



**Northern States Completions**  
 Williston, ND 701-572-5720

**LINER SPECIFICATIONS**  
 4 1/2" 11.6# LTC P-110 GRADE  
 TUBE ID = 4.000" DRIFT = 3.875"

**SWELLING PACKER LINER**-----for isolated section fracs with Frac Port Sub sections  
 Float Equipment

7" Casing Collars near planned Liner Top

DP Tally Depths	Casing Tally Depths
6382.96	6407.19

**NOT TO SCALE**

Drill Pipe Depths

All Frac Subs are pinned to shear open @ 1876 PSI (with Ball on Seat)

Northern States Completions										
Date:		12/17/2012		Pico Niobrara				Field:		
Well Name:		Hoshiko 1-1-36				Rig Name & #:		Ensign 128		
County:		Weld		*Item OD's are shown as "maximum OD" *Item ID's are shown as "minimum ID"				NSC Rep:		Ryan Daley
State:		CO						Company Rep:		Terry Leighton
4 1/2" LINER-----"AS RUN" DETAIL										
KB = 15'									DRILL PIPE DEPTHS	
ITEM		Centralized Entry Guide on PBR Top	DESCRIPTION	13.93' of 5 1/4" Seal Bore Length	OD	ID	LENGTH	TOP	BOTTOM	
1	5 1/4" ID x 15' Polished Bore Receptacle				5.920"	5.250"	14.93	6400.74	6415.67	
2	4 1/2" x 7" PPK Liner Hanger Packer w/ 1' Tong Neck				5.875"	4.000"	3.42	6415.67	6419.09	
	Centralizer (4 1/2" Buttress Box x LTC Pin)				5.875"	3.920"	0.60	6419.09	6419.69	
	14	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	533.71	6419.69	6953.40
3	Tendeka SwellRight Packer		5.625"			4.000"	13.75	6953.40	6967.15	
	9	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	344.59	6967.15	7311.74
3	Tendeka SwellRight Packer		5.625"			4.000"	13.75	7311.74	7325.49	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	75.16	7325.49	7400.65
4	Divert-A-Frac Port Sub II		Shifting Ball Size	3.500	5.420"	3.290"	3.30	7400.65	7403.95	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	74.55	7403.95	7478.50
5	Tendeka SwellRight Packer		5.625"			4.000"	13.75	7478.50	7492.25	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	75.76	7492.25	7568.01
6	Divert-A-Frac Port Sub II		Shifting Ball Size	3.250	5.420"	3.038"	3.30	7568.01	7571.31	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	76.60	7571.31	7647.91
7	Tendeka SwellRight Packer		5.625"			4.000"	13.75	7647.91	7661.66	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	76.64	7661.66	7738.30
8	Divert-A-Frac Port Sub II		Shifting Ball Size	3.000	5.420"	2.790"	3.30	7738.30	7741.60	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	75.42	7741.60	7817.02
9	Tendeka SwellRight Packer		5.625"			4.000"	13.75	7817.02	7830.77	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	75.23	7830.77	7906.00
10	Divert-A-Frac Port Sub II		Shifting Ball Size	2.750	5.420"	2.543"	3.30	7906.00	7909.30	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	76.30	7909.30	7985.60
11	Tendeka SwellRight Packer		5.625"			4.000"	13.75	7985.60	7999.35	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	76.60	7999.35	8075.95
12	Divert-A-Frac Port Sub II		Shifting Ball Size	2.500	5.420"	2.290"	3.30	8075.95	8079.25	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	75.56	8079.25	8154.81
13	Tendeka SwellRight Packer		5.625"			4.000"	13.75	8154.81	8168.56	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	76.94	8168.56	8245.50
14	Divert-A-Frac Port Sub II		Shifting Ball Size	2.250	5.420"	2.144"	3.30	8245.50	8248.80	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	74.72	8248.80	8323.52
15	Tendeka SwellRight Packer		5.625"			4.000"	13.75	8323.52	8337.27	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	76.00	8337.27	8413.27
16	Divert-A-Frac Port Sub II		Shifting Ball Size	2.125	5.420"	2.019"	3.30	8413.27	8416.57	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	75.92	8416.57	8492.49
17	Tendeka SwellRight Packer		5.625"			4.000"	13.75	8492.49	8506.24	
	1	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	37.25	8506.24	8543.49
18	Divert-A-Frac Port Sub II		Shifting Ball Size	2.000	5.420"	1.894"	3.30	8543.49	8546.79	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	75.50	8546.79	8622.29
19	Tendeka SwellRight Packer		5.625"			4.000"	13.75	8622.29	8636.04	
	2	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	77.44	8636.04	8713.48
20	Divert-A-Frac Port Sub II		Shifting Ball Size	1.875	5.420"	1.767"	3.30	8713.48	8716.78	
	2	Jts 4 1/2" 11.6# LTC Blank Liner		Water Reactive Elastomer (5 FT)	5.750" Centralizer (Top & Bottom)	5.000"	4.000"	75.27	8716.78	8792.05
21	Tendeka SwellRight Packer		5.625"			4.000"	13.75	8792.05	8805.80	
	1	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	37.60	8805.80	8843.40
22	4 1/2" Float Collar (Double Valve)				5.000"	---	1.90	8843.40	8845.30	
	1	Jts 4 1/2" 11.6# LTC Blank Liner				5.000"	4.000"	38.20	8845.30	8883.50
23	4 1/2" Guide Shoe w/ Aluminum Nose & Side Ports				5.000"	.750"	3.50	8883.50	8887.00	
							Lateral TD		8,897.00	

