-cryptoxln; good influx offwhite micxln, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxln and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: mix AA with influx It-med brn cryptoxln; very	Heebner Shale 3999' (-859)
	CONN CONN	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldic por., N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: various dense; shaly AA Ls: various dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite mickin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: cherty AA	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CON CON CONN CON CONN CONN CONN	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif/oolitic with fair-good vug, and moldic por, N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: threed brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; oc It gray with fair pp por., N.S.; cherty AA Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CON CON CONN CON CONN CONN CONN	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldic por., N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: tan, It brn cryptoxin and offwhite mic-vfxin	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CON CON CONN CON CONN CONN CONN	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottiled tan, granular, sl oolitic with poor to NVP Ls: offwhite, it gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good wug, and molife por, N.S.; It-med brn vf-cryptoxin, sl mottiled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottiled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CO	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good vug. and moldie por, N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ it gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: cherty AA Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CO	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good wug, and molicer, N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: cherty AA Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: mix AA with influx. It-med brn cryptoxin; very shaly spis AA with incr. dark gray to black	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CO	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good wai and molic por, N.S.; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fmxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CO	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif.oolitic with fair-good vug. and moldic por, N.S.; It-med brn vf-cryptoxin, al mottled IP; very shay spls AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite off-chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; oc It gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: cherty AA Ls: cherty AA Ls: cherty AA Ls: mix AA with influx It-med brn cryptoxin; very shaly spls AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin Ls: sl influx of sl mottled tan, It brn granular and It gray cryptoxin; Sh: vc gray Ls: offwhite mic-fnxin with some pp por., N.S. Ls: tan, It brn cryptoxin to sl mottled granular, NVP	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	CONN CO	3950 4000 4100		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif./oolitic with fair-good waj and molic por, MS; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin Ls:	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	Image: Control Image	3950		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif.oolitic with fai-good way, and molic joor, NS; It-med brn vf-cryptoxin, al mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: tan, it brn cryptoxin and offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin Ls: si influx of sl mottled tan, It brn granular and it gray cryptoxin; Sh: vc gray Ls: offwhite mic-fnxin with some pp por., N.S. Ls: tan, It brn cryptoxin to sl mottled granular, NVP	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: Control Image	3950 4000 4100		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sI mottled tan, granular, sI oolitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt tan fossilif/oolitic with fair-good vug, and moldic por, N.S.; It-med brn vf-cryptoxin, sI mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sI influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite mic-fnx, subchalky to chalky; sI influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spis AA with incr. dark gray to black Ls: tan, t. brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin Ls: si influx of sI mottled tan, It brn granular and It gray cryptoxin; Sh: vc gray Ls: offwhite mic-fnxin; offwhite dense; some mottled It brn mic-fnxin; offwhite dense; some mottled It brn mic-fnxin; offwhite dense subchalky to chalky Ls: tan, It brn cryptoxin nd sI mottled granular, NVP	Heebner Shale 3999' (-859) Lansing 4046' (-906)
	Image: Control Image	3950 4000 4100		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sI mottled tan, granular, sI oolitic with poor to NVP Ls: offwhite, It gray mic-vfxln dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxln; scatt, tan fossilif/colitic with fair-good vug, and molicit por, N.S.; It-med brn vf-cryptoxin, sI mottled IP; very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxln dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxln with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxln, finely sucrosic, N.S. Sh: sI influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sI influx gray, tan, offwhite offer the chalky, influx offwhite micxin, subchalky to chalky; sI influx gray, tan, offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin, very shaly spis AA with influx It-med brn cryptoxin Ls: si influx of sI mottled tan, It brn granular and It gray cryptoxin; Sh: ve gray Ls: clfwhite mic-fnxln; offwhite dense subchalky Ls: si influx mottled It brn/gray with micxin matrix; predom. tan, It-med brn cryptoxin and offwhite subchalky to chalky Ls:	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: Control Image	3950 4000 4100		Ls: It gray, It-med bm cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, bm vf-cryptoxin; some sl mottled tan, granular, sl oolitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, bm cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med bm cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif Joolitic with fai-good vug, and molic por, N.S.; It-med bm vf-cryptoxin, silmottled IP, very shaly spAA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: tanoid dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fmxin with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It bm vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micch, subchalky to chalky; sl influx gray, tan, offwhite, tan vf-cryptoxin; good influx offwhite micch, subchalky to chalky; sl influx gray, tan, offwhite off component Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micch, subchalky to chalky; sl influx gray, tan, offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: tan, It bm cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: more med bm, gray-bm cryptoxin, very shaly spls AA with influx It-med bm cryptoxin; very shaly spls AA with incr. dark gray to black Ls: tan, It bm cryptoxin to sl mottled granular, NVP Ls: various It bm, it gray mic-vfxin dense; some subchalky to chalky Ls: si influx mottled It bm/gray with micxin matrix; predom. tan, It-med bm cryptoxin and offwhite subchalky to chalky Ls: si influx mottled It bm/gray with micxin matrix; breadom mic-fmxin; offwhite dense subchalky to chalky. Ls: si influx mottled It bm/gray with micxin matrix; bm cryptoxin and tan mic-fmxin wit	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: Control Image: Contro Image: Control Image:	3950 4000 4100		 Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sI mottled tan, granular, sI colitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfair, scatt tan fossilf/colitic with fair-good vag, and molic por, N.S.; temed brn vf-cryptoxin, sI mottled IP; very shaly spis AA Ls: offwhite with dense; shaly AA Ls: rarious dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sI influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: flored offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; si influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; si influx gray, tan, offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense; some mottled It brn mic-fnxin, with some pp por., N.S. Ls: si influx of si mottled tan, It brn granular and It gray cryptoxin; Sh: ve gray Ls: offwhite mic-fnxin, with some pp por., N.S. Ls: tan, It b	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: Control Image: Contro Image: Control Image:	3950 4000 4100		Ls: It gray, It-med bm cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, bm vf-cryptoxin; some sl mottled tan, granular, sl oolitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, bm cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med bm cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt. tan fossilif Jooitic with fair-good vug, and molic por, N.S.; It-med bm vf-cryptoxin, simottled IP; very shaly spAA Ls: It-med bm, It gray cryptoxin; tan, It bm, offwhite vfxin dense; shaly AA Ls: tan, offwhite mic-fmxin with pp por. IP; some mottled offwhite/bm mari Dolo: influx tan, It bm vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med bm, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micorn, subchalky to chalky; sl influx gray, tan, offwhite off-cryptoxin; good influx offwhite micorn, subchalky to chalky; sl influx gray, tan, offwhite off-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: tan, off white influx It-med bm cryptoxin; very shaly spis AA with influx It-med bm cryptoxin, very shaly spis AA with influx It-med bm cryptoxin, NS; Ls: tan, It bm cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: wrious It bm, it gray mic-vfxin dense; some mottled It bm mic-fmxin; offwhite dense subchalky Ls: si influx mottled It bm/gray with micxin matrix; predom. tan, It-med bm cryptoxin and offwhite subchalky to chalky Ls: si influx they of spis of gray granular/oolitic with offwhite with micxin matrix, NVP, NS.	