

PRESSURE VESSEL & COLUMN INSPECTION REPORT

LSD: 3-32-50-19W5

Date: Jul 27, 2017

SAP Equipment ID:

VESSEL STATIC DATA						
Plant Wellsite		Op Unit Minehead			System	
Prov. Insp. # A0625503		CRN V9651.2			Equip Tag # 66196750	
Equipment Description Heat Medium Heater				Serial # NWP-08526-001-A		
Manufacturer NWP Industries				Vessel Class		
Internal Access: Description:				Year Built 2013		
MAWP 1480		PSI		@ 200		°F
CODE : W		RT :		PWHT :		
Diameter		Length (T/T)		mm		OAL mm
Shell Mat'l		Thickness		mm		Corr Allowance mm
Head Mat'l		Thickness		mm		Corr Allowance mm
Nozzle Mat'l		Thickness		mm / in		Corr Allowance mm
Internal Coating: NO		Internal Clad : NO		Capacity m ³		
Manway : NO		Inspection Port : NO		Saddle		
Nozzle Rating		lb ANSI		Painted : YES		Insulated YES

PROCESS DATA		
Product Description		
Operating Pressure		Operating Temperature °C

PSV STATIC DATA						
Serial No.	Location	Set Pressure	Capacity SCFM	Manufacturer	Model / Type	Service Date / Company
1192639	Pipe Rack	1351PSI	1395	Mercer	91-28C71T11U5	July 2015/Wizard

PSV DETAILS			
	Type (Thread/Flange)	ANSI Rating	Size (inches)
PRD Inlet	Threaded		1
PRD Outlet	Threaded		2

NDE Equipment Records					
Procedure#	Description	Manufacturer	Model#	Serial#	Due Date

INSPECTION SUMMARY

A visual external inspection was performed on the vessel and a summary of what was found follows. Data plate secure and legible. Vessel and piping in good condition. PSV last serviced in 2016. Heater has 10% RT on data plate. Vessel secure to pilings, mounting bolts secure. Ladder in good condition and secure. Insulation in good condition but water present in insulation on bottom UT ports. Vessel not in operation at the time of inspection. UT completed by Streamline.

RECOMMENDATIONS

None noted

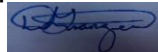
NONCONFORMANCES / INSPECTION DEFICIENCIES

None noted

INSPECTION PLANNING					
Inspection Strategy	Availability	Inspection Interval			
Inspection Date	Date of Last Inspect	Date of Next Inspect			

REPORT CERTIFICATION

The signatures below certify that inspections/tests have been completed in accordance with the identified inspection strategy and that the specified equipment is considered fit for service until the date of next inspection.

Inspected by	Donavon Granger		Date	Jul 27, 2017
Company	Streamline Inspection Ltd	PESEL #	000752	API # 48529
Reviewed and Approved by			Date	
		PESEL #		API #

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SAP Equipment ID:

Criticality Assessment Rerun _____

Inspection Planning Rerun _____

Assessed Next Inspection Date _____

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SAP Equipment ID:

DETAILED INSPECTION VISUAL EXTERNAL

ID	Description	Condition	Location	NCR	Comments
V1	General Other (Please Explain)				
V2	General Corrosion	Acceptable			No corrosion concerns noted
V3	General Leaks	N/A			Vessel not in operation
V4	Vibration	N/A			
V5	Dissimilar Flange Rating	Acceptable			None noted
V6	Ladder/Stairway	Acceptable			No issues
V7	Heads	Acceptable			No concerns noted
V8	Guy Wires	N/A			
V9	Electrical Ground	Acceptable			Securely grounded
V10	Painted Inactive Corrosion	Acceptable			
V11	Coating/Painting	Acceptable			No significant failures observed
V12	Expansion Joint or Bellows	N/A			
V13	Gauge/Site Glass	Acceptable			No leaks or damage noted
V14	Shell	Acceptable			No concerns noted
V15	Jacket	N/A			
V21	Support Other (Please explain)	N/A			
V22	Foundation	Acceptable			No concerns noted
V23	Anchor Bolts	Acceptable			Securely in place
V24	Saddle/Skirt	Acceptable			Securely in place
V25	Davit	N/A			
V26	Fireproofing	N/A			
V31	Connections Other (Please explain)	Acceptable			Expansion tank in good condition
V32	Small Branches	Acceptable			No significant sign of strain or concerns
V33	Nozzles	Acceptable			No stresses, corrosion or misalignment
V34	Manways	N/A			
V35	Reinforcing Pads	N/A			
V36	Inadequate Thread Engagement	Acceptable			No concerns noted
V37	Bolting	Acceptable			Intact with no missing bolts or short bolting
V38	Flanges	Acceptable			No active leaks
V39	Leak Clamps	N/A			
V41	Insulation Other (Please explain)	Good			Water in insulation on bottom UT ports
V42	Damage	N/A			
V43	Penetrations	N/A			
V44	Insulation Jacket	N/A			
V45	Banding	N/A			
V46	Seals/Joints	Acceptable			No concerns
V51	Relief Devices Other (Please explain)	Acceptable			Serviced and seal intact
V52	Corrosion	Acceptable			None noted
V53	Leaks	Acceptable			None noted
V54	Restricted Inlet/Outlet	N/A			
V55	Manual Operation Lever	Acceptable			