Operator	Pico Niobrara
Well Name	Hoshiko 1-1-36
Rig Name	Ensign 128
Run Date	12/16/12

## "AS RUN" LINER TALLY

KOP	5894
7" Shoe	7020

Total Joints Talled	95
Liner Size	4 1/2"
Thread Description	LTC
Lateral TD	8897.00

								Shoe--Off Bottom		10.00
Original Tally Jt #	Wt	Grade	Actual Run Jt #	Item Description	Length			Item Top Depth	Item Bottom Depth	Cumulative Length
Shoe			Shoe	Guide Shoe w/ Side Ports	3.50			8883.50	8887.00	3.50
1	11.6	P-110	1	4 1/2" LTC Liner	38.20	1	38.20	8845.30	8883.50	41.70
Float			Float	Float Collar (Double Valve)	1.90			8843.40	8845.30	43.60
2	11.6	P-110	2	4 1/2" LTC Liner	37.60	1	37.60	8805.80	8843.40	81.20
Pkr	11.6	P110	Pkr	Swelling Packer 1	13.75			8792.05	8805.80	94.95
3	11.6	P-110	3	4 1/2" LTC Liner	37.92	2	75.27	8754.13	8792.05	132.87
4	11.6	P-110	4	4 1/2" LTC Liner	37.35		Block Total	8716.78	8754.13	170.22
Frac Sub		P110	Frac Sub	Frac Sub 1	3.30			8713.48	8716.78	173.52
5	11.6	P-110	5	4 1/2" LTC Liner	39.10	2	77.44	8674.38	8713.48	212.62
6	11.6	P-110	6	4 1/2" LTC Liner	38.34		Block Total	8636.04	8674.38	250.96
Pkr	11.6	P110	Pkr	Swelling Packer 2	13.75			8622.29	8636.04	264.71
7	11.6	P-110	7	4 1/2" LTC Liner	38.00	2	75.50	8584.29	8622.29	302.71
8	11.6	P-110	8	4 1/2" LTC Liner	37.50		Block Total	8546.79	8584.29	340.21
Frac Sub		P110	Frac Sub	Frac Sub 2	3.30			8543.49	8546.79	343.51
9	11.6	P-110	9	4 1/2" LTC Liner	37.25	1	37.25	8506.24	8543.49	380.76
Pkr	11.6	P110	Pkr	Swelling Packer 3	13.75			8492.49	8506.24	394.51
10	11.6	P-110	10	4 1/2" LTC Liner	38.87	2	75.92	8453.62	8492.49	433.38
11	11.6	P-110	11	4 1/2" LTC Liner	37.05		Block Total	8416.57	8453.62	470.43
Frac Sub		P110	Frac Sub	Frac Sub 3	3.30			8413.27	8416.57	473.73
12	11.6	P-110	12	4 1/2" LTC Liner	37.36	2	76.00	8375.91	8413.27	511.09
13	11.6	P-110	13	4 1/2" LTC Liner	38.64		Block Total	8337.27	8375.91	549.73
Pkr	11.6	P110	Pkr	Swelling Packer 4	13.75			8323.52	8337.27	563.48
14	11.6	P-110	14	4 1/2" LTC Liner	37.40	2	74.72	8286.12	8323.52	600.88
15	11.6	P-110	15	4 1/2" LTC Liner	37.32		Block Total	8248.80	8286.12	638.20
Frac Sub		P110	Frac Sub	Frac Sub 4	3.30			8245.50	8248.80	641.50
16	11.6	P-110	16	4 1/2" LTC Liner	38.00	2	76.94	8207.50	8245.50	679.50
17	11.6	P-110	17	4 1/2" LTC Liner	38.94		Block Total	8168.56	8207.50	718.44
Pkr	11.6	P110	Pkr	Swelling Packer 5	13.75			8154.81	8168.56	732.19
18	11.6	P-110	18	4 1/2" LTC Liner	37.56	2	75.56	8117.25	8154.81	769.75
19	11.6	P-110	19	4 1/2" LTC Liner	38.00		Block Total	8079.25	8117.25	807.75
Frac Sub		P110	Frac Sub	Frac Sub 5	3.30			8075.95	8079.25	811.05
20	11.6	P-110	20	4 1/2" LTC Liner	37.50	2	76.60	8038.45	8075.95	848.55
21	11.6	P-110	21	4 1/2" LTC Liner	39.10		Block Total	7999.35	8038.45	887.65
Pkr	11.6	P110	Pkr	Swelling Packer 6	13.75			7985.60	7999.35	901.40
22	11.6	P-110	22	4 1/2" LTC Liner	37.51	2	76.30	7948.09	7985.60	938.91
23	11.6	P-110	23	4 1/2" LTC Liner	38.79		Block Total	7909.30	7948.09	977.70
Frac Sub		P110	Frac Sub	Frac Sub 6	3.30			7906.00	7909.30	981.00
24	11.6	P-110	24	4 1/2" LTC Liner	37.34	2	75.23	7868.66	7906.00	1018.34
25	11.6	P-110	25	4 1/2" LTC Liner	37.89		Block Total	7830.77	7868.66	1056.23
Pkr	11.6	P110	Pkr	Swelling Packer 7	13.75			7817.02	7830.77	1069.98
26	11.6	P-110	26	4 1/2" LTC Liner	37.12	2	75.42	7779.90	7817.02	1107.10
27	11.6	P-110	27	4 1/2" LTC Liner	38.30		Block Total	7741.60	7779.90	1145.40
Frac Sub		P110	Frac Sub	Frac Sub 7	3.30			7738.30	7741.60	1148.70
28	11.6	P-110	28	4 1/2" LTC Liner	38.04	2	76.64	7700.26	7738.30	1186.74
29	11.6	P-110	29	4 1/2" LTC Liner	38.60		Block Total	7661.66	7700.26	1225.34
Pkr	11.6	P110	Pkr	Swelling Packer 8	13.75			7647.91	7661.66	1239.09
30	11.6	P-110	30	4 1/2" LTC Liner	39.10	2	76.60	7608.81	7647.91	1278.19
31	11.6	P-110	31	4 1/2" LTC Liner	37.50		Block Total	7571.31	7608.81	1315.69
Frac Sub		P110	Frac Sub	Frac Sub 8	3.30			7568.01	7571.31	1318.99
32	11.6	P-110	32	4 1/2" LTC Liner	38.39	2	75.76	7529.62	7568.01	1357.38
33	11.6	P-110	33	4 1/2" LTC Liner	37.37		Block Total	7492.25	7529.62	1394.75
Pkr	11.6	P110	Pkr	Swelling Packer 9	13.75			7478.50	7492.25	1408.50
34	11.6	P-110	34	4 1/2" LTC Liner	37.20	2	74.55	7441.30	7478.50	1445.70
35	11.6	P-110	35	4 1/2" LTC Liner	37.35		Block Total	7403.95	7441.30	1483.05
Frac Sub		P110	Frac Sub	Frac Sub 9	3.30			7400.65	7403.95	1486.35
36	11.6	P-110	36	4 1/2" LTC Liner	37.12	2	75.16	7363.53	7400.65	1523.47

37	11.6	P-110	37	4 1/2" LTC Liner	38.04		Block Total	7325.49	7363.53	1561.51
Pkr	11.6	P110	Pkr	Swelling Packer 10	13.75			7311.74	7325.49	1575.26
38	11.6	P-110	38	4 1/2" LTC Liner	38.36	TD of 8 3/4" Open Hole @ 7,259'		7273.38	7311.74	1613.62
39	11.6	P-110	39	4 1/2" LTC Liner	37.64			7235.74	7273.38	1651.26
40	11.6	P-110	40	4 1/2" LTC Liner	38.29			7197.45	7235.74	1689.55
41	11.6	P-110	41	4 1/2" LTC Liner	36.12			7161.33	7197.45	1725.67
42	11.6	P-110	42	4 1/2" LTC Liner	39.00	9	Joints	7122.33	7161.33	1764.67
43	11.6	P-110	43	4 1/2" LTC Liner	38.67		Block Total	7083.66	7122.33	1803.34
44	11.6	P-110	44	4 1/2" LTC Liner	38.90		344.59	7044.76	7083.66	1842.24
45	11.6	P-110	45	4 1/2" LTC Liner	39.10	7,020'	7" Shoe	7005.66	7044.76	1881.34
46	11.6	P-110	46	4 1/2" LTC Liner	38.51			6967.15	7005.66	1919.85
Pkr	11.6	P110	Pkr	Swelling Packer 11	13.75			6953.40	6967.15	1933.60
47	11.6	P-110	47	4 1/2" LTC Liner	37.30			6916.10	6953.40	1970.90
48	11.6	P-110	48	4 1/2" LTC Liner	38.77			6877.33	6916.10	2009.67
49	11.6	P-110	49	4 1/2" LTC Liner	37.77			6839.56	6877.33	2047.44
50	11.6	P-110	50	4 1/2" LTC Liner	38.52	14	Joints	6801.04	6839.56	2085.96
51	11.6	P-110	51	4 1/2" LTC Liner	38.70		Block Total	6762.34	6801.04	2124.66
52	11.6	P-110	52	4 1/2" LTC Liner	38.20		533.71	6724.14	6762.34	2162.86
53	11.6	P-110	53	4 1/2" LTC Liner	37.86			6686.28	6724.14	2200.72
54	11.6	P-110	54	4 1/2" LTC Liner	37.84			6648.44	6686.28	2238.56
55	11.6	P-110	55	4 1/2" LTC Liner	37.12			6611.32	6648.44	2275.68
56	11.6	P-110	56	4 1/2" LTC Liner	37.94			6573.38	6611.32	2313.62
57	11.6	P-110	57	4 1/2" LTC Liner	38.25			6535.13	6573.38	2351.87
58	11.6	P-110	58	4 1/2" LTC Liner	38.75			6496.38	6535.13	2390.62
59	11.6	P-110	59	4 1/2" LTC Liner	39.19			6457.19	6496.38	2429.81
60	11.6	P-110	60	4 1/2" LTC Liner	37.50			6419.69	6457.19	2467.31
Ctrlzr	11.6	P110	Ctrlzr	Centralizer	0.60			6419.09	6419.69	2467.91
Packer			Packer	Hanger / Packer	3.42			6415.67	6419.09	2471.33
PBR		P110	PBR	PBR	14.93		LINER TOP	6400.74	6415.67	2486.26
61	11.6	P-110		4 1/2" LTC Liner	38.55	OUT				
62	11.6	P-110		4 1/2" LTC Liner	39.51	OUT				
63	11.6	P-110		4 1/2" LTC Liner	38.83	OUT				
64	11.6	P-110		4 1/2" LTC Liner	38.09	OUT				
65	11.6	P-110		4 1/2" LTC Liner	38.56	OUT				
66	11.6	P-110		4 1/2" LTC Liner	38.60	OUT				
67	11.6	P-110		4 1/2" LTC Liner	38.84	OUT				
68	11.6	P-110		4 1/2" LTC Liner	38.17	OUT				
69	11.6	P-110		4 1/2" LTC Liner	37.20	OUT				
70	11.6	P-110		4 1/2" LTC Liner	39.34	OUT				
71	11.6	P-110		4 1/2" LTC Liner	38.55	OUT				
72	11.6	P-110		4 1/2" LTC Liner	37.19	OUT				
73	11.6	P-110		4 1/2" LTC Liner	38.05	OUT				
74	11.6	P-110		4 1/2" LTC Liner	37.57	OUT				
75	11.6	P-110		4 1/2" LTC Liner	38.31	OUT				
76	11.6	P-110		4 1/2" LTC Liner	38.02	OUT				
77	11.6	P-110		4 1/2" LTC Liner	38.45	OUT				
78	11.6	P-110		4 1/2" LTC Liner	37.70	OUT				
79	11.6	P-110		4 1/2" LTC Liner	36.87	OUT				
80	11.6	P-110		4 1/2" LTC Liner	38.13	OUT				
81	11.6	P-110		4 1/2" LTC Liner	37.60	OUT				
82	11.6	P-110		4 1/2" LTC Liner	38.88	OUT				
83	11.6	P-110		4 1/2" LTC Liner	38.41	OUT				
84	11.6	P-110		4 1/2" LTC Liner	38.68	OUT				
85	11.6	P-110		4 1/2" LTC Liner	39.26	OUT				
86	11.6	P-110		4 1/2" LTC Liner	39.45	OUT				
87	11.6	P-110		4 1/2" LTC Liner	37.95	OUT				
88	11.6	P-110		4 1/2" LTC Liner	39.32	OUT				
89	11.6	P-110		4 1/2" LTC Liner	39.40	OUT				
90	11.6	P-110		4 1/2" LTC Liner	38.47	OUT				
91	11.6	P-110		4 1/2" LTC Liner	37.68	OUT				
92	11.6	P-110		4 1/2" LTC Liner	37.84	OUT				
93	11.6	P-110		4 1/2" LTC Liner	38.61	OUT				
94	11.6	P-110		4 1/2" LTC Liner	21.18	OUT				
95	11.6	P-110		4 1/2" LTC Liner	19.12	OUT				

DATE CASING TALLIED 12/15/2012

Total	<u>1899.61</u>	<u>1687.73</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	GRAND TOTAL	<u>3587.34</u>
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# Northern States Completions

<b>Date:</b>		<b>Oil Company:</b>		<b>Field:</b>	
<b>Well Name:</b>				<b>Rig Name &amp; #:</b>	
<b>County:</b>				<b>NSC Rep:</b>	
<b>State:</b>				<b>Company Rep:</b>	

## Ball & Seat Chart for 9 DAFPS-II Frac Sub System (above a pre-perfed Toe Section)

Actual measured ID NSC Shop	Actual measured ID (Field)	NSC Initials (Field)	Stage #	Frac Sub #	Ball Seat ID	Ball OD	Ball OD over Ball Seat ID	Clearance of ball thru previous ball seat
3.290"	"		10	9	3.290	3.500	0.210	.375" smaller than 4 1/2" 11.6# Liner Drift
3.038"	"		9	8	3.040	3.250	0.210	-0.040
2.790"	"		8	7	2.790	3.000	0.210	-0.040
2.543"	"		7	6	2.540	2.750	0.210	-0.040
2.290"	"		6	5	2.290	2.500	0.210	-0.040
2.144"	"		5	4	2.143	2.250	0.107	-0.040
2.019"	"		4	3	2.018	2.125	0.107	-0.018
1.894"	"		3	2	1.893	2.000	0.107	-0.018
1.767"	"		2	1	1.768	1.875	0.107	-0.018
			1		Pre-Perfed Toe Section			

The NSC shop ID's were taken in a controlled situation with precise measuring devices. A variance of up to .005" could be expected with the field measurements. For accuracy, NSC will report the shop-measured ID's.

Rates have been checked and verified.....rjg (3-4-11)

**Rates are based on the DAFPS-II being pinned for 1876 PSI**

Max Rate thru this seat = 102 Bbl/min

Max Rate thru this seat = 90 Bbl/min

Max Rate thru this seat = 78 Bbl/min

Frac Stage 3 @ less than 102 Bbls/min (due to allowable rate thru Frac Sub #3)

Frac Stage 2 @ less than 90 Bbls/min (due to allowable rate thru Frac Sub #2)

Frac Stage 1 @ less than 78 Bbls/min (due to allowable rate thru Frac Sub #1)

We, the undersigned have verified that the Frac Sub Ball Seat ID's are as shown above.

We have also verified that Frac Subs were installed in the proper run order in the liner string.

NSC Representative: \_\_\_\_\_

Oil Company Rep: \_\_\_\_\_

Date: \_\_\_\_\_