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: Control Image: Contro Image: Control Image:	3950 4000 4100		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl colitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfain; scatt tan fossiif/colitic with fair-good vug, and molicic por, NS; it-med brn vf-cryptoxin, sl mottled IP, very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: it gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; oc it gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: cherty AA Ls: tan, to brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: an, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: si influx of sl mottled tan, It brn granular and It gray cryptoxin; Sh: vc gray Ls: offwhite mic-fnxin; offwhite dense subchalky Ls: si influx of sl mottled tan, It brn granular and It gray cryptoxin; Sh: vc gray Ls: offwhite subchalky to chalky Ls: si influx mottled It brn 'gray with micxin matrix; predom. tan, It-med brn cryptoxin and offwhite subchalky to chalky Ls: si influx mottled It brn 'gray granular/colitic with offwhite micxin matrix, NVP, NS. Ls: si influx thy pard smalary, NVP, NS. Sh: si influx thy pard smalary, Si, sine tan oolitik with some popr pp por. ad tan, It brn cryptoxin ho or to NY	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
		3950 4000 4100 4150		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl colitic with poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfain; scatt tan fossiif/colitic with fair-good vug, and molicic por, NS; it-med brn vf-cryptoxin, sl mottled IP, very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfxin dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnxin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: it gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite, tan vf-cryptoxin; good influx offwhite micxin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; oc it gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: cherty AA Ls: tan, to brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: an, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: si influx of sl mottled tan, It brn granular and It gray cryptoxin; Sh: vc gray Ls: offwhite mic-fnxin; offwhite dense subchalky Ls: si influx of sl mottled tan, It brn granular and It gray cryptoxin; Sh: vc gray Ls: offwhite subchalky to chalky Ls: si influx mottled It brn 'gray with micxin matrix; predom. tan, It-med brn cryptoxin and offwhite subchalky to chalky Ls: si influx mottled It brn 'gray granular/colitic with offwhite micxin matrix, NVP, NS. Ls: si influx thy pard smalary, NVP, NS. Sh: si influx thy pard smalary, Si, sine tan oolitik with some popr pp por. ad tan, It brn cryptoxin ho or to NY	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: state of the state of	3950 4000 4100 4150		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfoin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, it an ine-vfain seat: tan fossili //ooliti.with fair.good wg, and molici.por; N.S; It-med brn vf-cryptoxin, sl mottled IP; very shaly spis AA Ls: Itemed brn, It gray cryptoxin; tan, It brn, offwhite wfan dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fnain with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: Itemed brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite miccin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opt chert Ls: mix AA with common offwhite subchalky to chalky; oc it gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: cherty AA Ls: tan, It brn cryptoxin and offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin, very shaly spis AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: write use filter with some pp por., N.S. Ls: tan, It brn cryptoxin to sl mottled granular, NVP Ls: sl influx of sl mottled tan, It brn granular and It gray cryptoxin, Sh: ve gray Ls: sl influx mottled It brn/gray with micxin matrix, prodom, tan, It-med brn cryptoxin and offwhite subchalky to chalky Ls: sl influx and gray one on Mite with some pp op or, N.S.; common offwhite dense subchalky Ls: sl influx the micryptoxin and a mic-fnxin with some pp op or, N.S.; common offwhite micxin matrix, prodom, tan, It-med brn cryptoxin to occ sl granular, poor to NVP Ls: warious	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: state of the state of	3950 4000 4100 4150		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn 4-cryptoxin; some sI mottled tan, granular, si oolitic wih poor to NVP Ls: offwhite, It gray mic-vfoln dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite wind ense; shaly AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite wind nese; shaly AA Ls: stratus dense; shaly AA Ls: stratus dense; shaly AA Ls: stratus dense; shaly AA Ls: tan, offwhite mic-fmain with pp por. IP; some mottled offwhite/brn mar1 Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: si influx black carbon; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin; good influx offwhite wind, subchalky to chalky; si influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite vf-cryptoxin; good influx offwhite mich, subchalky to chalky; si influx gray, tan, offwhite opq chert Ls: mix AA with normon offwhite subchalky to chalky; occ it gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: sinflux of si mottled tan, It brn granular and it gray cryptoxin, silty iP; scatt. offwhite, tan opq chert Ls: mix AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: wrious It brn, It gray mic-vfxin dense; some mottid It brn mic-fmxin, offwhite dense subchalky Ls: si influx of sill with some pp por., N.S. Ls: si influx mottled It brn/gray with micxin matrix; protom. tan, It-med brn cryptoxin and offwhite subchalky to chalky Ls: si influx mottled It brn/gray granular/colitic with offwhite mic-vfxin dense; some mottid It brn mic-fmxin, offwhite dense subchalky Ls: si influx mottled It brn/gray granular/colitic with spar matrix, NVP, N.S. Sh: si influx mottled It brn/gray granular/colitic with offwhite mic-vfxin dense, subchalky IP, some poor pp por, N.S.; common offwhite subchalky coc si granular, por t	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: state of the state of	3950 4000 4100 4150		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vfxin dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan mic-vfxin; scatt, tan fossiif /oolitic with fair-good vag, and molicipor; N.S.; It-med brn vf-cryptoxin, al motted IP; veryshaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite wfxin dense; shaly AA Ls: various dense; shaly AA Ls: various dense; shaly AA Ls: tan, offwhite mic-fmxin with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite miccin, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin, very shaly spis AA with influx It-med brn cryptoxin; very shaly spis AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite tan opq chert Ls: wricus It brn, It gray mic-vfxin dense; some mottidal It prn mic-fmxin, offwhite dense subchalky to shally IP; scatt. offwhite, tan opq chert Ls: si influx of sl mottled tan, It brn granular and It gray cryptoxin; Sh: ve gray Ls: offwhite mic-fmxin with some pp por., N.S. Ls: si influx mottled It brnigray with micxin matrix, predom. tan, It-med brn cryptoxin and offwhite subchalky to chalky Ls: si influx mottled It brnigray mite micxin matrix, predom. tan, It-med brn cryptoxin and offwhite with micrind matrix, NVP, N.S. Sh: si influx dark gray to b	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