PRESSURE VESSEL & COLUMN INSPECTION REPORT

LSD: 3-32-50-19W5

Date: Jul 27, 2017

SAP Equipment ID:

DETAILED INSPECTION VISUAL INTERNAL

ID	Description	Condition	Location	NCR	Comments
V1	General Other (Please Explain)				
V2	Corrosion (depth, length, width)				
V3	Erosion				
V4	Distortion				
V5	Blisters				
V6	Deposits				
V7	Heads				
V8	Welds				
V9	Nozzles				
V10	Shell				
V11	Gasket Surfaces				
V21	Internals Other (Please explain)				
V22	Demister				
V23	Baffle/Wier				
V24	Sparger				
V25	Thermowells				
V26	Metallic Linings				
V27	Nonmetallic Linings				
V28	Trays				
V29	Tray Rings				
V30	Other Welded Attachments				

DETAILED INSPECTION OTHER TECHNIQUES

ID	Location	Observation/Measurement	Acceptance Criteria	NCR	Comments
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

DETAILED INSPECTION UT THICKNESS

CML	Nom. Thk	Current Reading	Short Term Corr Rate	Long Term Corr Rate	Remaining Life	Comments

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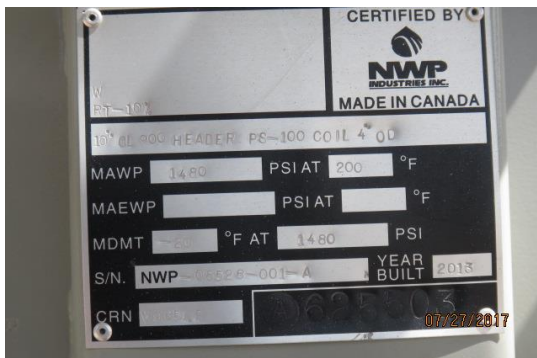
PHOTOS



LSD Sign



Vessel Overview



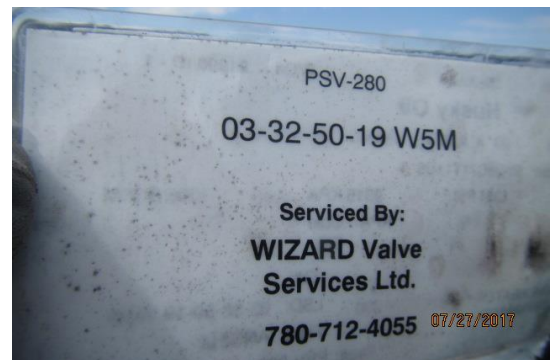
Data Plate



A#



PSV



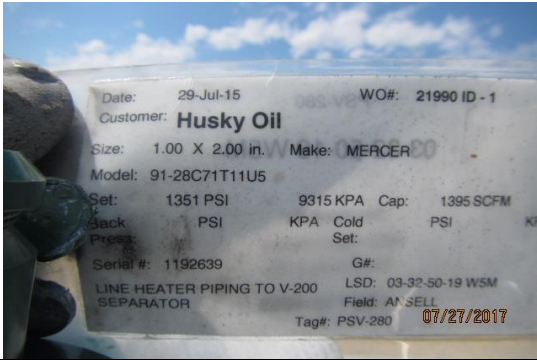
PSV Service Tag

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PSV Service Tag



Vessel Support



Piping Support



Vessel Piping



Heater End

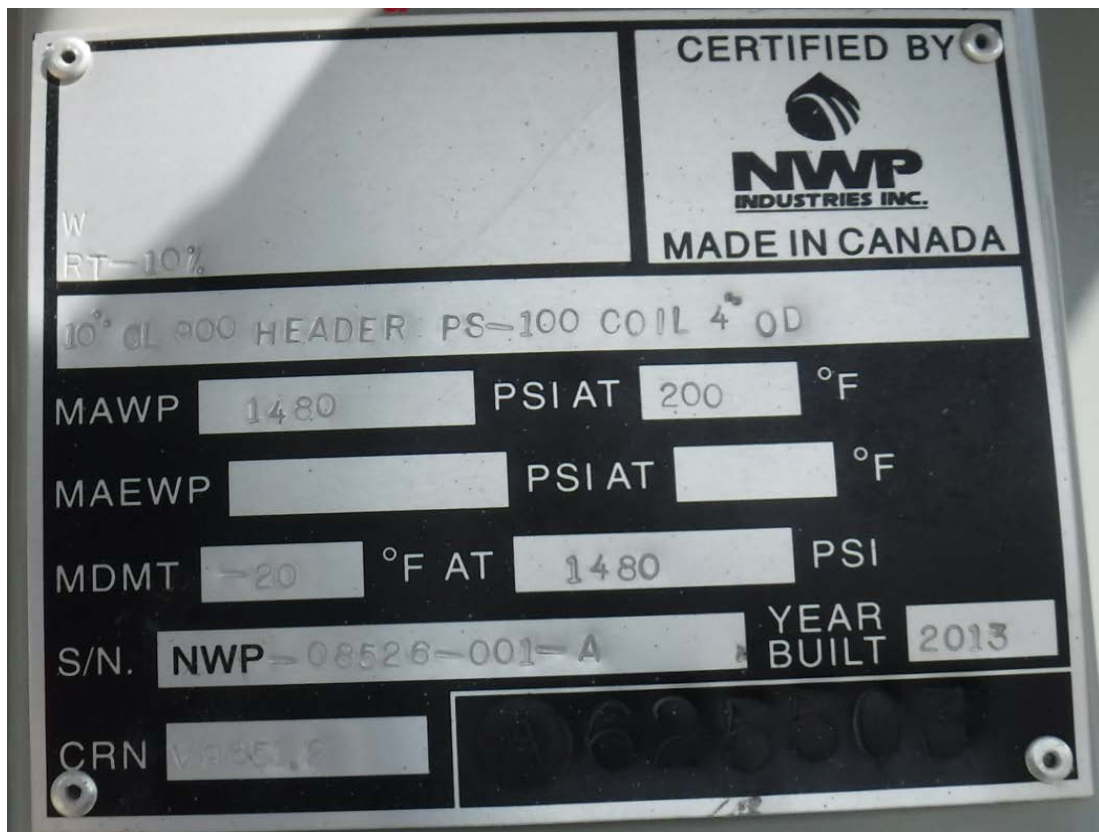


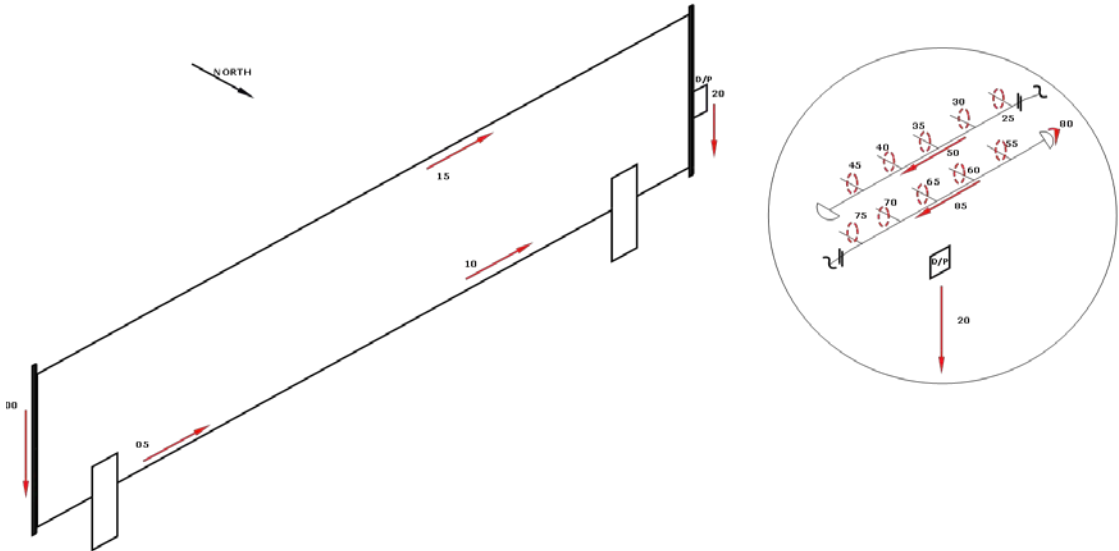
Foundation Support



Location Name:	MINEHEAD	LSD:	03-32-50-19W5
Jur #:	A0625503	Equipment/Tag No.	V-240
Equipment Description:	LINE HEATER		
Manufacturer:	NWP INDUSTRIES		
Serial Number:	NWP-08526-001-A	CRN:	V9651.2
Shell MAWP:	1480	PSI	Shell Design Temp: 200 °F
Tube MAWP:		PSI	Tube Design Temp: °F
Shell Material:	Unknown	Head Material:	Unknown
Shell Thickness:		mm	Head Thickness: mm
Corrosion Allowance:		mm	Date Built: 2013
Size:	1371.6	mm	Pipe / Rolled Plate: PLATE
RT:	0		

NOTES:







Ultrasonic Corrosion Survey

*All values are in millimeters unless otherwise stated.

Survey Name: Husky Energy

Date: Jul 28, 2017

Inspector: D. Skeard

LSD: 03-32-50-19W5	Area: MINEHEAD	Location: FIELD
Jur #: A0625503	Tag Number: V-240	Vessel Name: LINE HEATER
CRN: V9651.2	Year Built: 2013	Serial Number: NWP-08526-001-A
RT: 0	Vessel CA: 0.000 mm	Manufacturer: NWP INDUSTRIES
	Shell MAWP: 1480 PSI	Tube MAWP: PSI
	MAWTF: 200 °F	MAWTF: °F
		Pipe/Plate PLATE

TML Description	Baseline	Flange ANSI:	Material: Unknown
00 HEAD	2017	CA	T Min
Shape: Flat	Min 9.63	0.000	STCR mm/yr 0.000
OD: 1371.6	Avg 9.68		LTCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments:		Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI:	Material: Unknown
05 SHELL	2017	CA	T Min
Shape: Cylindrical	Min 6.48	0.000	STCR mm/yr 0.000
OD: 1371.6	Avg 6.53		LTCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments:		Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI:	Material: Unknown