		3950 4000 4100 4150		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vful dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common med-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, it gray cryptoxin; tan, It brn, offwhite vful dense; shaly AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vful dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fndn with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfuln, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite miccln, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite chert Sh: gray Ls: tan, offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spls AA with influx It-med brn cryptoxin; very shaly spls AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite subchalky; occ it gray with fair pp por., N.S.; cherty AA Ls: si influx of sl mottled tan, It brn granular and it gray cryptoxin; Sh: ve gray Ls: offwhite mic-fnxin with some pp por., N.S. Ls: tan, It brn cryptoxin to sl mottled granular, NVP Ls: tan, It brn cryptoxin to sl mottled granular, NVP Ls: tan, It brn cryptoxin to sl mottled granular, NVP, Ls: tan, It brn cryptoxin to sl mottled granular, NVP Ls: tan, It brn cryptoxin to sl mottled granular, NVP; Ls: si influx offwhite mic-vfxin dense; some mottled It brn mic-fnxin, offwhite dense subchalky to chalky Ls: tan, It brn cryptoxin to granular with some pp por., N.S.; common offwhite subchalky IP, some por, N.S.; common offwhite subchalky IP, some por, N.S.; common offwhite subchalky IP, some por you. and tan, it pray fn-med xin to cor si granular, por to NVP Ls:	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
	Image: state of the state of	3950 4000 4100 4150		Ls: It gray, It-met brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mico-Vind dense; various gray, brn cryptoxin; Sh: common med to dark gray, brn cryptoxin; Sh: common med brn cryptoxin Ls Ls: offwhite, ta mic-vfan; scatt, tan fossiff.oolitic with fair-good wg. and moliel por. NS, It med brn vf-cryptoxin, al mottled IP: very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vfan dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fixin with pp por. IP; some mottled offwhite/brn marl Dolo: influx tan, It brn vfan, finely sucrosic, N.S. Sh: sl influx black carbon; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micch, subchalky to chalky; sl influx gray, tan, offwhite opt chert Ls: mix AA with common offwhite subchalky to chalky; noc it gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: cherty AA Ls: tan, offwhite vf-cryptoxin and offwhite subchalky iP; scatt. offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin very shaly spis AA with inor. dark gray to black Ls: tan, It brn cryptoxin and offwhite mic-vfan dense, subchalky IP; scatt. offwhite, tan opq chert Ls: offwhite wichding iP; scatt. offwhite, tan opq chert Ls: sinflux drift and tan mic-fixin dense; some motivhite subchalky IP; scatt. offwhite dense subchalky Ls: sl influx tan; df spi of gray granular, NVP Ls: sl influx tan; gray to black, Ls: sl influx and if gray cryptoxin to sl mottled granular, NVP Ls: sl influx drift gray to black, Ls: sl influx and matrix, prodom, tan, It-med brn cryptoxin and offwhite subchalky IP, scomo offwhite subchalky to chalky Ls: sl influx tan; gray to black, Ls: sl influx and matrix, prodom, tan, It-med brn cryptoxin and the gray offwhite mic-vfan dense; subchalky Ls: sl influx tan; gray to bl	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
		3950 4000 4100 4150		Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl oolitic wih poor to NVP Ls: offwhite, It gray mic-vful dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common med-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, it gray cryptoxin; tan, It brn, offwhite vful dense; shaly AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite vful dense; shaly AA Ls: various dense AA with influx med to dark gray dense shaly Ls: tan, offwhite mic-fndn with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfuln, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite miccln, subchalky to chalky; sl influx gray, tan, offwhite chert Sh: gray Ls: tan, offwhite chert Sh: gray Ls: tan, offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spls AA with influx It-med brn cryptoxin; very shaly spls AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite subchalky; occ it gray with fair pp por., N.S.; cherty AA Ls: si influx of sl mottled tan, It brn granular and it gray cryptoxin; Sh: ve gray Ls: offwhite mic-fnxin with some pp por., N.S. Ls: tan, It brn cryptoxin to sl mottled granular, NVP Ls: tan, It brn cryptoxin to sl mottled granular, NVP Ls: tan, It brn cryptoxin to sl mottled granular, NVP, Ls: tan, It brn cryptoxin to sl mottled granular, NVP Ls: tan, It brn cryptoxin to sl mottled granular, NVP; Ls: si influx offwhite mic-vfxin dense; some mottled It brn mic-fnxin, offwhite dense subchalky to chalky Ls: tan, It brn cryptoxin to granular with some pp por., N.S.; common offwhite subchalky IP, some por, N.S.; common offwhite subchalky IP, some por, N.S.; common offwhite subchalky IP, some por you. and tan, it pray fn-med xin to cor si granular, por to NVP Ls:	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
				Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some sl mottled tan, granular, sl colitic with poor to NVP Ls: offwhite, It gray mic-vfain dense; various gray, brn cryptoxin; Sh: common med to dark gray, brn cryptoxin; Sh: hend brn vr-optoxin, sl mottled P; very shaly spSA Ls: Itemed brn, It gray cryptoxin; tan, It brn, offwhite whin dense; shaly AA Ls: tran, offwhite mic-fmain with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfdin, finely sucrosic, N.S. Sh: sl influx black carbon.; Ls: some med brn, gray cryptoxin Sh: it gray, gray-green, soft, silty IP Ls: Itemed brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite wickn, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin good influx offwhite miccf, subchalky to chalky; sl influx gray, tan, offwhite vf-cryptoxin and offwhite subchalky; influx offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spis AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite taio-frxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: more med brn, gray-brn cryptoxin and offwhite subchalky IP; scatt. offwhite, tan opq chert Ls: si influx of sl mottled tan, It brn granular and It gray cryptoxin, Sh: ve gray Ls: offwhite wichnain, offwhite dense; some mottled It brn mic-fmain, offwhite dense; subchalky IP; scatt. offwhite subchalky IP; scatt. and the mic-fmain with some pp por., N.S. Ls: tan, It brn cryptoxin and offwhite subchalky IP; scatt. and the mic-fmain with some pp por., N.S. Ls: stinux in 90° spi J gray granular/oolitic with spir numer, numer, numer, numer, N.S. Ls: stinux tan, It pray fin-med xin, sl sucrosite with markin, mainty, NVP, N.S. Sh: sl influx drive mainty, bry, mod sin with sort o NVP Ls: various dense AA; trace med brn sl collitic with spir tand xi	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA
				Ls: It gray, It-med brn cryptoxin; incr. med to dark gray shale and dense gray shaly Ls Ls: common gray, brn vf-cryptoxin; some si mottled tan, granular, si oolitic wih poor to NVP Ls: offwhite, it gray mic-vfan dense; various gray, brn cryptoxin; Sh: common med to dark gray, some black, common red-brn slough very shaly mix AA; more med brn cryptoxin Ls Ls: offwhite, tan wic-vfan; scatt. tan fossiff. joilic with fiar goot wag, and moleit por. NS. It med brn vf-cryptoxin, si mottled IP, very shaly spis AA Ls: It-med brn, It gray cryptoxin; tan, It brn, offwhite whin dense; shaly AA Ls: tran, offwhite mic-fruch with pp por. IP; some mottled offwhite/brn mari Dolo: influx tan, It brn vfxin, finely sucrosic, N.S. Sh: si influx black carbon.; Ls: some med brn, gray cryptoxin Sh: It gray, gray-green, soft, silty IP Ls: It-med brn, gray vf-cryptoxin Ls: flood offwhite, tan vf-cryptoxin; good influx offwhite micch, subchalky to chalky; si influx gray, tan, offwhite ochert Ls: mix AA with common offwhite subchalky to chalky; occ It gray with fair pp por., N.S.; cherty AA Ls: cherty AA Ls: tan, thr cryptoxin and offwhite uschalky; lnitux offwhite opq chert Ls: mix AA with influx It-med brn cryptoxin; very shaly spis AA with incr. dark gray to black Ls: tan, It brn cryptoxin and offwhite mic-vfxin dense, subchalky IP; scatt. offwhite, tan opq chert Ls: warious It brn, It gray mic-vfxin dense; some motion in pp and smal wdp, por; some tan oplitc with offwhite mic-fixin; offwhite dense subchalky Ls: si influx of si mottled tan, It brn granular and It gray cryptoxin; Sh: vc gray Ls: offwhite mic-vfxin dense; subchalky to chalky co-halky. Ds: common offwhite subchalky to chalky co-halky. Ds: some tan inform with some pp or, N.S.; common fwhite subchalky to chalky co-halky. Ds: some tan inform with some pp or, N.S.; common fwhite subchalky to chalky co-halky. Ls: si influx tan gray in micxin matrix, predom. tan, It-med brn cryptoxin and offwhite micxin matrix, IVPP, N.S. Ls: various tan, It brn cryptoxin to granular MVP; less:	Heebner Shale 3999' (-859) Lansing 4046' (-906) shaly samples AA



		DRILL STEM TES	ST REP	ORT				
	OBITE	Murfin Drilling Company		Mir	nnix 1-7			
	STING , INC.	250 N Water STE 300		7-2	0s-34w			
		Wichita KS, 67202 - 1216		Job	Ticket: 43	245	DST	#:1
		ATTN: Wes Hansen		Tes	t Start: 20	11.08.15	@ 11:50:00)
GENERAL INFORM Formation: Upp Deviated: No Time Tool Opened: 14:2	er Pawnee Whipstock:	ft (KB)		Tes Tes	21	Conventior Jace McKir	nal Bottom	Hole
Time Test Ended: 20:4						28	- 1	
	0 ft (KB) To 46 47.00 ft (KB) (TN 7.88 inchesHole			Ref	erence Ele KB to	vations: o GR/CF:	3129.	00 ft (KB) 00 ft (CF) 00 ft
Serial #: 8675 Press@RunDepth: Start Date: Start Time: TEST COMMENT:	Inside 69.78 psig 2011.08.15 11:50:01	 4601.00 ft (KB) End Date: End Time: 	2011.08.15 20:41:45	Capacity Last Calil Time On Time Off	b.: Btm: 2		8000. 2011.08. 5 @ 14:26: 5 @ 18:30:	45
	No return blow B.O.B. in 48 min. No return blow							
_	Pressure vs. T			PI	RESSUR	E SUM	MARY	
600 1000 1	Time (Hous)	8075 Temperature 8075 Temperature 116 110 100 06 06 03 05 06 05 06 05 06 05 06 06 06 06 06 06 06 06 06 06	Time (Min.) 0 2 32 92 94 154 244 244	Pressure (psig) 2370.76 20.51 33.99 1181.21 48.68 69.78 1150.81 2288.18	112.10 113.26 114.79 114.50 115.64 117.13	Open To Shut-In(1 End Shut Open To Shut-In(2 End Shut	Iro-static Flow (1)) -In(1) Flow (2)) -In(2)	
	Recovery				Gas	s Rates		
Length (ft)	Description	Volume (bbl)			Choke (ir	nches) Pres	sure (psig)	Gas Rate (Mcf/d)
	t gas in pipe	0.00						
	% O 50 % M	0.59						
20.00 100% C)	0.10						
ļ								

		ILL STEM TEST F	REPORT			FLUID SI	JMMARY
RILUB	IIE Murfir	n Drilling Company		Minnix 1-7	,		
RILOBITE		Water STE 300		7-20s-34w			
		ta KS, 67202 - 1216		Job Ticket: 43	3245	DST#:1	
	ATTN	: Wes Hansen		Test Start: 20	011.08.15 @ 1	1:50:00	
Mud and Cushion Infe	ormation						
Mud Type: Gel Chem		Cushion Type:			Oil A PI:		deg API
Mud Weight: 10.00 I		Cushion Length:			Water Salinity:		ppm
Viscosity: 52.00 s Water Loss: 8.79 i		Cushion Volume: Gas Cushion Type:		bbl			
	ohm.m	Gas Cushion Pressure	:	psig			
Salinity: 5100.00 p				P0.9			
	nches						
Recovery Information	ı	_					
	r	Recovery Table			1		
	Length ft	Description		Volume bbl			
	0.00	372 feet gas in pipe		0.000	•		
	120.00	ocm 50% O 50 % M		0.590	•		
	20.00	100% O		0.098	ļ		
То	tal Length: 14	0.00 ft Total Volume:	0.688 bbl				
	m Fluid Samples: 0	Num Gas Bombs:	0	Serial #:			
	boratory Name: covery Comments: A	Laboratory Locatio	n:				
		11. 04 @ 00 - 01					



Printed: 2011.08.16 @ 08:27:57 Page 3

Ref. No: 43245

Trilobite Testing, Inc



PROD COPY INVOICE

Invoice Numbe	r: 128194
Invoice Date	Aug 10, 2011
Page:	

heer.

Voice: (785) 483-3887 Fax: (785) 483-5566

a status

Bill To: Murfin Drlg. Co., Inc. 250 N. Water STE #300 Wichita, KS 67202

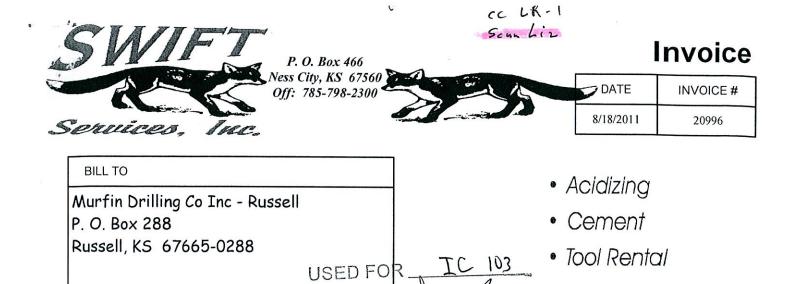
Murfin Drlg. Co., Inc. 250 N. Water STE #300 Wichita, KS 67202		OP-1 rates Pay MDC/M				
Gustomer ID	Well Name# or Customer P.O.	Payment	Terms			
Murfin	Minnix #1-7	Net 30	Days			
Job Location	Camp Location	Service Date	Due Date			
KS1-01	Oakley	Aug 10, 2011	9/9/11			

			J	0.0,11
Quantity	ltem	Description	Unit Price	Amount
175.00	MAT	Class A Common	16.25	2,843.75
6.00	MAT	Chloride	58.20	349.20
181.00	SER	Handling	2.25	407.25
65.00	SER	Mileage /	19.91	1,294.15
1.00	SER	Surface	1,125.00	1,125.00
130.00	SER	Heavy Vehicle Mileage	7.00	910.00
1.00	SER	Manifold Head Rental	200.00	200.00
130.00	SER	Light Vehicle Mileage	4.00	520.00
1.00	EQP	8 5/8 Wooden Plug	92.00	92.00
1.00	CEMENTER	Alan Ryan		
1.00	CEMENTER	Terry Heinrich		
1.00	OPER ASSIST	Ethan Glassman		
-				
		- 1 - 1		
		Amount Amount	Description	
			MAKNY	
		7903 7981 15	1 ament	-(Sg1-1
	14	0203 7481.15 (2109.48)	(and and a second seco	
		2 20011 (0)	and a standard at the second standard standard at the second standard standard standard standard standard stand	
		3. 5024.0001		
ALL PRICES	ARE NET, PAYA	BLE Subtotal		7,741.35
	OLLOWING DATE		an a data ta manya ata a a a data ang ang ang ang ang ang ang ang ang an	239.80
	1 1/2% CHARGE			7,981.15
	ER. IF ACCOUNT TAKE DISCOUNT			1
CURRENT,	TARE DISCOUNT	TOTAL		7,981.15
\$ 270	9.48	K I MANA	<u>in an Grand an Albert</u>	1,301/13
1	/		> In	<u> </u>
	MD-ON-OR BEFO 4, 2011	RE		101948
Seb	7, 49.11			- 2709.48
L				(5271.101

(3271.6

Federal Tax I.D.#: 20-5975804

ALLIED CEMEN	TING CO., LLC. 040007
REMIT TO P.O. BOX 31 RUSSELL, KANSAS 67665	SERVICE POINT:
DATE 8/10/11 7 20 34	LLED OUT ON LOCATION JOB START JOB FINISH 3'DO 5:50 COUNTY STARE
LEASE MINNIX WELL # 1-7 LOCATION SLOTT CITY OLD OR NEW (Circle one)	12W 105 EISTO SLOTT KI
CONTRACTOR Mur Fin 20	OWNER Same
TYPE OF JOB SUFFACE FT HOLE SIZE 12/14 T.D. 224/22/17 CASING SIZE 2571 DEPTH 224/22 FT	AMOUNT ORDERED 175 Com 300 CC
TUBING SIZE DEPTH DRILL PIPE DEPTH TOOL DEPTH	
TOOL DEPTH PRES. MAX MINIMUM MEAS. LINE SHOE JOINT	COMMON
CEMENT LEFT IN CSG. 15' PERFS.	GEL CHLORIDE6 @ 59 20 3 49 20
DISPLACEMENT [3, 34] EQUIPMENT	ASC @ @ @
PUMPTRUCK CEMENTER Alar # 422 HELPER Targ	@ @ @
BULK TRUCK # 404 DRIVER Earl BULK TRUCK	@ @ @
# DRIVER	HANDLING 18/5K1 @ 2.25 407 25 MILEAGE/14 5/2/mile 2294 15
REMARKS: A Car Carriet. Mar 1)554. Ca	TOTAL 4295-35
Displace Plug wit 13.34 BBL HJO	DEPTH OF JOB 224/12
Coment Aid Circulate,	PUMP TRUCK CHARGE 125 EXTRA FOOTAGE $@$ MILEAGE $?$ $@$ $?$ $@$ $?$
Thorth Yun Alm Terry Earl	MANIFOLD + 17 x ad @ 200 00 Liteledicle 65 x 2 @ 4 _ 520
CHARGE TO: MURFin Drilling	TOTAL 255
CITYSTATEZIP	PLUG & FLOAT EQUIPMENT
	87/8Wood_ Plug @ 9200
To Allied Cementing Co., LLC. You are hereby requested to rent cementing equipment and furnish cementer and helper(s) to assist owner or	@ @ @@
contractor to do work as is listed. The above work was done to satisfaction and supervision of owner agent or contractor. I have read and understand the "GENERAL TERMS AND CONDITIONS" listed on the reverse side.	TOTAL 92
PRINTED NAME KELLY WILSON	TOTAL CHARGES IF PAID IN 30 DAYS
SIGNATURE Kelly Wilson	
	5271.67



ED

APPROV

TERMS	Well N	o. Lease	County	Contractor	We	II Type	W	ell Category	Job Purpose	e	Operator
Net 30	#1-7	Minnix	Scott	Company Tools		Oil	D	evelopment	Cement LongSt	ri	Blaine
PRICE	REF.		DESCRIPT	ION		QT	Y	UM	UNIT PRICE	4	AMOUNT
575D 578D-L 407-4 403-4 409-4 413-4 417-4 290 280 221 330 325 284 283 285 276 580 581D 583D		Mileage - 1 Way Pump Charge - Long 4 1/2" Insert Float SI 4 1/2" Cement Baske 4 1/2" D.V. Tool & I 4 1/2" Turbolizer 4 1/2" Roto Wall Scr 4 1/2" D.V. Latch Do D-Air Flocheck 21 Liquid KCL (Clayfix Swift Multi-Density Standard Cement Calseal Salt CFR-1 Flocele Additional Hours (If Service Charge Ceme Drayage Subtotal Sales Tax Scott Cour	noe With Auto et Plug Set atcher own Plug & Ba) Standard (MID Circulate More ent	ffle CON II)			$\begin{array}{c} 1\\ 1\\ 2\\ 1\\ 15\\ 25\\ 1\\ 5500\\ 4\\ 3500\\ 2500\\ 12\\ 2500\\ 12\\ 2500\\ 175\\ 50\\ 1\\ 600\end{array}$	Miles Job Each Each Each Each Each Gallon(s) Gallon(s) Gallon(s) Gallon(s) Sacks Sacks Sacks Sack(s) Lb(s) Lb(s) Hours Sacks Ton Miles	$\begin{array}{c} 6.00\\ 1,500.00\\ 300.00\\ 250.00\\ 2,700.00\\ 70.00\\ 40.00\\ 200.00\\ 35.00\\ 2.50\\ 25.00\\ 16.50\\ 13.50\\ 35.00\\ 0.20\\ 4.00\\ 2.00\\ 2.00\\ 1.00\\ \end{array}$		480.00 1,500.00 300.00T 500.00T 2,700.00T 1,050.00T 1,050.00T 1,000.00T 1,250.00T 1,250.00T 1,250.00T 3,375.00T 420.00T 250.00T 700.00T 100.00T 200.00 1,200.00 2,480.14 23,755.14 1,485.29
We A	ppre	ciate Your	Busines	s!				Tota	I		\$25,240.43

Service Locatons 	CHARGE ADDRES: CCITY, ST, T, -7	MURFIN J i an i x		city Modec Delivered To			996 1 ^{or} J
EFERRAL LOCATION		Development cement long steing		PEKMII NO.		1 - 205 - 34W	(U)
PRICE SECONDARY REFERENCE/ REFERENCE PART NUMBER	ACCOUNTING LOC ACCT	DESCRIPTION		aty. Jum	aty. um	UNIT	AMOUNT
575	1	MILEAGE TRY 114		80 m		(0 CV)	480 00
578	-	04		17		5	1500 00
107		t flort		42 12	1/21	and the as	Carlo and Carlo
illy		DI/ tool		· +	D C	SOOLE	3700 00
409	Į	TURBOLIZER		+`¦	15100	20102	105000
1-2 年		Rote Wall Scratcher		42 a.	2 ton	00 00	!
L14		DV letch over plue & helfle		42 Un	191	200 00	200 000
	ļ	Rotative have Rontal	V	it we	- / en	od one	200100
390	-	D-AIR			5 Gul	35 00	175100
2¢D		Flocet 21			500 1001	2 20	1250 100
INCE		PCL Mapra			y gul	35 00	10000
LEGAL TERMS: Customer hereby acknowledges and agrees to	es and agrees to	REMIT PAYMENT TO:	SURVEY OUR EQUIPMENT PERFORMED	AGREE	DECIDED	E PAGE TOTAL	
but are not limited to, PAYMENT, RELEASE, INDEMNITY, and	or which include,		WITHOUT BREAKDOWN? WE UNDERSTOOD AND			X	14,500 14
LIMITED WARRANTY provisions.	01	SWIFT SERVICES, INC.	MEL TOOR NEEDS? OUR SERVICE WAS PERFORMED WITHOUT DELAY?	DELAY?		letotduz-	23,755114
MUSI BE SIGNED BY CUSTOMER OR CUSTOMER'S AGENT PRIOR TO START OF WORK OR DELIVERY OF GOODS	08.10	P.O. BOX 466	WE OPERATED THE EQUIPMENT AND PERFORMED JOB CALCULIATIONS	UIPMENT		Scett IN 37	11111 10
X Keur (Helon DATE SIGNÉD	AMA []	NESS CITY, KS 67560	SATISFACTORILY? ARE YOU SATISFIED WITH OUR SERVICE?	SERVICE	\	3	12001
	1410	785-798-2300	CUSTOMER	CUSTOMER DID NOT WISH TO RESPOND	D NO O RESPOND	TOTAL	25,240,43
SWIFT OPERATOR	R ACCEPTANCE OF MAT	CUSTOMER ACCEPTANCE OF MATERIALS AND SERVICES The customer hereby acknowledges receipt of the materials and services listed on this ticket	dges receipt of the mat	erials and services	listed on this ticke		Thank Youl
					/		inn Viimir

		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				and the second sec	A	7
NS.		N Q C	PO Box 466.		CONTINUATION		TICKET No. 20996	396
Seruice		Ness Cri Off: 78	Ness City, KS 6/560 Off: 785-798-2300		CUSTOMER DEILUNG	WELL WINNIX 1-7	DATE AUG 11 PAGE	PAGE SCF
PRICE	SECONDARY REFERENCE/ PART NUMBER		ACCOUNTING OC ACCT DF	TIME	DESCRIPTION	ary. I ww ary. J ww		
330	and the second sec	1			SMD Cenert	SK		Contraction of the second
1800	325	-				250 sk	13 35	
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						CONTIN		14:500.14
			20					

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MER	PERIN T	RILLING	WELL NO.	-7		LEASE M	innix	JOB TYPE Compart long string TICKET NO. 200996
HART	TIME		VOLUME	PUM	PS	PRESSURE		Convence Tong String 20916
NO.	lime	RATE (BPM)	(BBL) (GAL)	T	C	TUBING	CASING	DESCRIPTION OF OPERATION AND MATERIALS
								250 EA-Z \$ 350 SMD w/ 4 Flocale
								45" × 10.5" LTD 5882' RTD 5080'
								Contralizes 1-14,58 Bisterts 53,59
								119;75-4752' sheet41'
					-			insect 4708' DI its9 @ 2377'
	0500						-	on loc TRK114
	0650							start 42" 10.5" casing in well
	0820	4	-					circulate w/ pipe @ 2377' 2375'
•	0850	1						ATTACH DV TOOL and RESUME FLAMING PIPE
	1000							Deop BALL and cieculate ROTATE
	1055	43	5				180	Pino 5 661 KEL plush
		434	12	÷			100	Rup Stogal Flocenk
		434	15				100	Pup 15 bbi KCL flish
	1110	434					IUD	MMX 250 5K3 EA-2 @ 15.3
	1110	434	59				100	
	1125		-21			1.0		Down D/12
	11-5							akebout pais \$ line
		43	35					Ping Hall
		43/	30				ź	Plays incodes
Y	1145		72				1500	CAND Plup
	17.10	and the second secon					1900	Release pressue to tende - dried up
					-			
					-			Drop bonib
	12.0						1100	Urish tere
	1210						1100	open DY tool
	1000		20					Circulate well
	1330		- au					Ping 20 661 KCL flink
	17	13			-		18	Plug RH - MH (SMD) 305ts - 2000
	1345	634	2de		-		200	Mix SWD @ 11.2 ppg 3005ks
		624	18D				600	ł
	1.4	674	198		-		600	
	1410	13.					(Canal)	Drop place
		621				 	200	Viglace Plug
		634	22		-		600	coment to sinface
		634	38	ļ			1600	LAND Pling 300ste wixed of 30 top't
-		-						hugh trick I so it
								BACK UP
	1510							job complete the pare for