10 SHELL	2017	CA	T Min
Shape: Cylindrical	Min 6.35	0.000	STCR mm/yr 0.000
OD: 1371.6	Avg 6.48		LTCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments:		Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI:	Material: Unknown
15 SHELL	2017	CA	T Min
Shape: Cylindrical	Min 6.38	0.000	STCR mm/yr 0.000
OD: 1371.6	Avg 6.45		LTCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments:		Remaining Life:
			Retirement Date:



Ultrasonic Corrosion Survey

*All values are in millimeters unless otherwise stated.

Survey Name: Husky Energy

Date: Jul 28, 2017

Inspector: D. Skeard

LSD: 03-32-50-19W5	Area: MINEHEAD	Location: FIELD
Jur #: A0625503	Tag Number: V-240	Vessel Name: LINE HEATER
CRN: V9651.2	Year Built: 2013	Serial Number: NWP-08526-001-A
RT: 0	Vessel CA: 0.000 mm	Manufacturer: NWP INDUSTRIES
	Shell MAWP: 1480 PSI	Tube MAWP: PSI
	MAWTF: 200 °F	MAWTF: °F
		Pipe/Plate PLATE

TML Description	Baseline	Flange ANSI: Unknown	Material: Unknown
20 HEAD	2017	CA	T Min
Shape: Flat	Min 9.63	Nominal 0.000	STCR mm/yr 0.000
OD: 1371.6	Avg 9.68		LTCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments:		Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
25 NOZZLE	2017	CA	T Min
Shape: 360° Circ	Min 8.48	Nominal 1.070	STCR mm/yr 0.000
OD: 114.3	Avg 8.66	7.490	LTCR mm/yr 0.019
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
30 NOZZLE	2017	CA	T Min
Shape: 360° Circ	Min 8.43	Nominal 1.070	STCR mm/yr 0.000
OD: 114.3	Avg 8.59	7.490	LTCR mm/yr 0.032
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
35 NOZZLE	2017	CA	T Min
Shape: 360° Circ	Min 8.38	Nominal 1.070	STCR mm/yr 0.000
OD: 114.3	Avg 8.66	7.490	LTCR mm/yr 0.044
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		Remaining Life:
			Retirement Date:



Ultrasonic Corrosion Survey

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Survey Name: Husky Energy

Date: Jul 28, 2017

Inspector: D. Skeard

LSD: 03-32-50-19W5	Area: MINEHEAD	Location: FIELD
Jur #: A0625503	Tag Number: V-240	Vessel Name: LINE HEATER
CRN: V9651.2	Year Built: 2013	Serial Number: NWP-08526-001-A
RT: 0	Vessel CA: 0.000 mm	Manufacturer: NWP INDUSTRIES
	Shell MAWP: 1480 PSI	Tube MAWP: PSI
	MAWTF: 200 °F	MAWTF: °F
		Pipe/Plate PLATE

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
40 NOZZLE	2017	CA	Nominal
Shape: 360° Circ	Min 8.51	Flag 7.490	T Min 8.560
OD: 114.3	Avg 8.79		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.013
			Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
45 NOZZLE	2017	CA	Nominal
Shape: 360° Circ	Min 8.43	Flag 7.490	T Min 8.560
OD: 114.3	Avg 8.76		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.032
			Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: Unknown
50 SHELL	2017	CA	Nominal
Shape: Cylindrical	Min 15.34	Flag 15.060	T Min 15.060
OD: 273.05	Avg 15.77		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.000
			Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
55 NOZZLE	2017	CA	Nominal
Shape: 360° Circ	Min 8.56	Flag 7.490	T Min 8.560
OD: 114.3	Avg 8.92		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.000
			Remaining Life:
			Retirement Date:



Ultrasonic Corrosion Survey

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Survey Name: Husky Energy

Date: Jul 28, 2017

Inspector: D. Skeard

LSD: 03-32-50-19W5	Area: MINEHEAD	Location: FIELD
Jur #: A0625503	Tag Number: V-240	Vessel Name: LINE HEATER
CRN: V9651.2	Year Built: 2013	Serial Number: NWP-08526-001-A
RT: 0	Vessel CA: 0.000 mm	Manufacturer: NWP INDUSTRIES
	Shell MAWP: 1480 PSI	Tube MAWP: PSI
	MAWTF: 200 °F	MAWTF: °F
		Pipe/Plate PLATE

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
60 NOZZLE	2017	CA	Nominal
Shape: 360° Circ	Min 8.41	Flag 7.490	T Min 8.560
OD: 114.3	Avg 8.84		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.038
			Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
65 NOZZLE	2017	CA	Nominal
Shape: 360° Circ	Min 8.56	Flag 7.490	T Min 8.560
OD: 114.3	Avg 8.69		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.000
			Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
70 NOZZLE	2017	CA	Nominal
Shape: 360° Circ	Min 8.74	Flag 7.490	T Min 8.560
OD: 114.3	Avg 9.04		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.000
			Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: SA-106-B
75 NOZZLE	2017	CA	Nominal
Shape: 360° Circ	Min 8.51	Flag 7.490	T Min 8.560
OD: 114.3	Avg 9.14		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.013
			Remaining Life:
			Retirement Date:



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Survey Name: Husky Energy

Date: Jul 28, 2017

Inspector: D. Skeard

LSD: 03-32-50-19W5	Area: MINEHEAD	Location: FIELD
Jur #: A0625503	Tag Number: V-240	Vessel Name: LINE HEATER
CRN: V9651.2	Year Built: 2013	Serial Number: NWP-08526-001-A
RT: 0	Vessel CA: 0.000 mm	Manufacturer: NWP INDUSTRIES
	Shell MAWP: 1480 PSI	Tube MAWP: PSI
	MAWTF: 200 °F	MAWTF: °F
		Pipe/Plate PLATE

TML Description	Baseline	Flange ANSI: Unknown	Material: Unknown
80 HEAD	2017	CA	T Min
Shape: Ellipsoidal	Min 13.64	Flag 15.060	Nominal 15.060
OD: 273.05	Avg 14.05		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.355
			Remaining Life:
			Retirement Date:

TML Description	Baseline	Flange ANSI: Unknown	Material: Unknown
85 SHELL	2017	CA	T Min
Shape: Cylindrical	Min 15.29	Flag 15.060	Nominal 15.060
OD: 273.05	Avg 15.65		STCR mm/yr 0.000
Spec: ASME VIII Div.1	Comments: ASSUMED NOMINAL		LTCR mm/yr 0.000
			Remaining Life:
			Retirement Date: