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# DRILLING OPTIMISATION ON THE NORWEGIAN CONTINENTAL SHELF

OPPORTUNITIES IN WELL DESIGN PRACTICE

PATRICK HARRIS UNIVERSITY OF STAVANGER MSc. Petroleum Engineering – Dissertation

To Paul, Jo'Ann, Hugh and Annika.

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This body of work serves as partial satisfaction of the requirements of the Master of Science (Petroleum Engineering) degree programme, at the University of Stavanger. I trust this work will be of interest to practising or aspiring Drilling Engineers, whose work concerns the Norwegian Continental Shelf, or Drilling Optimisation as a broader subject area.

Patrick Harris Stavanger 2018

## **Executive Summary**

The purpose of this thesis was to attempt to provide evidence that Norway's drilling fraternity is long overdue for a re-think in the way it drills wells. In so doing, the author has chosen to focus on slim well drilling as a means of reducing drill costs. It was postulated that slim well drilling could lead to much lower drilling investment costs. This body of work therefore focuses on the regulatory, economic and technical implications of slim hole drilling in Norway.

The study examined the historical trends of drilling optimisation, particularly in light of the recent downturn. It was discovered that drilling investment costs in Norway have increased three-fold since the year 2000 with drilling and wells contributing 50% of that overall investment (>NOK100B per year). Whilst there has indeed been some improvement in efficiency since 2014, there is still a major issue with hidden NPT and overall rig crew efficiency. There are, however, some exciting developments in play for slimming down explorations wells in Norway, with the possibility of even drilling with a single casing string being considered.

To attempt to indicate that slim wells are indeed possible, six hypothetical exploration wells were examined. Two in the North Sea, another two in the Norwegian Sea and the remainder in the Barents Sea. These regions were chosen to give the broadest possible outlook for the opportunities and challenges at play for the Norwegian sector. For each region, one conventional well design and one slender well proposal was analysed and despite an absence of some data, realistic assumptions were made based on publically available data from Norwegian operators.

From a technical standpoint, our analysis concluded the following:

- For each conventional well presented, it was technically possible to remove one or two casing strings, with no lost production and well integrity remaining intact;
- The limiting technical factor in slim well design is kick tolerance. All slim hole options required changes to casing set depth and hole size due to kick tolerance;
- Due to recent advances in downhole technology, the use of tools such as alternate-flow through casing shoes mean ECD's are not the problem they would otherwise be. By under-reaming certain hole sections and using managed pressure drilling, ECD's can be further reduced, as can annular pressures during cementing;

In assessing the technical merits of slim well drilling, an economic model was developed for each of the six drill proposals. A number of realistic assumptions were made based on ballpark materials pricing and some limited drill cost data from an undisclosed operator. Our economic analysis concluded the following:

- Simply slimming down a well, all casing depths remaining equal may not necessarily be economically beneficial. This will depend entirely on operating time;
- Material cost savings, while significant, only play a minute role in reducing wellbore costs. These savings will fluctuate depending on the operating company's competitive market advantage in securing lower per-unit material costs;
- The primary cost driver of economically successful slim well drilling is rig crew performance;

The study rounds-up with an expose of the current opportunities and challenges facing industry today. Whilst it is easy to show evidence of the techno-economic merits of slim hole drilling, it was thought prudent to examine the current industry appetite for these sorts of wells, in light of the challenges which need to be overcome before commercialisation of slim hole drilling can occur. The biggest roadblocks currently hindering the commercial success of slim hole drilling are the preventive drilling rig certification costs for new rigs in Norway and the current state of the local OCTG market. A number of recommendations to industry were presented:

- Standardisation of drilling rig certification processes and regulations between Denmark, Norway and the UK (North Sea sector);
- Standardisation of manufacturing, operating and documenting practises across industry;
- The implementation of rig crew performance incentive schemes, which are particularly important given that the economic merits of slim wells hinge on a high performing crew;
- Implementing risk sharing models to ensure a more stable flow of income/expense, as well as reviewing the ways in which rig costs are set;
- "Going digital". Implementing digital well planning to drive down costs.

In closing, this thesis concludes that slim wells are a lucrative option for Norwegian operating companies, in that they are technically sound for the Norwegian Continental Shelf and economically viable given a prevalence of the conditions outlined above.

# **Table of Contents**

Acknowledge	ments	4
Executive Su	mmary	5
	gures	
	ables	
iii. List of At	bbreviations and Terms	.11
	Introduction	
	Background	
	History and Development of Drilling Optimisation	
	Design on the Norwegian Continental Shelf	
	Geological Overview of the Norwegian Continental Shelf	
	Summary of NCS Present Day Wellbore Profiles	
	Norway's Need for Cost-Effective Drilling	
	ng Optimisation – Opportunities, Challenges and Limitations	
	Developments in Slender Well Design	
	Well Design with Fewer Casing Strings	
Chapter 3:	Technical Analysis	.42
3.1 Reg	ional Overview	
3.1.1	Barents Sea	
	Norwegian Sea	
	North Sea	
	ing Evaluation Criteria	
	ent Design Practises by Region	
	Barents Sea Conventional Well Design	
	Norwegian Sea Conventional Well Design	
3.3.3	North Sea Conventional Well Design	.69
	der Well Design Opportunities	
	General Assumptions	
	Barents Sea	
	Norwegian Sea	
3.4.4	North Sea	.81
3.4.5	Well Control	
3.4.6	Kick Tolerances	
3.4.7	Equivalent Circulating Densities	.92
3.5 Eco	nomic Considerations	.96
	Financial Assumptions	
	Barents Sea	
	Norwegian Sea1	
3.5.4	North Sea1	
3.5.5	Discussion1	11
	Assessment1	
Chapter 4:	Industry Opportunities and Limitations1	
4.1 Limi	tations on Slim Well Drilling in Norway1	25

4.1.1	Regulatory Restrictions on Rig Supply	125
4.1.2	Market Restrictions	126
4.2 Opp	oortunities and Industry Recommendations	126
4.2.1	Streamlining of Rig Requirements for Drilling (DK/NO/UK)	126
4.2.2	Industry Standardisation	
4.2.3	Performance Incentive Schemes	128
4.2.4	Risk Sharing Models	129
4.2.5	Digital & Automated Well Planning	129
Chapter 5:	Conclusions	131
Recomme	nded Future Work	131
Bibliography		133
5.1 Tim	e Depth Curves by Field	138
5.1.1	Heidrun	138
5.1.2	Snøvit	143
5.1.3	Åsgard	146
5.1.4	Eldfisk	148
5.2 Wel	I Design Reports from Landmark™	149
5.2.1	Barents Sea	149
5.2.2	Norwegian Sea	194
5.2.3	North Sea	238
5.3 Drill	Cost Estimates	291
5.3.1	Barents Sea	291
5.3.2	Norwegian Sea	296
5.3.3	North Sea	301

### i. List of Figures

Figure 1 - WTI Oil Price History (Federal Reserve of St. Louis, 2018)1	4
Figure 2 - Common Casing Profiles on the Norwegian Continental Shelf (Aadnøy, 2010)1	7
Figure 3 - Drilling efficiency on the NCS since 1994 (OG21, 2014)2	20
Figure 4 - Increased time usage in wellbore operations from 1992 to present (OG21, 2014)2	20
Figure 5 - Petoro field study for asset depreciation due to cost inflation (OG21, 2014)2	21
Figure 6 - Average resources per well on the NCS (OG21, 2014)2	22
Figure 7 - Comparison of slender vs. conventional well construction (Howlett, et al., 2006)2	23
Figure 8 - Inner annulus tool on field trial, which is run inside casing (Howlett, et al., 2006)2	25
Figure 9 - Failure mechanisms around a typical wellbore (Maury & Sauzay, 1987)2	27
Figure 10 - Kick tolerance comparison for conventional vs. slim well	
Figure 11 - Conventional Exploration Well Design on the NCS (AkerBP, 2017)	33
Figure 12 - Removal of 9-5/8" casing string (AkerBP, 2017)	34
Figure 13 - Deep dual-conductor option with contingent liner (AkerBP, 2017)	35
Figure 14 - Vision for single-string exploration drilling (AkerBP, 2017)	
Figure 15 - Conductor Anchor Node installation (NeoDrill, 2016)	37
Figure 16 - Conventional vs monodiameter wellbore architecture (Smith, 2004)	39
Figure 17 - Comparison of casing expansion methods (Shen, 2007)4	10
Figure 18 - Geological overview of the Barents Sea (NPD, 2017)4	13
Figure 19 - Barents Sea downhole temperature profile (Khutorski, et al., 2008)4	4

Figure 20 - Barents Sea study wellbore location	45
Figure 21 - Barents Sea Sample Pressure Profile, normalised to MSL	46
Figure 22 - Pore pressure data for selected Barents Sea wells (Directorate, 2018)	47
Figure 23 - Geological overview of the Norwegian Sea (NPD, 2017)	48
Figure 24 - Norwegian Sea study well location	49
Figure 25 - Norwegian Sea Sample Pressure Profile, normalised to MSL	50
Figure 26 - Pore pressure data for selected Norwegian Sea wells (Directorate, 2018)	
Figure 27 - North Sea geological overview (NPD, 2017)	
Figure 28 - North Sea study well location	
Figure 29 - North Sea study well pressure profile, normalised to MSL	54
Figure 30 - Pore pressure data for selected North Sea wells (Directorate, 2018)	
Figure 31 - Typical VME design limits plot with NORSOK design factors (Bellarby, 2009)	
Figure 32 - Barents Sea wellbore schematic (conventional architecture).	
Figure 33 – Design limits plot for 20" surface casing	61
Figure 34 - Design limits plot for 13-3/8" intermediate casing	
Figure 35 - Design limits plot for 9-5/8" intermediate casing	
Figure 36 - Design limits plot for 7" production liner	
Figure 37 – Norwegian Sea study well general schematic	
Figure 38 - Design limits plot for 20" surface casing	
Figure 39 - Design limits plot for 13-3/8" intermediate casing	
Figure 40 - Design limits plot for 9-5/8" intermediate casing	68
Figure 41 - Design limits plot for 7" production liner	
Figure 42 - North Sea study well general schematic	70
Figure 43 - Design limits plot for 20" surface casing	71
Figure 44 - Design limits plot for 13-3/8" intermediate casing	72
Figure 45 - Design limits plot for 9-5/8" intermediate casing	
Figure 46 - Design limits plot for 7" production liner	
Figure 47 - Barents Sea slender well design proposal	76
Figure 48 - Design limits plot for 13-3/8" surface casing	77
Figure 49 - von Mises design plot for 9-5/8" intermediate casing	77
Figure 50 - Design limits plot for 7" production liner	78
Figure 51 – Norwegian Sea slender well design proposal	79
Figure 52 - Design limits plot for 9-5/8" surface casing	80
Figure 53 - Design limits plot for 7" production casing	80
Figure 54 - North Sea slender well design proposal	
Figure 55 - Design limits plot for 11-3/4" surface casing	82
Figure 56 - Design limits plot for 9-5/8" intermediate casing	82
Figure 57 - Design limits plot for 7" production liner	83
Figure 58 - Well control flow chart (Harness Energy, 2014)	
Figure 59 - Barents Sea slender well - surface hole section kick tolerance	86
Figure 60 - Barents Sea slender well - intermediate hole section kick tolerance	87
Figure 61 - Barents Sea slender well – production hole section kick tolerance	87
Figure 62 - Norwegian Sea slender well – surface hole (new) section kick tolerance	88
Figure 63 - Norwegian Sea slender well – production hole section kick tolerance	89
Figure 64 - North Sea slender well – intermediate hole section kick tolerance	91
Figure 65 - North Sea slender well - production hole section kick tolerance	91
Figure 66 – Estimated ECD: Barents Sea slender well – intermediate hole drilling	92

Figure 67 - Estimated ECD: Barents Sea slender well – production hole drilling	93
Figure 68 - Estimated ECD: Norwegian Sea slender well w/ original int. casing set depth	94
Figure 69 - Estimated ECD: Norwegian Sea slender well w/ deep int. casing set depth	95
Figure 70 - Estimated ECD: North Sea first intermediate hole section	95
Figure 71 - Estimated ECD: North Sea second intermediate hole section	96
Figure 72 - Estimated ECD: North Sea production hole section	96
Figure 73 - Barents Sea conventional study well cost estimate	98
Figure 74 - Barents Sea slender study well cost estimate	101
Figure 75 - Barents Sea time/cost comparison	102
Figure 76 - Barents Sea phase cost breakdown	102
Figure 77 - Norwegian Sea conventional study well cost estimate	103
Figure 78 - Norwegian Sea slender well drill cost estimate	105
Figure 79 - Norwegian Sea Slender time/cost comparison	106
Figure 80 - Norwegian Sea slender well phase/cost comparison	106
Figure 81 - North Sea conventional study well cost estimate	107
Figure 82 - North Sea slender well drill cost estimate	109
Figure 83 - North Sea slender well time/cost comparison	110
Figure 84 - North Sea slender well phase cost comparison	110
Figure 85 – Average material cost comparison for all wells	111
Figure 86 - Time/Depth curves for Norwegian & Australian fields (Directorate, 2018)	113
Figure 87 - Risk matrix (DNV GL, 2010)	115

### ii. List of Tables

Table 1 & Table 2 - Key reservoir properties of major fields on the NCS (Nadeau, 2016)	16
Table 3 - Comparison of kick tolerances for slim vs. conventional well profiles	31
Table 4 - NORSOK D-010 wellbore design factors (Standards Norway, 2013)	57
Table 5 - Load cases as required by NORSOK D-010 (Standards Norway, 2013)	57
Table 6 - List of standard tubulars as provided by unnamed Norwegian Operator	58
Table 7 - List of standard connections as provided by unnamed Norwegian Operator	59
Table 8 - Barents Sea Conventional Well: Casing Summary	
Table 9 - Norwegian Sea Conventional Well: Casing Summary	65
Table 10 - North Sea Conventional Well: Casing Summary	
Table 11 - NORSOK D-010 wellbore design factors (Standards Norway, 2013)	75
Table 12 - Load cases as required by NORSOK D-010 (Standards Norway, 2013)	75
Table 13 - Barents Sea Slender Well Casing Summary	76
Table 14 - Norwegian Sea Slender Well Casing Summary	79
Table 15 - North Sea Slender Well Casing Summary	
Table 16 - Scaling factors for Barents Sea slender well	100
Table 17 - Scaling factors for Norwegian Sea slender well design cost estimate	104
Table 18 - Scaling factors for North Sea slender design cost estimate	
Table 19 - Slim hole drilling risk register	124

### iii. List of Abbreviations and Terms

- ARO Asset Retirement Obligation
- BHA Bottom-hole assembly
- BOP Blowout preventer
- **CAPEX** Capital expenditure
- **DP** Drill pipe
- ECD Equivalent circulating density
- EMW Equivalent mud weight
- FFP Fit for purpose
- Green Test Pressure testing wet cement
- Grey Test Pressure testing cured cement
- HSE Health, safety and environment
- JHA Job hazard analysis
- LOT Leak-off test
- Mud Window Range of equivalent densities or pressures that avoids drilling problems
- NOK Norwegian Krone
- $\label{eq:NPT-Non-productive time} \textbf{NPT} \textbf{Non-productive time}$
- OBM Oil-based mud
- **OCTG** Oil Country Tubular Goods
- **OD** Outer diameter
- Oil Price Price of oil per barrel
- **OPEX** Operating expenditure
- PDC Poly-crystalline diamond compact (drill bit)
- PJSM Pre-job safety meeting
- **ROP** Rate of penetration
- RT Rotary table (aka. Kelly bushing)
- SOP Standard operating procedure
- SPE Society of Petroleum Engineers
- TVD True vertical depth
- WBM Water-based mud
- WOB Weight on bit
- WTI West Texas Intermediate

## **Chapter 1: Introduction**

Oil and gas exploration is complex in its very nature. It is an industry that epitomises the phrase "high risk, high reward". In keeping with this theme, we note that drilling operations today, constitute the highest overall contribution to project capital expenditure. A project may well be deemed economically viable or not purely based on its drill costs. As Drilling Engineers, it is hence our overarching responsibility to not only deliver highly productive wells with lifelong integrity, but to deliver the same with one eye on our shareholders and one on our pocket.

For the past decade, the advent of more stringent regulations, brought about for a number of technical, social and economic reasons, have stymied the industry's ability to deliver wellbores at a comparatively low cost. In Norway, where operators produce hydrocarbons in one of the World's most challenging regions, these issues are more boldly exemplified. It is the Author's hypothesis that drilling operations on the Norwegian Continental Shelf are long overdue for a re-think and stand in need of optimisation to reduce wellbore costs.

This body of work will focus on the opportunities that may exist for optimised drilling on the Norwegian Continental Shelf. The text opens with an historical account of drilling optimisation as a broader subject area and subsequently proceeds with an expose and critique of Norwegian regulations concerning oil and gas drilling. Of particular focus is the effect the regulations have had on industry efficiency and well designs today. Against this backdrop, the most recent developments in slim or slender well drilling are presented, along with an overview of innovative reduced casing drilling.

The study builds on these theoretical fundamentals and innovative ideas to present new options for wellbore architecture on the Norwegian Continental Shelf. Options for each of the three major regions of the Shelf (i.e. North Sea, Norwegian Sea, Barents Sea) are presented (limited to exploration wells) from a technical and economic standpoint. A synopsis of the major risk factors, along with technical, market and regulatory concerns is subsequently outlined.

We close with a number of recommendations for Norwegian operators and State Regulators. It is the Author's intention that this study be used to optimise drilling operations in both Norway and around the world, thereby making wellbore operations more cost-effective. The author hypothesises that slender well drilling is a techno-economically viable option for Norwegian operating companies. This body of work will investigate this claim.

# Chapter 2: Background

#### 2.1 The History and Development of Drilling Optimisation

The topic of drilling optimisation is nothing new – the concept has been in existence since 1967, where the first techniques were applied (James L. Lummus (Pan American Petroleum Corp.), 1970). As a broader subject area, drilling optimisation seeks ultimately, to cut capital and operating expenditure (CAPEX and OPEX) by addition, removal or innovation of various technical facets of the drilling process.

According to Lummus, with the development of the rotary drilling rig from its initial conception during the early period of the 20<sup>th</sup> century, to where it is today, the drilling process has gone from a highly labour intensive percussion type process, to its modern day scientific approach. The timeline can be divided in four distinct periods:

- 1. The Conception Period (1900 1920): The foundation of modern day drilling, which began not long after the first discoveries of oil in North America;
- 2. The Development Period (1920 1948): The transformation of first-generation rigs to what would be most closely related to their current form;
- 3. The Scientific Period (1948 1968): The introduction of modern science into the drilling process and the first attempts of looking at drilling through an academic lens;
- 4. The Automation Period (1968 onwards): The inception of automated processes into modern day rigs.

Whilst Lummus makes number of valid arguments pertaining to the development rotary drilling, he argues that the Scientific and Automation Periods leapfrog one another even to this day. It could be argued further that automation is a relative term. With the developments made in modern computing and control systems, it is fair to argue that the Automation period may not have even begun. This is because the modern day interpretation of automation entails a much more literal definition of the term, than was the case in the early 70's.

Irrespective of what one might surmise about our current period of rotary drilling, what is evidently clear is that the present appetite for optimised (and ultimately cost-effective) drilling processes is pegged to the oil price<sup>1</sup>. To illustrate this point, Figure 1 below shows the price of WTI oil over the past 20 years.

<sup>&</sup>lt;sup>1</sup> This is a key concept, since it will feed this work's arguments surrounding the need for drill cost reduction on the Norwegian Continental Shelf in future chapters.



#### Figure 1 - WTI Oil Price History (Federal Reserve of St. Louis, 2018)<sup>2</sup>

The change in industry appetite for optimised drilling is easily understood when considering macro-economic oil-price trends. Put simply: when prices (and bottom lines) are up, the industry pays little attention to innovation and optimised drilling, since corporate scorecards do not underscore the need for what is perceived in these times as unnecessary expenditure. Conversely, when prices and profits are down, what typically follows is an industry-wide panic and a strong push for cheaper wells with higher productivity, driven by an often short-term shareholder-appeasing view.

However, this concept, while broadly applicable on some small level, fails to consider the effect of production rates and overall corporate vision on how one entity may view optimised drilling over another and, thus, how these processes ultimately mature. Let us consider a hypothetical well drilled in Saudi Arabia's Ghawar field, which produces some four to five million boe<sup>3</sup>/day. Historically, wells drilled in this field have such a rapid payback period, coupled with a high oil price and positive reserves replacement ratio, that the need for cost-saving drilling solutions has not been present. However, let us now consider a well drilled in Central Australia, where the average production rate per well falls in the range of 300-3000 boe/day. With high water cuts, coupled with some of World's highest labour costs<sup>4</sup>, for some of the smaller operators, each new well is make-or-break.

It is easy to see how the payback period of a new drill may serve to either mask or highlight the push for optimised drilling. In the Saudi Arabian example, if one assumed a one-month payback period on a new drill, the emphasis on cost control for that new drill is much lower than for the

<sup>&</sup>lt;sup>2</sup> Data downloaded as .csv file, showing oil price development from 1989 to present day.

<sup>&</sup>lt;sup>3</sup> "boe" stands for "barrel of oil equivalent". The term exists to summarise total wellbore fluid production equivalent to the amount of energy found in one barrel of oil. (Investopedia, 2017)

<sup>&</sup>lt;sup>4</sup> Cooper Basin average rig spread rate ranges from USD\$60-150M per day, with an approximate CAPEX of USD\$500M-1MM. (Note: M = thousand).

Central Australian example, where that payback period might range from say two to five years. However, with the natural decline in production from some of the World's major oilfields over the next decade, combined with volatile oil prices, innovative and cost-saving drilling methods will almost certainly be overdue for a renaissance.

#### 2.2 Well Design on the Norwegian Continental Shelf

The Norwegian Continental Shelf is one of the World's most challenging regions in which to explore for hydrocarbons. From the early days of oil exploration in the North Sea sector, to the present day new frontiers of the Arctic, the region has demanded both strong intellectual and financial investment.

#### 2.2.1 Geological Overview of the Norwegian Continental Shelf

Hydrocarbon exploration on the Norwegian Continental Shelf is presently restricted to the North Sea, Norwegian Sea and Barents Sea regions. The geological conditions in these regions are highly favourable for oil and gas development and production. Hydrocarbons formed by plankton organisms, which sank to the bottom of the ocean some 140-200 million years ago. This phenomenon was the beginning of what would ultimately prove to be one of the World's most hydrocarbon-rich regions. This plankton was converted to oil and gas as it underwent diagenetic pressure and temperature changes. This process typically occurs between temperatures of 60 to 120 degrees Celsius and has been well documented by Nadeau et. al., when the Golden Zone concept was coined (Nadeau, 2011). In order for hydrocarbons to accumulate, there needs to be an active source rock, migration pathway and ultimately a cap rock. These three main geological conditions are all found on the Norwegian Continental Shelf (Grønnestad, 2014). In Norway, most oil and gas producing reservoirs are Middle Jurassic (mostly within the Golden Zone), with commercially marginal fields outside of this zone. In the UK sector, by means of contrast, the highest reservoir temperature is 235 degrees Celsius.

Field	Res. Type	Dep. System	Res. Fluid	Age	Res depth (m)	Avg P (bar)
Draugen	Sandstone	Shallow Marine	Oil	Late Jurassic	1600	163
Snorre	Sandstone	Fluvial	Oil	Late Jurassic	2700	375
Grane	Sandstone	Shallow Marine	Oil	Paleocene	1700	176
Valhall	Chalk	Deep Marine	Oil	Cretaceous	2400	450
Goliat	Sandstone	Shallow Marine	Oil and Gas	Triassic	1100-1800	160
Ormen Lange	Sandstone	Deep Marine	Gas	Paleocene	2800	290
Kristin	Sandstone	Shallow Marine	Gas	Jurassic	4600	900

Table 1 & 2, shown below, summarise a number of key reservoir properties for Norway's major oil and gas fields.

Field	Avg T (c)	NTG	Porosity	Sw	GOR	Bo/Bg	RF
Draugen	70	0.97	0.30	0.20	60	1.30	0.70
Snorre	97	0.40	0.20	0.43	150	1.34	0.50
Grane	77	0.98	0.33	0.10	90	1.10	0.65
Valhall	90	0.95	0.40	0.33	120	1.54	0.40
Goliat	45	0.60	0.25	0.30	93	1.30	0.30
Ormen Lange	90	0.80	0.30	0.25	5000	0.005	0.70
Kristin	170	0.35	0.15	0.70	1200	0.004	0.30

Table 1 & Table 2 - Key reservoir properties of major fields on the NCS (Nadeau, 2016)

#### 2.2.2 Summary of NCS Present Day Wellbore Profiles

Aadnøy, in the second edition of his book, Modern Well Design, presents a schematic of typical wellbore profiles drilled in Norway today, as shown in Figure 2 (Aadnøy, 2010). We notice these profiles contain a minimum of five casing strings. These well designs have evolved from the increasing complexity of wells drilled in Norway and new technologies allowing boundaries to be pushed further than ever.

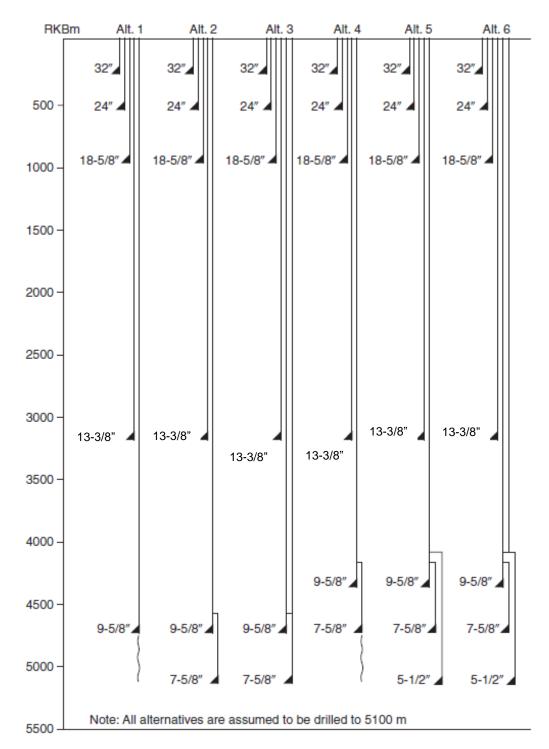


Figure 2 - Common Casing Profiles on the Norwegian Continental Shelf (Aadnøy, 2010)<sup>5</sup>

<sup>&</sup>lt;sup>5</sup> This figure has been edited. 14" casing strings have been replaced with 13-3/8" casing strings, since 14" casing strings are presently uncommon.

#### 2.2.3 Norway's Need for Cost-Effective Drilling

#### 2.2.3.1 A Brief History of NORSOK D-010

In order to put drilling optimisation into context for the Norwegian sector, it is essential to understand how NORSOK standards have changed the way wells are drilled. This section will present a brief history of well integrity standardisation in Norway and outline how NORSOK D-010 has reshaped oil and gas well drilling, and at what cost to operators. Subsequently, a critique of the standard will be presented with proposed changes.

Activity on the Norwegian Continental Shelf during the early nineties was characterised by low oil prices and high operating costs. Around the same time, the Asian financial crisis drove world oil prices to near USD\$10/bbl<sup>6</sup>. The drop in oil prices, combined with rampant project budget blowouts and increased market volatility underscored the need for industry to become more cost effective (Norsk olje & gass, Norsk Industri, Norges Rederiforbund, 2016). The birth and incubation of NORSOK D-010 is well documented by Energy Global (et. al). In 1993, the Norwegian oil and gas industry sought to develop an initiative called NORSOK, with the aim being to increase Norway's international competitiveness in oil and gas exploration and production and reduce wellbore costs significantly. The drive to standardisation came about because of a change in Norwegian Petroleum Directorate (NPD) regulations from being prescriptive (i.e. "Thou shalt...") to loosely instructive, (i.e. "You should...") and some would argue, more functional. This gave operators more leeway for innovation, whilst at the same time ensuring a more rigid adherence to local legal requirements (Energy Global, 2014).

As a means of ensuring industry-wide compliance with the newly minted standard, the NPD stipulated usage of NORSOK D-010 into Norwegian oil and gas regulations. In doing so, the burden of proof of compliance shifted to the operators, rather than the state, where D-010 was being underutilised or neglected. However, to appease industry, interested parties of the Norwegian oil and gas sector were invited to undertake regular reviews of the standard to ensure its currency<sup>7</sup>.

Fast forward to 2010, and the Deep Water Horizon disaster. The Macondo blowout brought an increased focus on wellbore integrity into the limelight and triggered a revision to D-010. The new revision (fourth), which was eventually introduced in 2013, provided a greater focus on barrier establishment during plug and abandonment operations. The revision also covered additional well barrier elements and managed pressure drilling, which were both untouched in previous revisions. The standard, in its current form, is an all-encompassing wellbore integrity standard with a heavy focus on barrier control and operational HSE, and is being adapted worldwide (Energy Global, 2014).

#### 2.2.3.2 NORSOK's Effect on Wellbore Economics

The changes brought about by D-010's introduction have been well documented. Nina Samad, in her 2017 Master's Thesis<sup>8</sup> presented an encompassing response from industry to the changes the standard has brought about. In general, the changes presented in the fourth revision have boosted technological innovation and created a general openness to new methods, but at increased cost to operators (Samad, 2017).

<sup>7</sup> NORSOK D-010 standard is today in its fourth revision.

<sup>&</sup>lt;sup>6</sup> The Asian financial crisis was a series of currency devaluations and other events that spread through many Asian markets during the nineties (Investopedia, 2017)

<sup>&</sup>lt;sup>8</sup> Master's Thesis – NTNU – Spring 2017. See bibliography for further details.

In the study conducted by Samad, which looked to gauge industry response to NORSOK D-010, one noteworthy mention is that the majority of the operators indicated that the standards had done little to change their current operating practises. Norske Shell AS indicated that further to adherence to the standard, they had incorporated D-010 into their own internal wellbore operations manual. They also indicated that their global operations had become more risk-focused and less restrictive. ConocoPhillips were upbeat about the D-010 standards, with their hope being an increased attention paid to wellbore integrity. They did however, point to the change in wellbore costs being down to technology rather than regulations. These responses point to a general positive outlook on the regulations, but provide little evidence of any regulatory effect on wellbore costs.

OG21 Technology Group presented an opposing opinion, in their October 2014 presentation surrounding drilling technology improvement potential at the turning of the oil price. The presentation outlined a number of key points surrounding regulatory effects on drilling competitiveness:

- Investment costs on the NCS have increased three-fold since the year 2000 with drilling and wells contributing 50% of that overall investment (>NOK100B per year);
- The NCS is maturing, with the average field size and reserves per well decreasing. As cost continue to increase, new well targets may be sub-economic with resources unable to be converted to reserves;
- If costs were reduced, wellbore profitability would improve.

In order to put these conflicting opinions into context, it is important to think about plug and abandonment operations. Returning briefly to Samad's study, Statoil (now Equinor) in their response, whilst praising in the D-010 standard, did report that there was a clear trend that D-010 has increased Asset Retirement Obligation (ARO). Their analysis indicated that P&A costs would need to come down by some 50%, as opposed to broad budgets allowing for 25% increasing wellbore profitability (Samad, 2017). This is an important point, since before 2012, plug and abandonment at Statoil (now Equinor) (and indeed the Lion's share of NCS operators) was hardly the fore frontal issue it is today. This points to a bigger issue – wellbore design today on the NCS is heavily focused around planning a well for plug and abandonment, rather than optimising the drill costs<sup>9</sup>. OG21 interviewed 21 industry experts as part of their study, who indicated that Norwegian regulations and standards have potentially limited the rig market with a negative impact on rig intake and costs and pointed to a culture of "time doesn't matter" having evolved in Norway (OG21, 2014).

#### 2.2.3.3 Decreased Efficiency and the Need for Optimised Drilling in Norway

As discussed in the foregoing, there has been a decline in drilling efficiency on the Norwegian Continental Shelf over the past decade. The best illustration of this point comes courtesy of the NPD, Statoil (now Equinor) and Petoro as presented in OG21's report, as shown in Figure 3, below.

<sup>&</sup>lt;sup>9</sup> Important to note that NPT and rig rates, whilst not critical to our study of NORSOK D-010, are indeed accountable to some degree for decrease profitability on the NCS.

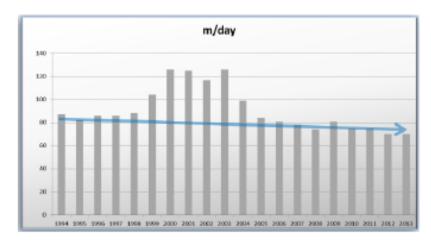


Figure 3 - Drilling efficiency on the NCS since 1994 (OG21, 2014)

We note that the number of metres drilled per day on average has steadily decreased over the past decade. This is a key metric for drilling performance because it is independent of wellbore cost, or rig rates. However, this is not the only metric that illustrates poor efficiency. We note from Figure 4 (OG21, 2014) a steep increase in the time used in key phases of the drilling process from 1992 to the present day. One of the most noteworthy features is the alarming increase in on-bottom drill times for the 17-1/2" and 12-1/4" hole sections – sections that, in theory, should be quickest to drill. Increased complexity in the face of ever-constant development of technology cannot be an excuse for poor efficiency. Since time itself is the biggest overall contributing factor to high wellbore costs, a picture, it seems, truly does paint a thousand words in highlighting the present-day problem.

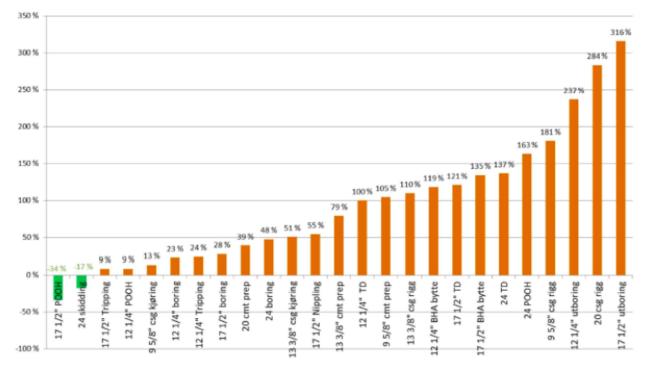


Figure 4 - Increased time usage in wellbore operations from 1992 to present (OG21, 2014)

In understanding this figure, it is imperative to point out a number of key facts. This figure was produced in 2014, before the downturn in oil prices. The data was collected from an application developed by Austrian company, proNova, which measures real-time rig data and reports crew KPI's. In a recent interview conducted with (Petoro, 2018), in Stavanger, it was indicated that these figures may have in fact declined by around 50% since 2014. However, it was also mentioned that whilst this is a welcome change, there has still been little-to-no improvement in "hidden" non-productive time, i.e. efficiency. During times the data was being collected, there has been a marked improvement in performance. However, during times where monitoring was disconnected, the same levels of performance have reportedly not been seen.

The decline in efficiency can be attributed to the increased regulatory constraints and a renewed focus on HSE, which, while having made well operations generally safer, has introduced the need for longer operating times and the need for more tasks to be performed (OG21, 2014). Top-down pressure on wellsite HSE reporting has increased the time taken for routine paperwork, created more "steps" which stifle drilling performance optimisation. This has introduced a culture of "reporting for the sake of reporting". It is important, nevertheless, to acknowledge the benefits and need for a mainstay HSE culture in wellbore operations. However, regulations being as they are, the only way to optimise wellbore costs is through the refinement and innovation of well design practises and improvement in crew performance (this last point is discussed further in <u>Chapter 4</u>).

Let us take this argument one step further and revert focus back to Norway, but through a broader macro-economic lens. Petoro conducted a field study of cost inflation and its effect on value deterioration on oil and gas assets on the NCS (OG21, 2014). The study showed that for the field case examined, a mere six percent increase in either investment or OPEX would reduce field life by up to 12 years. Figure 5, depicted below, depicts this phenomenon.



Figure 5 - Petoro field study for asset depreciation due to cost inflation (OG21, 2014)

When evaluating this study against the backdrop of wellbore decline and the maturation of the NCS, we start to understand the importance of cheaper wells. Figure 6, courtesy of Petoro, shows the average reserves per well and a forward prognosis of same. In the context of Figure 4, one understands the implications of increasing wellbore costs in Norway with declining production

payback. <u>Chapter 3</u> of this body of work will further explore the opportunities for innovation and cost-saving in Norwegian wellbore operations. A discussion will subsequently be presented in <u>Chapter 4</u>, where the challenges of said proposals will be evaluated in the context of the foregoing.

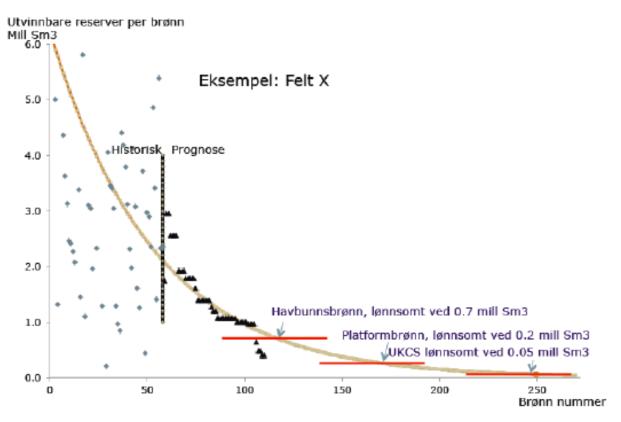


Figure 6 - Average resources per well on the NCS (OG21, 2014)

#### 2.3 Drilling Optimisation – Opportunities, Challenges and Limitations

This section of our theory review will take on a technical focus and examine some of the current and future technologies and opportunities to optimise drilling on the NCS.

#### 2.3.1 Developments in Slender Well Design

#### 2.3.1.1 Slender Well Design Concept<sup>10</sup>

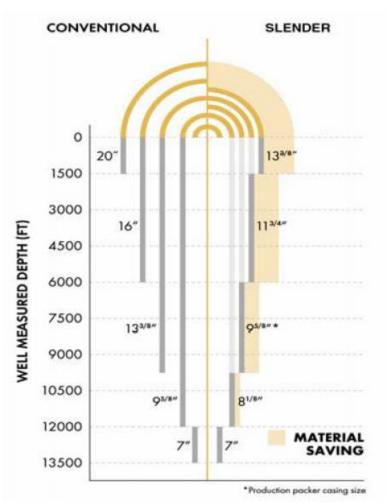
The concept is simple. We drill wells with smaller diameter casing strings and reduce the annular clearances between each string. We save money and reduce HSE risk. However, in proving the concept techno-economically viable, there are a myriad of considerations, which are discussed herein.

Slimming down oil and gas wells has long been the desire of many an operator, for its economic merits. The concepts, technologies and challenges were examined by (Howlett, et al., 2006) in their study of new slender well construction technology. Among the biggest restrictions to slimming down well designs is the selection of the optimum pipe size. When planning a new well, its lifetime needs to be considered in light of its potential productivity. Production Engineers ideally want the largest possible production tubing or casing diameter to minimise frictional pressure

<sup>&</sup>lt;sup>10</sup> Note: Throughout this work, for the purposes of simplicity, "slender" and "slim" are used interchangeably when referencing well architecture.

losses, thereby optimising flowrates. However, this is not always possible due to economic restrictions. Many operators often conclude that economic merits do not stack up against additional work involved to commercialise slender well drilling. This is usually due to the upfront costs of rig modifications, OCTG market restrictions and overall project risk. In commercialising slender well technology, Howlett et. al.'s study considered it essential that any slender wellbore architecture needed to provide flexibility in design, whilst allowing for optimum pipe sizes across zones of interest (Howlett, et al., 2006).

It is important to distinguish between slim hole and slender hole design. Slender well design is simply a reduction in annular clearance between casing strings. This can be used in tandem with reduced casing sizes providing technical requirement are met and annular clearances are within the allowable API guidelines (or local equivalents). This for the purposes of our analysis, slender wells are discussed in their slim form, hence merging the nomenclature. Figure 7, shown below, clearly illustrates the possibilities of slimming down well designs and was the result of field trials conducted by Howlet et. al.



*Figure 7 - Comparison of slender vs. conventional well construction (Howlett, et al., 2006)* The benefits of slender well design are noteworthy. Among others, the key advantages are:

- Economically beneficial due to lower casing costs, lower volumes of drilling fluid required and overall reduced rig and logistical expenditure;
- Improved HSE performance due to handling of smaller/lighter equipment, combined with a lower risk of transportation issues. Also worth noting is the increased burst and collapse strengths, typically associated with smaller diameter casing strings;
- Operators can still keep "one in the back pocket", in case contingency strings need to be run, since liners can be spaced over troublesome areas;
- Since there are few overlapping casing strings, we reduce the potential for leak paths at the top of the well, thereby simplifying our abandonment process.

However, there are of course challenges that come with slender wells, chief among which are:

- Surging and swabbing
- High ECD's
- Centralisation and good quality cementing

When we think about slender well designs, one immediate concern is the restricted annular clearance experience when running casing strings in hole. This in turn, presents a high risk of surge and swab, particularly when using highly viscous, or thixotropic drilling fluids in tandem with tight mud windows. In order to abate the issue of surge and swab, a flow diversion shoe was designed. The flow diversion shoe allows for standard flow rates during operations. Subsequently, by increasing the flowrate to some predetermined rate, the flow is then diverted to an inner annulus created by an inner tubing string (Hunting Energy Services, 2016). The inner annular space allows fluid to flow through outlets, thus avoiding full flow through the borehole-liner/casing annulus. Figure 8, courtesy of Howlett et. at., depicts this concept.



Figure 8 - Inner annulus tool on field trial, which is run inside casing (Howlett, et al., 2006)

The artificial inner annulus adds a new path of least resistance, which allows passage of cuttings and debris, whilst simultaneously allowing fluid flow in the conventional manner. The reduced fluid volume in the conventional annulus abates the surge and swab effect, but there is, however, lingering concern surrounding ECD's given the reduced annular clearance.

A common method of avoiding high ECD's in slender wellbore operations is to drill the next hole section will large wellbore diameters. This typically requires a bi-centred drill bit or under-reaming capabilities. General experience in these operations has widened substantially over the past decade, and is commonly used in many regions of the world to alleviate differential sticking in problem formations. It follows that larger wellbore diameters will give lower (or more acceptable) ECD's and ideally mitigate wellbore stability issues when running casing/liners into narrow sections (Howlett, et al., 2006).

With running narrow casing strings into enlarged wellbore sections, comes the challenge of centralisation. Whilst Howlett, et. al. argue that bi-centred non-rotating bow spring centralisers are a good option, history is littered with examples of poor standoff and patchy cement quality

when using bow spring centralisers. One of the main issues with non-rotating centralisers is exactly that – they are non-rotatable. It has been shown both scientifically and empirically that rotation and reciprocation of casing strings during primary cementing ultimately leads to better quality cement jobs. Whilst this may not be the case for liners (where bi-centre bow springs may be a good option), rotatable, moulded solid-body centralisers (or similar) have typically shown the best results, particularly in troublesome wells.

Another important consideration, often overlooked, but particularly critical for slender wells, is drifting and strapping casing, as well as its running practises. During transportation, where there is no good reason for this to occur as often as it does, some casing always gets damaged en route to site. Whether loaded onto trucks or barges, the casing needs adequate protection from damage. Whatever the unloading method once on location, it is essential that the casing is subjected to as little transfer as possible, to lower the risk of damage. This may seem trivial, but the impacts can be very costly as will be shown shortly. When strapping and drifting the casing, assuming there is no damage during transportation, it is likely the casing will be in-gauge, with no defects present. During casing running, failing to adhere to these practises, in tandem with poor running procedures can lead to impassable sections of casing due to damage. This is ever more pronounced in slim wells, since the annular clearances are much finer than for conventional wells. The results, therefore, of being careless with transport and inaccurately strapping and drifting casing, could see the need to abandon and side-track sections of the wellbore, at a significant cost to the operator (Byrom, 2007).

#### 2.3.1.2 Wellbore Stability and its Importance to Slim and Slender Wells

Of primary concern with this paradigm shift in well design is wellbore stability. During drilling, mud weight selection is just as crucial as mud chemistry. Unhindered drilling operations will require a deep understanding of prevailing geologic conditions and wellbore pressures. Geomechanical studies will help to determine the minimum and maximum principal stresses, which will in turn shape the safe drilling window. Assuming both of these phenomena are well understood and implemented effectively, drilling of the 8-1/2" open hole section will logically proceed unabated.

Since wellbore stability is strongly time-dependent, it is important to qualify the merits of this design in light of time. There is much literature surrounding borehole stability, however one such account that excellently summarises its mechanics was written by (Caenn, et al., 2011), in Composition and Properties of Drilling and Completions Fluids<sup>11</sup>. When we drill a well, the horizontal stresses are relieved and the hole will subsequently contract. The contraction will continue until the radial stress at its wall is equal to the pressure of the mud column, minus the pore pressure. The load is then transferred to a zone of hoop stresses that create tangential shear stresses around the borehole wall. If this strain caused by stress-relief of the rock does not exceed the elastic limit, the change in wellbore diameter will typically go unnoticed to the driller. If, however the elastic limit is exceeded and plastic deformation occurs, the deformation will be permanent. At this point, reaming out of hole will abate any difficulties and remove the deformed rock. An excellent summary of the failure modes of a borehole is shown in Figure 9.

<sup>&</sup>lt;sup>11</sup> Regularly dubbed the "Mud Bible" by many senior industry experts.

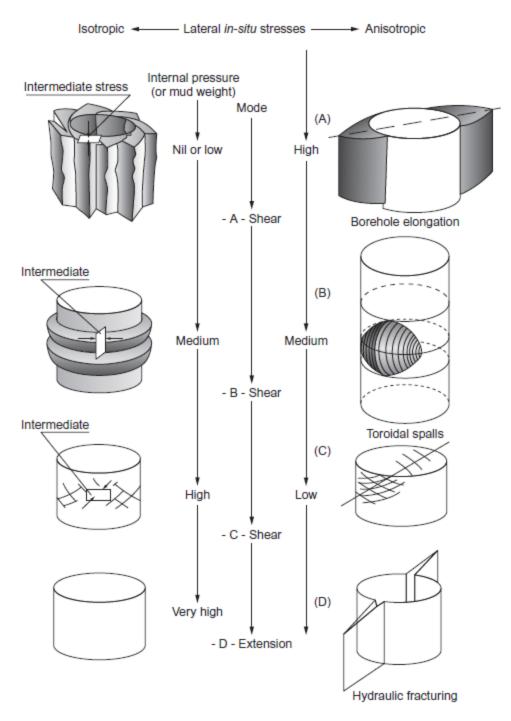


Figure 9 - Failure mechanisms around a typical wellbore (Maury & Sauzay, 1987)

The key take-away in assessing borehole mechanics in light of slim well design is to understand that this rock deformation is time-dependent. The time in question needs to be well understood before drilling barefoot completions or slim and slender wells and will vary from rock to rock, depending on the wellbore in-situ stresses. It follows that the drilling fluid, which provides maximum stability, varies from region to region. This is particularly true when it comes to shales, since shale hydration is one of the biggest (and most easily avoidable) contributors to instability. Chemical wellbore instability is worst in WBM due to the problems surrounding shale hydration,

whereas OBM does not hydrate shales. Before formulating the optimum mud chemistry to minimise downhole issues, it is critical to collect as much information as possible about the geology, stress history and areal faulting. This also includes the collection of pore and fracture pressure curves and modelling of minimum and maximum horizontal stress. These data are typically derived from offset well reports and well logs. Where this data is unavailable, it is prudent to test samples of potential problem formations to determine the optimum saline solution. Further information regarding mud chemistry and formulation is available from Caenn, et al., but is beyond the scope of this text (Caenn, et al., 2011).

#### 2.3.1.3 Well Control during Slim Hole Drilling

Well control is essential in the drilling of any wellbore which contains hydrocarbons. It is one of the critical elements of any casing design and is typically the last word in casing set depth selection. For slim hole drilling, however, the importance of well control is more pronounced, given the smaller diameters. Small influx volumes in slim wells can result in large influx heights. This means high pressures along the vertical profile of the wellbore. Hence, kicks tolerances may often be lower than would otherwise be desirable, thereby underscoring the need for full alertness in kick detection, while drilling (Maurer Engineering Inc., 1993 - 1995).

Shook R., et. al. (Maurer Engineering Inc., 1993 - 1995), presented in their paper on Slim-Hole Drilling and Completion Barriers, the fundamentals of slim hole well control.

#### **Differential Sticking**

Differential sticking is a condition wherein the drillstring becomes stuck along the axis of the wellbore. Differential sticking occurs when high contact forces caused by depleted zones, or high wellbore pressures are exerted over a long section of the drillstring (Schlumberger, 2011). Differential sticking becomes ever more risky in slim wells due to the smaller annular clearances. Factors that relate to slim well drilling include high wellbore pressures, thick mud cakes and larger relative pipe diameters (which yield a greater contact area). Efforts to minimise contact area include designing downhole tools using spirals, heavy weight drill pipe with upsets or by adding clamp-on stabilisers, or other offset tools (Maurer Engineering Inc., 1993 - 1995).

#### Kick Detection

The major variance between conventional and slim well drilling, as far as kick tolerance is concerned, is that the smaller annular space means a given volume of kick will occupy a greater height. A greater height of lighter fluid will result in a sharper decrease in hydrostatic pressure on the kicking formation (Maurer Engineering Inc., 1993 - 1995). This is represented below in the Kick Tolerance section, where we see the difference in maximum allowable influx volumes for reduced annular clearances.

For slim wells, kick detection is critical, since much smaller kick volumes in slim wells can have the same negative effects are larger volumes in conventional wells. Therefore, early detection is paramount to avoiding loss of well control. Conventional well control techniques have called for a quick shut-in and monitoring of annular pressures while slowly circulating the kick out of hole and increasing the mud weight. These techniques rely on low annular friction pressures and assume they are a very low percentage of the total system pressure loss. For slim wells, annular pressure drops can represent 90% of the total system pressure drop. Because of this, Shook R., et. al., suggest dynamic well control techniques, or modified versions of the Driller's Method (Maurer Engineering Inc., 1993 - 1995).

#### Kick Tolerance

Kick tolerance is defined as the maximum volume of kick influx that can be shut-in and circulated out of the wellbore without breaking down the weak point (formation below the casing shoe) (Redmann Jr., 1991). Lapeyrouse, in the Driller's go-to handbook, Formulas for Calculations for Drilling, Production and Workover, along with Jin and Li, 2016, both presented an excellent summary of calculating kick tolerance and their formulae are summarised below (assuming oilfield units):

First and foremost, the kick intensity needs to be determined. This is calculated as the difference between the maximum anticipated formation pressure and the planned mud weight:

Kick Intensity = 
$$EMW_{Formation Pressure-Max} - EMW_{Planned Mud Weight}$$
  
Equation 1 - Kick intensity

Once kick intensity is determined, we calculate the maximum allowable shut in casing pressure (MASICP), as follows:

$$MASICP = (EMW_{LOT} - EMW_{Planned Mud Weight}) \times TVD_{Casing Shoe} \times 0.052$$

Equation 2 - Maximum allowable casing shut-in pressure

Using the MASICP and the kick intensity, we proceed to calculate the influx height. In order to achieve this, knowledge of the gas influx gradient is required.

$$Influx Height = \frac{\left[MASICP - (Kick Intensity \times TVD_{Casing Shoe} \times 0.052)\right]}{\left(EMW_{Current Mud Weight} \times 0.052\right) - EMW_{Gas Influx}}$$
Equation 3 - Hydrocarbon influx height

Next, the influx volume around the BHA, based on influx height is required. This is determined as follows:

 $Influx Volume_{BHA} = Influx Height \times Capacity_{Annular_{BHA-Hole}}$ 

Equation 4 - Influx volume around the BHA

Where the annular capacity between the BHA and open hole is shown by (units: bbl/ft):

$$Capacity_{Annular_{BHA-Hole}} = \frac{\left(Diameter_{BHA}^2 - Diameter_{Open Hole}^2\right)}{1029.4}$$

#### Equation 5 - Annular capacity - open hole and BHA

As the kick volume often exceeds the confines of the open hole and BHA annular space, we perform the same volumetric calculation and determine the influx volume at the shoe, based on the height.

 $Influx Volume_{Casing Shoe} = Influx Height \times Capacity_{Annular_{DP-Hole}}$ 

#### Equation 6 - Influx volume at the casing shoe

Where the annular capacity between the drill pipe and open hole is (units: bbl/ft):

$$Capacity_{Annular_{DP-Hole}} = \frac{(Diameter_{DP}^2 - Diameter_{Open Hole}^2)}{1029.4}$$

Equation 7 - Annular capacity - open hole and drill pipe

Based on the influx volume at the shoe, we then apply Boyle's Law (NASA - Glenn Research Center, 2015) to calculate the influx volume at the bottom.

$$Influx Volume_{Bottom} = \frac{(Influx Volume_{Casing Shoe} \times Leak off Pressure_{Casing Shoe})}{EMW_{Formation Pressure}}$$

Equation 8 - Influx volume at bottom

We now compare the two values for influx volume (the casing shoe and on-bottom). The smaller of the two is the kick tolerance. Calculations above adapted from (Jin & Li, 2016), (Lapeyrouse, 2002)

Consider the following example shown in Table 3, which neatly illustrates the effect slim wells have on kick tolerance. In this example, we will compare the difference in kick tolerance by changing a given well design from 8-1/2" open hole production section to 6-3/4". We will alter the BHA accordingly based on readily available OCTG sizes for drill pipe and collar<sup>12</sup>.

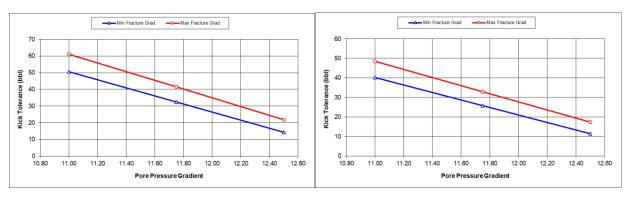
Kick Zone Parameters:	Conventional	Slim	
Openhole Size ?	8.5	6.75	inch
Measured Depth ?	3353	3353	m
Vertical Depth ?	3353	3353	m
Horizontal Length (>87 deg) ?	0	0	m
Tangent Angle Above Horizontal?	0	0	deg
Min Pore Pressure Gradient ?	1.318	1.318	sg
Max Pore Pressure Gradient ?	1.498	1.498	sg
Kick Zone Temperature ?	349	349	deg.F
Weak Point Parameters:			
Vertical Depth ?	1067	1067	m
Section Angle (<87 deg) ?	0	0	deg
Min Fracture Gradient / EMW ?	1.690	1.690	sg
Max Fracture Gradient / EMW ?	1.797	1.797	sg
Weak Point Temperature ?	190	190	deg.F

#### **Other Parameters:**

<sup>&</sup>lt;sup>12</sup> The NORSOK D-010 requirement for kick tolerances is 4m<sup>3</sup> (Standards Norway, 2013), which in practice means both of these well designs would be disqualified. This example is purely for illustration purposes.

Drill Collar OD ?	6.750	5.000	inch			
Drill Collar Length ?	182.9	182.9	m			
Drillpipe OD ?	5.5	3.5	inch			
Surface Pressure Safety Factor ?	100	100	psi			
Mud Weight in Hole ?	1.558	1.558	sg			
Annular Capacity Around BHA:	0.0850	0.0655	bbl/m			
Annular Capacity Around DP:	0.1338	0.1062	bbl/m			
At Min Fracture Gradient:						
Gas Gradient at Weak Point	0.1036	0.1036	sg			
For Min Pore Pressure:						
Max Allowable Gas Height:	600.9	600.9	m			
Kick Tolerance:	<mark>50.6</mark>	<mark>40.2</mark>	<mark>bbl</mark>			
For Max Pore Pressure:						
Max Allowable Gas Height:	186.4	186.4	m			
Kick Tolerance:	<mark>14.4</mark>	<mark>11.4</mark>	bbl			
At Max Fracture Gradient:						
Gas Gradient at Weak Point	0.1099	0.1099	sg			
For Min Pore Pressure:						
Max Allowable Gas Height:	683.0	683.0	m			
Kick Tolerance:	<mark>61.1</mark>	<mark>48.4</mark>	bbl			
For Max Pore Pressure:						
Max Allowable Gas Height:	266.7	266.7	m			
Kick Tolerance:	21.9	<mark>17.3</mark>	<mark>bbl</mark>			

#### Table 3 - Comparison of kick tolerances for slim vs. conventional well profiles



#### Figure 10 - Kick tolerance comparison for conventional vs. slim well

The results of this quick comparison are clear. Slimming down from 8-1/2" to 6-3/4" reduces the kick tolerance by 10-20%. Whilst this is one specific example, the overriding theory proves true for all other cases.

As regards well control design, the biggest difference between conventional and slim well control design is the effect of ECD's, drilling fluid rheology and reduced annular clearance. During slim well drilling, smaller diameters yield larger annular friction pressures. This in turn, increases the ECD while drilling. This means that kick detection becomes more difficult since the higher ECD's give the illusion of being overbalanced, while this may not be in the case hydrostatically. When circulation is broken, a kick can very quickly migrate in an uncontrolled manner up the wellbore. In this case, a drilling break may not be as effective an indicator as is the case for conventional drilling.

BHA becomes an important consideration during slim well design. The idea is to minimise the use of drill collars, which implies the use of PDC bits that require less WOB, potentially in tandem with a mud motor to provide extra rotary speed and replace some of the collars. The reason for this is that conventional application of drill collars in slim wells creates not only high annular friction pressures, but also increases the risk of swab and surge. Where too many collars are run, swabbing and surging kicks become likely, with or without circulation.

When designing the drilling fluid, the rheology should be tailored to the prevailing conditions, but formulated to achieve laminar flow. This is desirable since it will give lower ECD's due to lower annular friction pressure. If possible, the addition of a lubricating agent has been show in some studies to reduce annular friction pressures further still (Maurer Engineering Inc., 1993 - 1995).

It should be noted that the use of Managed Pressure Drilling would be a very effective method of controlling ECD's, particularly when used in conjunction with an ECD reduction tool (Bansal, et al., 2007).

#### 2.3.1.4 Recent Developments in Slender Well Design on the Norwegian Continental Shelf

One of the earliest studies to take place in Norway, which looked at slimming down floating explorations wells was conducted by (Stene, 1996). Saga Petroleum (now Equinor) in 1996, initiated a feasibility study, to assess the possibilities of scaling down floating exploration drilling operations, as had been achieved onshore. The project ultimately did not go ahead due to high fluctuations in rig rates, but over the next 20 years, the industry subsequently reached a point of having some slim exploration wells, but few if-any appraisal and production wells.

There has, to-date, been a large undertaking by industry to slim down exploration wells, however one study proves that there is certainly more to be done. AkerBP ASA in 2017, at the Drilling Engineers Association, Norway, presented the latest developments in slim well design for exploration wells on the NCS and outlined proposal for future work (AkerBP, 2017). The conventional design of exploration wells typically involved four casing strings (as depicted in Figure 11, below), ranging from 30" conductors to a 9-5/8" liner, with an 8-1/2" open hole barefoot completion. Whilst this design as proved robust and safe, it is time consuming and presents high operations risk (due to the number of wellbore sections).

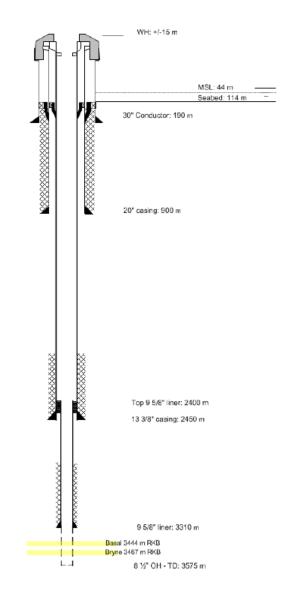


Figure 11 - Conventional Exploration Well Design on the NCS (AkerBP, 2017)

AkerBP's study outlined future well cost improvements, by analysing the Ivar Aasen Geopilot wells. This was the first significant step toward slim well drilling as it looked to skip the 9-5/8" production casing altogether and simply drill a 8-1/2" section out from the 13-3/8" casing and complete barefoot (shown in Figure 12). Of foremost concern to the proposed design was blowout analysis and wellbore stability.

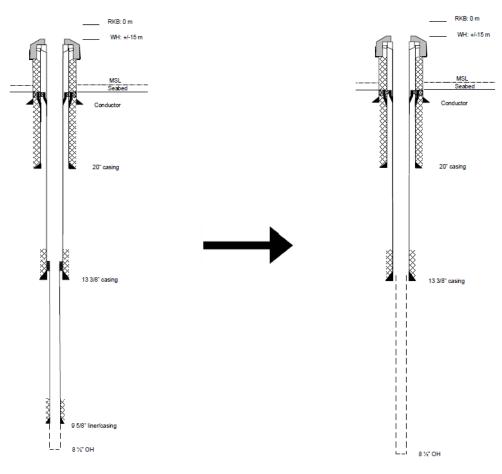


Figure 12 - Removal of 9-5/8" casing string (AkerBP, 2017)

The results of this trial yielded improvements in operational performance on the Ivar Aasen field.

- Two weeks open hole logging;
- Data acquisition within budget;
- Initially planned for three bores over two wells and ended up with five.

One noteworthy aspect of this new design is the top-hole experience. After installing the conductor section, pilot holes with +/- 6 bar hydrostatic head were drilled (abnormally high) and conductors set between 200 and 350 mTVDRT. This lead to rapid top-hole losses and seepage from seabed generating craters, spread all around the rig. As a means of improving on these issues, a gas dispersion study was conducted and it was concluded to set the conductor deeper in formations with improved integrity. The conductors were then run as 30" x 20" down to 450 mTVDRT, with a 16" contingency liner available in case of shallow gas (see Figure 13) (AkerBP, 2017).

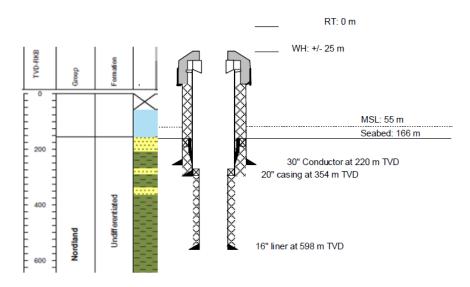


Figure 13 - Deep dual-conductor option with contingent liner (AkerBP, 2017)

The surface hole section was drilled with 13-3/8" casing, with a 9-5/8" string as a backup, in case of abnormal pore pressures or stability issues. Whilst this is a sensible design choice for proof of concept, problems are likely to arise due to lower than optimal annular velocities when flowing from open hole into the 13-3/8" casing. These low velocities (which will likely be sub-critical velocities for cuttings lift) will cause cuttings and downhole debris to accumulate at the 13-3/8" casing shoe. If left unswept, in the long term, this could lead to stuck pipe with negative knock-on effects. A more prudent solution may be to case the well with a smaller diameter string, however this may be uneconomic depending on the prevailing market for OCTG and wellheads (AkerBP, 2017). AkerBP took is currently looking to take this study further and take the wellbore design from two casing strings down to one. This will be discussed in the next sub-section.

#### 2.3.1.5 Future Opportunities for NCS Slim Well Design – One Casing String?

The future opportunities for slim well design, as proposed by AkerBP's aforementioned study, are a nice segue into the forthcoming section on well design with fewer casing strings. Field trials are currently underway to evaluation the potential of drilling exploration wells with one casing string. Whilst this may seem a bizarre idea to the seasoned Drilling Engineer, AkerBP have set out their vision for the project<sup>13</sup>, as presented in Figure 14, below.

<sup>&</sup>lt;sup>13</sup> At time of writing, the final well design was under review

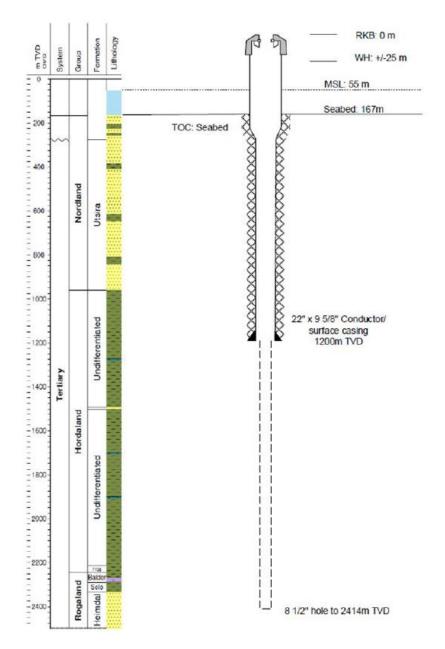


Figure 14 - Vision for single-string exploration drilling (AkerBP, 2017)

The design toys with the idea of drilling a 12-1/4" surface hole section, with an under-reamed 26-30" section for the conductor to sit within, although the study indicates that splitting the two sections could be an option. A backup 7" liner would be used in case of wellbore stability issues in the production hole section.

Continuing with our discussion on single casing string options, let us now shift focus to some of the recent developments in production well technology in Norway, which have the potential to further the ideas proposed by AkerBP. One such innovation is the Conductor Anchor Node, or CAN system. This is a pre-installed wellbore foundation, whose aim is to replace conventional conductors. The CAN may also serve as a single production well template for drilling of slender wells.

CAN installation typically requires a DP-compatible vessel, an AHC Crane >150 tonnes, a work ROV and surveying services (for the purposes of landing). A pilot hole of say 50mMDRT is typically drilled in the desired region to evaluate the prevailing soil strength. The soil strength is then input into models, which determine the required conductor length. Subsequently, the conductor is jetted into the formation by means of reverse suction of fluids and displacement of soil. The picture below shows a typical CAN and a cross sectional representation post-installation (Figure 15) (NeoDrill, 2016).

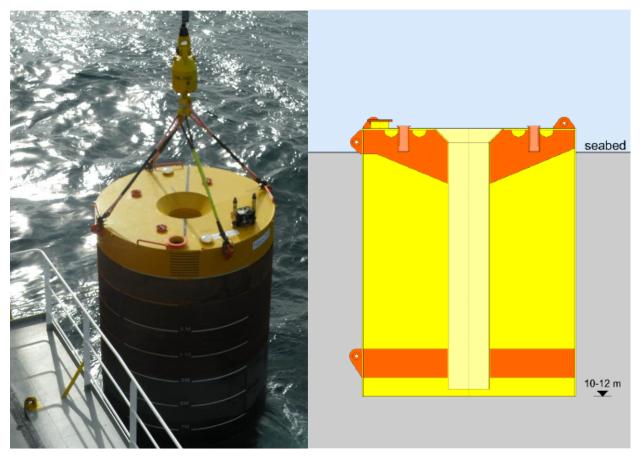


Figure 15 - Conductor Anchor Node installation (NeoDrill, 2016)

A Centrica case study was detailed in a 2017 SPE Drilling Operations article by (Kopperud, et al., 2017). The study detailed the pilot test of the CAN system on Centrica's Ivory Deepwater Exploration Well in the Norwegian Sea. Their overriding strategy was to do as much up-front work as possible before rig-arrival. This would ultimately save time and reduce the risk of delays due to weather, logistics etc. NeoDrill was contracted for provision and installation of the CAN. A 50mMDRT offset pilot hole was drilled and analysis of the drilling and soil samples concluded that the CAN would need only be 50m in length. A summary of the main conclusion of the run is presented below, and is taken from (Kopperud, et al., 2017):

• The lvory drilling operations demonstrated that combining the CAN with a short jetted conductor was a successful means of achieving an effective dual-derrick operation in the riserless well section.

- Significant time efficiency was achieved in this part of the well. With 4.6 rig days between well spudding inside the CAN and landing the BOP, 7.3 days were saved compared with the expected P50 time plan.
- Upfront preparation of detailed operational procedures, involving key operational personnel, is critical for executing an efficient riserless operation with a dual-derrick rig.
- Conductor Anchor Node Optimizes Efficiency of Riserless Deepwater Exploration Drilling

The study highlights the key benefits of using such a system and one can clearly see its broader applications. Installing the CAN on a template for production well drilling can not only reduce operation times, but can be used in tandem with AkerBP's aforementioned study (where soil conditions allow) to proceed directly to running 13-3/8" or 9-5/8" casing (depending on contingency casing options). This could even be done by drilling with casing, thereby saving an unnecessary trip. Although, in doing so, the economics and risk/rewards of such an operation need to be evaluated in the technical context of the prevailing conditions and wellbore costs.

The following section looks at recent developments in mono-diameter well construction and presents options for removing unnecessary casing strings.

# 2.3.2 Well Design with Fewer Casing Strings

This section will focus on expandable casing technology and some of the opportunities and challenges surrounding its application. Expandable casing presents an exciting opportunity for industry to cut wellbore costs and increase wellbore production, however, its limitations and cost means it is still a fringe idea, yet to make its mark on the mainstream market. However, given a favourable economic climate, this technology will have wide-reaching applications. (Shen, 2007) presented an excellent overview of the opportunities which exist with monodiameter wells.

When we think about well geometry, we are typically used to seeing casing sizes proceed largest to smallest. There are well established technical and HSE reasons for this and this sort of profile has been an industry mainstay since we first introduced the concept of wellbore casing and cementing. Monobore wells, on the other hand, are exactly as the name suggests. Production casing is cementing in place as per normal operating procedure, however this time, the casing diameter is "opened-up" by means of a running tool and the outcome is a mono-diameter well. Often times, this string can be used as a production conduit, else a tubing string may be run if desirable. The diagram below (Figure 16) depicts this concept and shows the differences between convention and monodiameter well profiles.

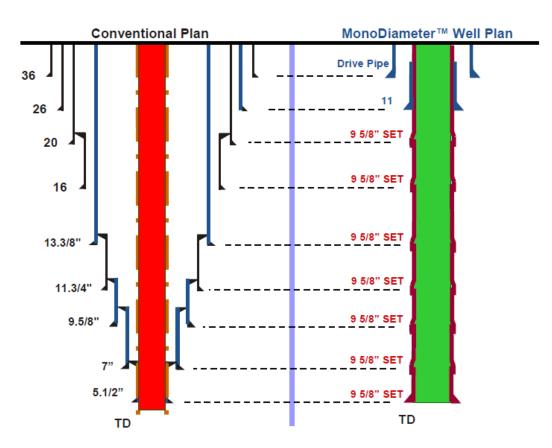


Figure 16 - Conventional vs monodiameter wellbore architecture (Smith, 2004)

The benefits and economic impacts of monodiameter wells were presented by (Campo, et al., 2003). The time and cost savings with monodiameter drilling and mostly due to the reduction in overall wellbore costs. We also see improved net present value since preservation of higher wellbore completions diameters can allow for higher and sustained production rates. Major benefits include, among others:

- Reduced materials costs due to smaller diameter (i.e. lower mud usage, decreased cuttings and fluids disposal costs) hence reduced environmental impact;
- Higher production rates for development of deeper reservoirs due to larger diameters;
- Broader options for increasing the number of wells from the given infrastructure.

Technically speaking, a monobore geometry is obtained in one of the following manners, as proposed by (Shen, 2007):

- 1. Drilling with one hole size right through to TD (improbable, highly risky and would almost certainly never be sanctioned);
- 2. Employ under-reamers and bi-centred drill bits, with use of a solid expandable tubular to open up the casing diameter, post-installation.

There are varying methods of expanding casing and they are presented in the diagram below (Figure 17).

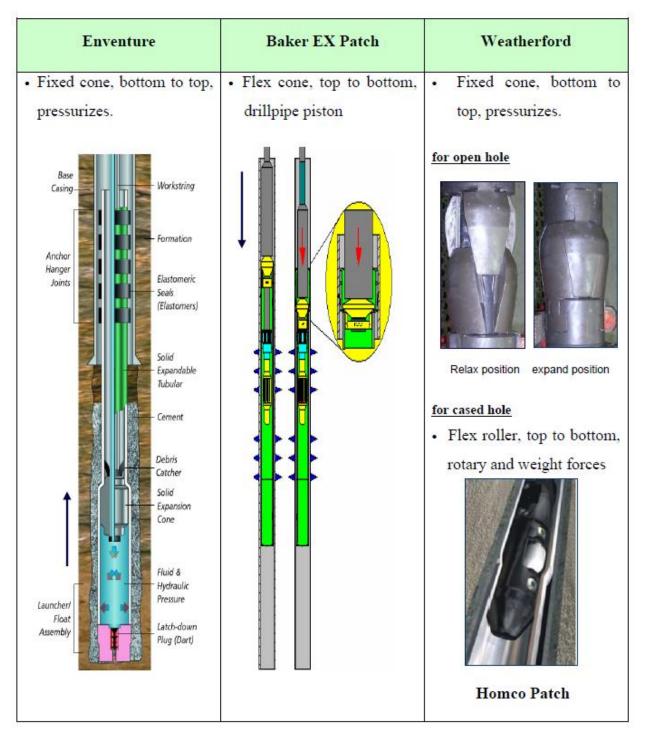


Figure 17 - Comparison of casing expansion methods (Shen, 2007)

Installing expandable tubulars, unfortunately, comes at a high risk, mainly due to their material properties. Of major concern is casing collapse strength deration, as one surmises from the foregoing figure. It is estimated that expansion of casing reduces the burst and collapse resistance some 50-60%. The point is to expand the casing beyond its elastic limit, such that it is now plastically deformed. The degree of expansion places the plastic strain either close to the

elastic region, or close to the point of fracture. The sides will bulge because the material is no longer strong enough to support the load without shape change, hence the lateral expansion. Due to imperfections in the steel, expansion of casing can exacerbate otherwise benign micro-fractures, which may render the steel useless in providing a load resistance (Shen, 2007). Therefore, when running this technology, it is important to consider the load scenarios very carefully and run workbench trials before running the casing in hole. One particular limiting factor, and one which is very hard to simulate, is the effect of temperature. The expansion of steel downhole, in combination with high temperature with de-rate an already de-rated casing string and could further accentuate any steel imperfections.

# Chapter 3: Technical Analysis

In this Chapter, we will build on the ideas and opportunities previously outlined to present a number of different options for well design on the Norwegian Continental Shelf. The primary purpose of this chapter is simply to show viability of the slender well design concept from a technical standpoint. Our analysis will focus on the three major regions of the shelf, namely; the Barents Sea, North Sea and Norwegian Sea. For each region, current exploration well design practises are presented, as well as new options for slender wellbore architecture. The section proceeds with technical commentary and risk assessment and finishes with an economic comparison of each initiative to outline the potential cost savings. Chapter 4 will discuss some of the qualitative, regulatory and market challenges surrounding these proposals and offer suggestions for the industry on slender wellbore architecture.

Note:

- All technical analysis henceforth is presented in Mixed API units;
- Decimal points are represented by ".", rather than ",", as is commonplace in Norway;
- Analysis has been undertaken using Pro Well Plan and Halliburton Landmark software suites.

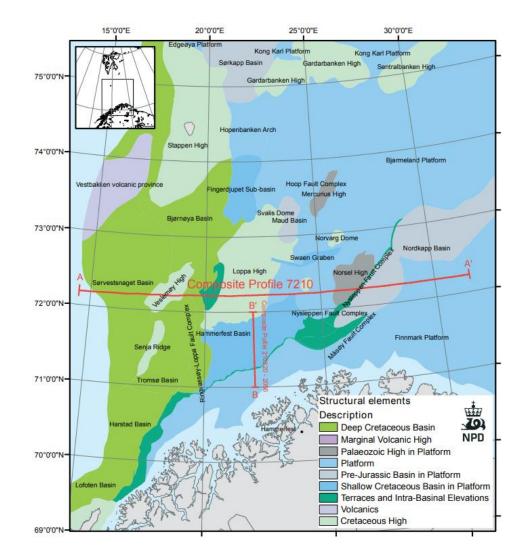
# 3.1 Regional Overview

This section will present the results of a number of studies conducted to demonstrate the potential and opportunities that abound in slender well design for Norway. Due to the lack of available wellbore pressure data, three different pore/fracture pressure profiles (one for each region) have been developed based on publically available data<sup>14</sup>. Reasonable assumptions have been made in consultation with both industry and academia to ensure the curves are somewhat representative of what one might expect from each region.

# 3.1.1 Barents Sea

The Barents Sea is located in an intracratonic setting between the Norwegian mainland and Svalbard (NPD, 2017). The Norwegian Petroleum Directorate estimates that the region holds almost half of nation's undiscovered 18 billion bbl of hydrocarbons (ThermoFisher Scientific, 2016). Figure 18 below shows a geological overview of the Barents Sea region.

<sup>&</sup>lt;sup>14</sup> Some wellbore data is publically available from the Norwegian Petroleum Directorate



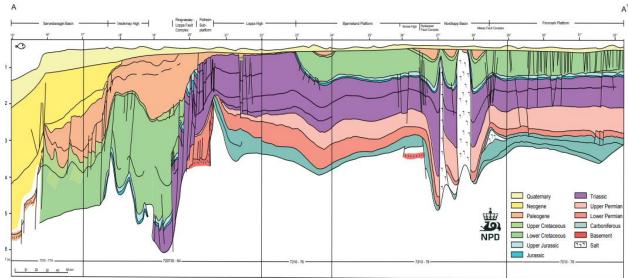


Figure 18 - Geological overview of the Barents Sea (NPD, 2017)

The Barents Sea covers an area some seven times the size of the North Sea. The shelf itself is quite deep, with water depths ranging from 200 to 500m. The maximum depth in the Norwegian trench is 513 m. Seabed temperatures range from -2 to 3 degC, with wellbore temperatures typically as appears in Figure 19, below<sup>15</sup>. Due to the warm ocean currents, the Barents Sea has a much milder climate than its latitude would otherwise suggest. However, with the winters, brings near total inaccessibility to a good portion of the northern region (Khatmulin, 2014).

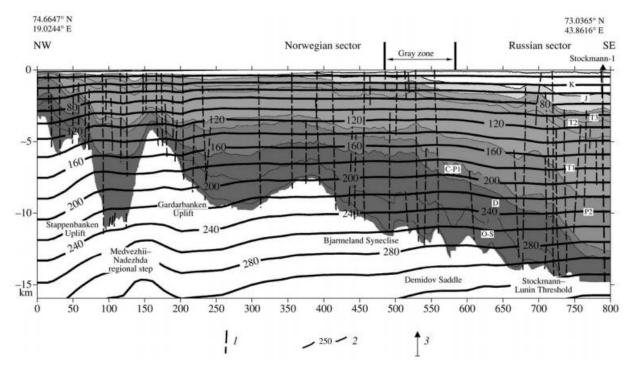


Figure 19 - Barents Sea downhole temperature profile (Khutorski, et al., 2008)

The Barents Sea well was selected from a region of high activity, the location for which is shown below in Figure 20.

<sup>&</sup>lt;sup>15</sup> The solid black lines indicate downhole temperatures in degC.

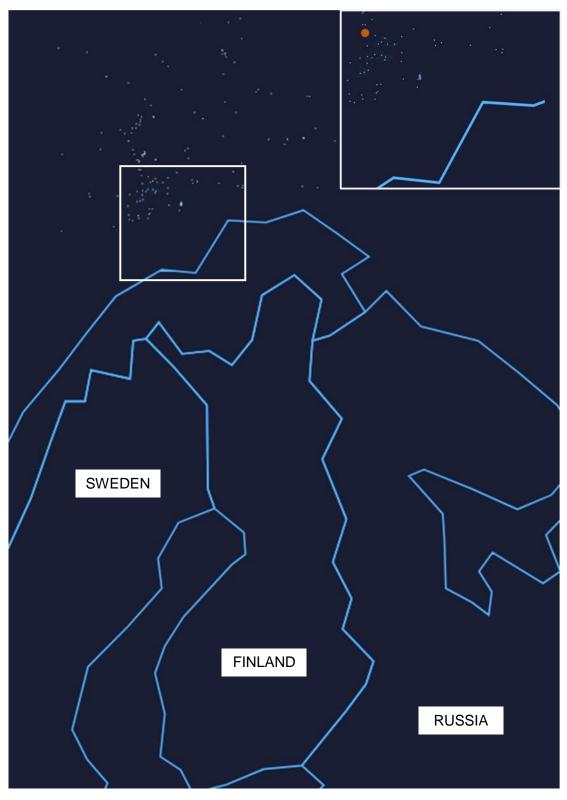
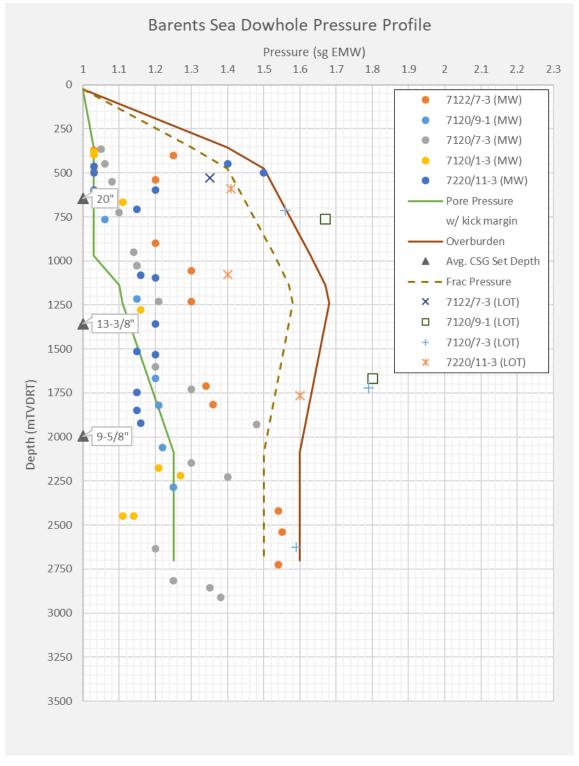


Figure 20 - Barents Sea study wellbore location

The pore/fracture pressure profile for the Barents Sea region is presented below in Figure 21. Figure 22 depicts some publically available pore pressure data from the Diskos Database



(Directorate, 2018), which in addition to the NPD online database, helped formulate the downhole pressure profiles.

Figure 21 - Barents Sea Sample Pressure Profile, normalised to MSL

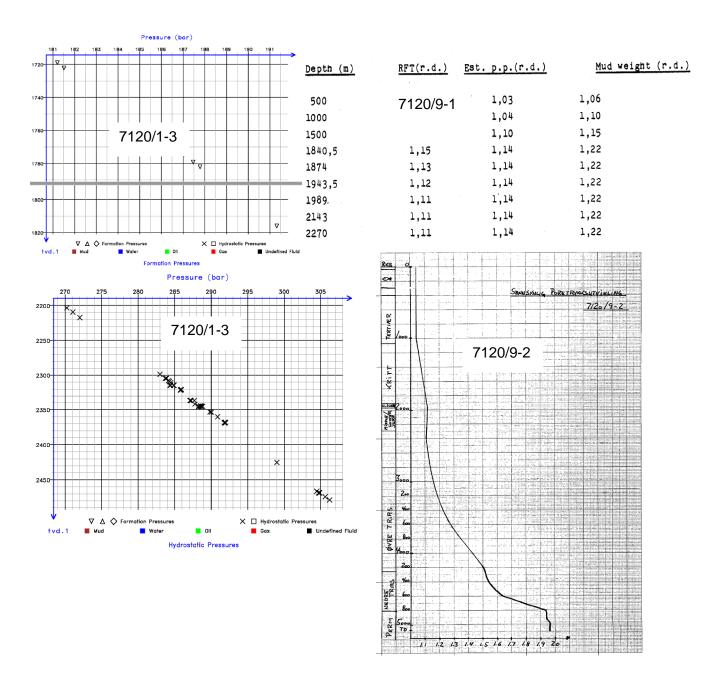


Figure 22 - Pore pressure data for selected Barents Sea wells (Directorate, 2018)

#### 3.1.2 Norwegian Sea

A structural map of the Norwegian Sea is shown below in Figure 23. The Norwegian sea lies between the North Sea and the Barents Sea. The wide variance of water depths and rough sea conditions pose significant challenges for drilling operations (Genova, 2005). Whereas drilling a depths past 500m has been conducted regularly, only few gas fields have been commercially exploited. The deepest project is the Ormen Lange development, with a water depth of 800-1100m. Seabed temperatures range from 0 to -2 degC, which causes problems with hydrate formations. Downhole temperatures can reach up to 170 degC with formation pressures of up to 900 bar, as was noted on the Kristin development (Norsk Petroleum, 2016).

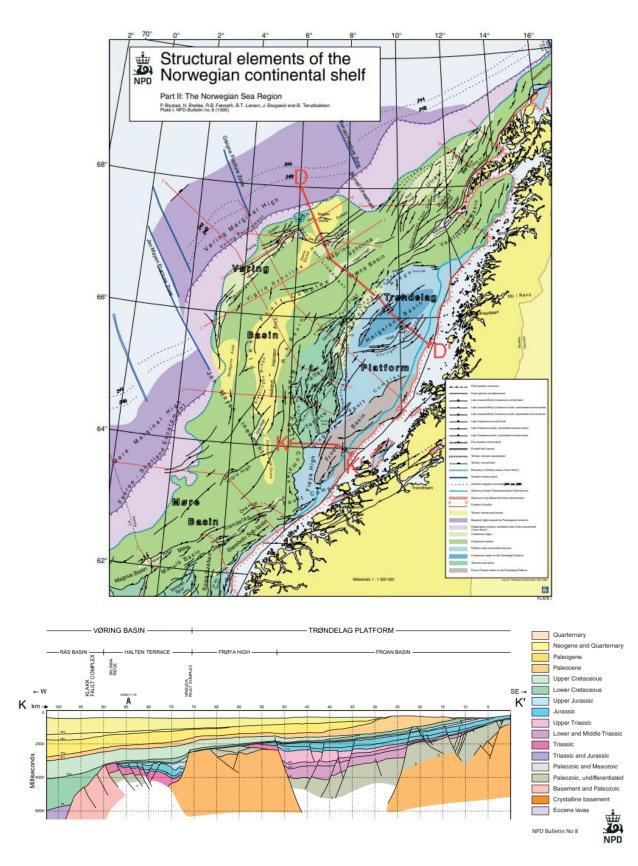
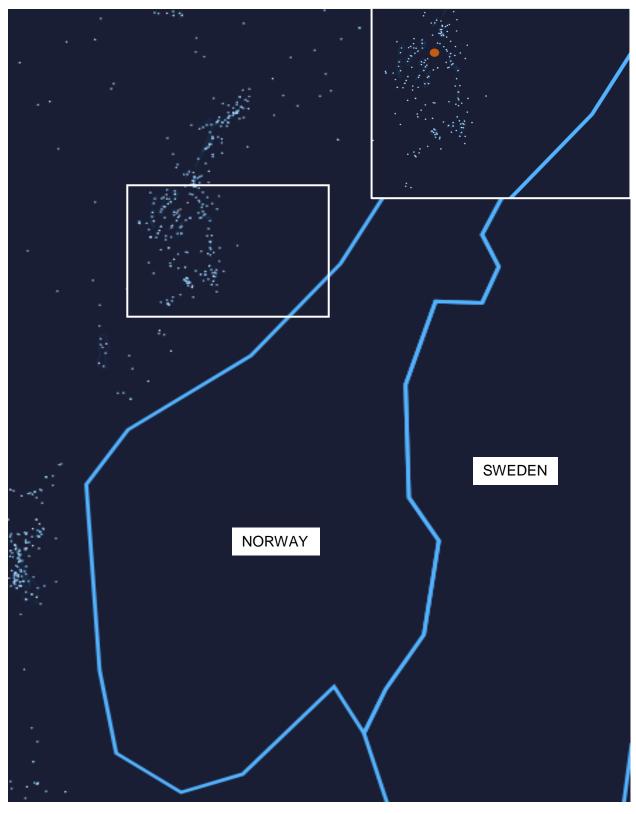


Figure 23 - Geological overview of the Norwegian Sea (NPD, 2017)



The location of the Norwegian Sea study well is shown below in Figure 24.

Figure 24 - Norwegian Sea study well location

The pore/fracture pressure profile for the Norwegian Sea region is presented below in Figure 25. Figure 26 presents some publically available pore pressure data from the Diskos Database (Directorate, 2018), which in addition to the NPD online database, helped formulate the downhole pressure profiles.

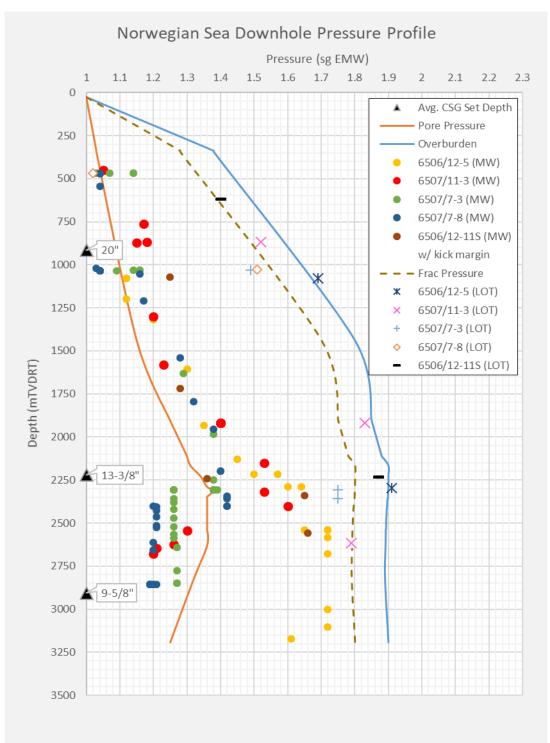


Figure 25 - Norwegian Sea Sample Pressure Profile, normalised to MSL

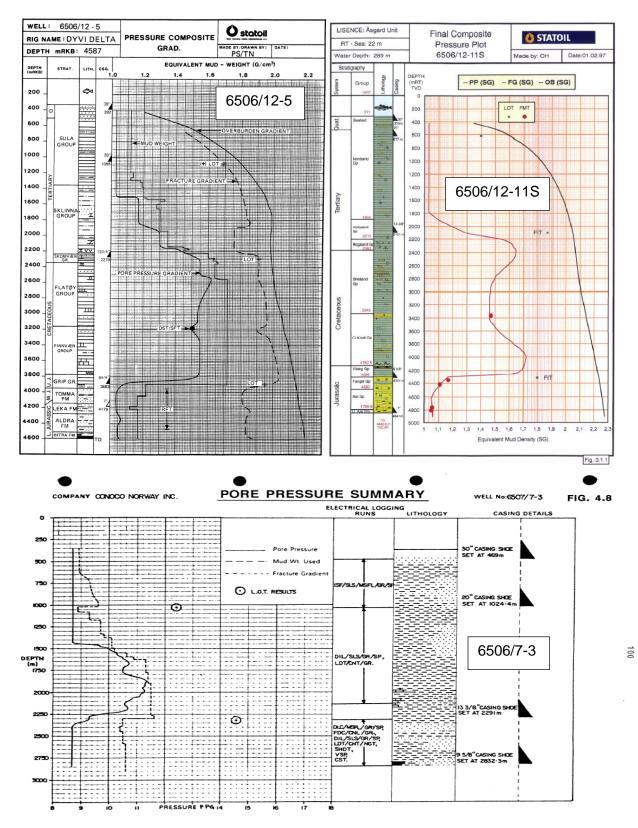


Figure 26 - Pore pressure data for selected Norwegian Sea wells (Directorate, 2018)

# 3.1.3 North Sea

The North Sea is the most heavily explored oil and gas producing region in Norway. The region is also very important for the UK. The basic structural framework of the North Sea is the result of Upper Jurassic/Lower Cretaceous rifting. The majority of the region has a water depth of between 100 and 200m, whereas some wells have been drilled in increasingly deeper water. The region is slightly overpressured, with few regions that would be classified as HPHT. This is because of the volume of production throughout the region over the past 50 years. Wells are typically 100-200 degC in temperature at total depth (NPD, 2017). A depiction of the region is shown below in Figure 27.

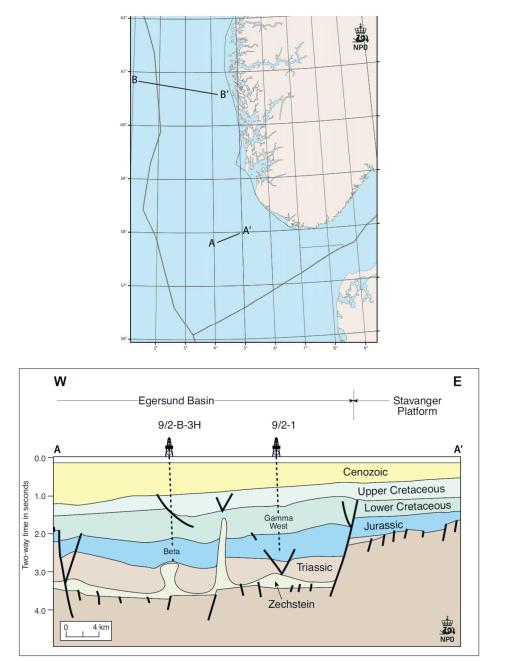
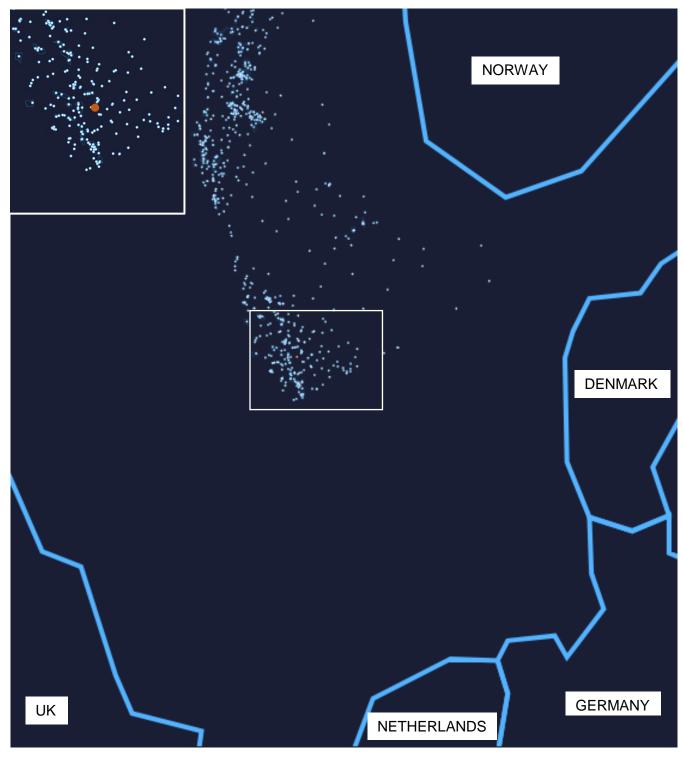


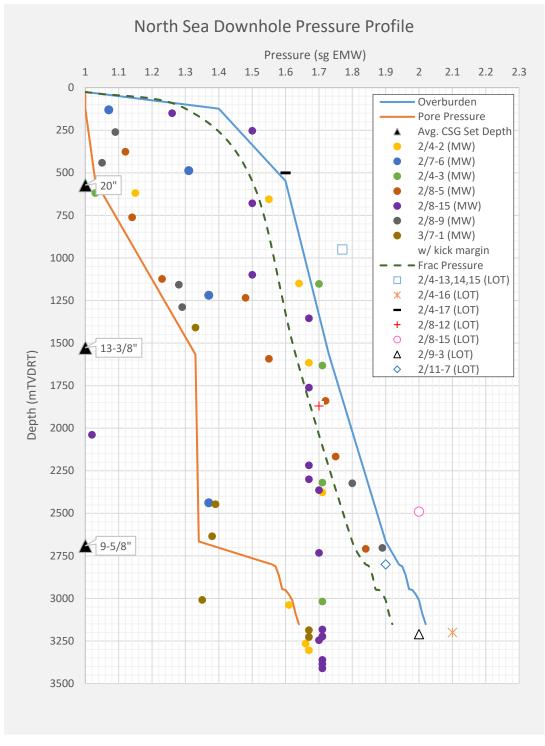
Figure 27 - North Sea geological overview (NPD, 2017)



The location of the North Sea study well is shown below, in Figure 28.

Figure 28 - North Sea study well location

The pore/fracture pressure profile for the North Sea study well is presented below in Figure 29. Figure 30 presents some publically available pore pressure data from the Diskos Database



(Directorate, 2018), which in addition to the NPD online database, helped formulate the downhole pressure profiles.

Figure 29 - North Sea study well pressure profile, normalised to MSL

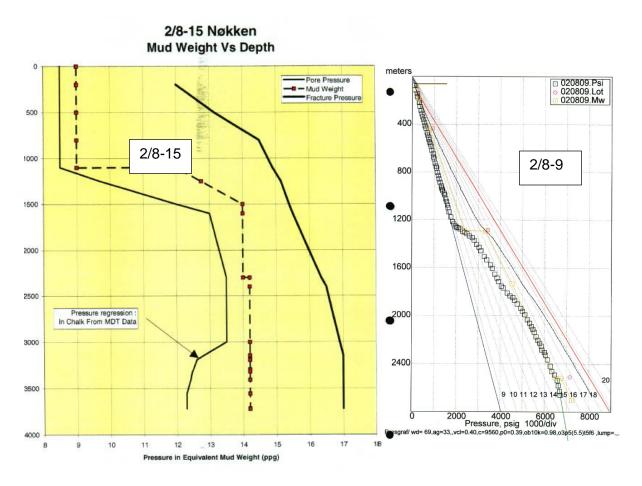


Figure 30 - Pore pressure data for selected North Sea wells (Directorate, 2018)

# 3.2 Casing Evaluation Criteria

In order to compare our two casing designs for each region, we will use the von Mises stressderived Triaxial Design Limits plot. Bellarby, 2009, outlined the principles of triaxial casing design. He noted the importance of analysing wellbore tubular designs with reference to both pressure and axial effects. The combination of pressure and axial effects will serve to strengthen or else de-rate casing burst and collapse ratings, depending on the situation. For example: where casing is held in tension, the burst rating will increase by some given amount. Conversely, in the same scenario, the collapse rating will decrease by some amount. From a mathematical standpoint, we express this phenomenon in terms of three (axial, radial and tangential (or hoop)) stresses. (Bellarby, 2009). The most widely used yield criterion in the Petroleum industry is what has come to be known as the von Mises stress (Byrom, 2013). The von Mises stress can be expressed as follows:

$$\sigma_{VME} = \frac{1}{\sqrt{2}} \sqrt{\left[(\sigma_a - \sigma_t)^2 + (\sigma_t - \sigma_r)^2 + (\sigma_r - \sigma_a)^2\right]}$$

#### Equation 9 - von Mises equivalent stress (VME)

Where:  $\sigma_a$  is the axial stress (a combination of tensile, bending and ballooning effects),  $\sigma_t$  is the tangential stress and  $\sigma_r$  is the radial stress.

Since both radial and tangential stresses are a function of differential pressure, this means that triaxial stresses may be plotted on a two-dimensional plane (Bellarby, 2009). The most commonly used visualisation of the von Mises stress is the Design Limits plot. The plot presents as an ellipse, whose boundaries represent the maximum allowable combined pressure and axial stresses (multiplied by the relevant local design factors – outlined below). For each load case, the combined axial/pressure line is plotted onto the ellipse. A casing string is considered "safe", where all load lines fall within the design limits. Bellarby presents a typical design limits plot with the NORSOK design factors, as below in Figure 31.

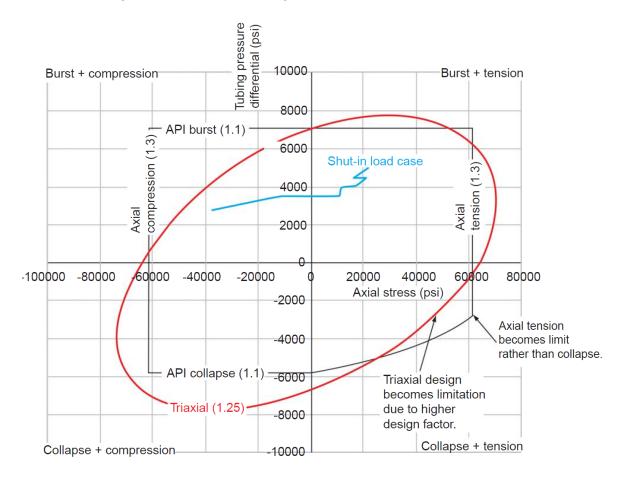


Figure 31 - Typical VME design limits plot with NORSOK design factors (Bellarby, 2009)

# 3.3 Current Design Practises by Region

For each region, two well designs are provided; one being a conventional design and the other being a slender well design. For the conventional design, an unnamed Norwegian operating company has provided a list of standard tubulars and connections used for wellbore casing and completion, as per its contracts in-place. It will be assumed that this operator is drilling the conventional wells and that their wellbore completions would proceed with those casing strings shown in Table 6 and Table 7 below. Subsequently, the slender well design selects from common API grade casings and makes reasonable assumptions to show that these well designs are indeed possible.

Note: all design reports for each region are displayed at length in Appendix 5.2.

# General Assumptions

For all well designs herein, we assume that the aforementioned unnamed company performs all operations. In addition, the general assumptions for the following well designs are:

- Vertical exploration wells are considered. Production wells excluded;
- All designs are calculated using NORSOK D-010 design factors, as depicted below in Table 4;

Parameter	Design factor*	Supplementary requirement/information
Burst	1,10	
Collapse	1,10	
Axial	1,25	For well testing a design factor of 1,50 should be used to cater for pulling the packer free at the end of the test.
Tri-axial	1,25	Tri-axial design factors are not relevant for connections

\*The above design factors are based on wall thickness manufacturing tolerance of minus 12,5%.

#### Table 4 - NORSOK D-010 wellbore design factors (Standards Norway, 2013)

• When designing for burst, collapse and axial loading, the following load cases have been considered, as directed by NORSOK D-010:

Item	Description	Comments
1.	Gas kick	Size/volume and intensity to be defined
2.	Gas filled casing	Applicable to last casing above the reservoir and subsequent casings
3.	Production and/or Injection tubing leaks	Based on WDP. See 7.7.2 for multipurpose wells
4.	Cementing of casing	
5.	Leak testing casing	See 7.7.2 for multipurpose wells
6.	Thermal expansion of fluid in enclosed annuli	Collapse and burst
7.	Dynamic loads from running of casing, including over pull to free stuck casing	
8.	Permanent abandonment	See section 9.3.2

Table 5 - Load cases as required by NORSOK D-010 (Standards Norway, 2013)

- No calculations which require inputs from rig specifications have been performed, since doing so would remove the objectivity of the study;
- The study has only considered vertical exploration/appraisal wells, due to lack of available data to draw reasonable analogues for production wells;
- Fully-packed BHA's are assumed for drilling of each hole section;
- No shallow gas is assumed present to be present;
- The reservoir gas gradient is assumed to be 0.1 psi/ft;
- The reservoir oil gradient is assumed to be 0.276 psi/ft;
- All cement columns (except the conductor strings) have a 150m tail cement;

- Friction factors are 0.3 for all cases;
- Casings de-rated for temperature effects;
- Casing set depths based on allowable kick tolerances (as per NORSOK D-010) and competent formations;
- 50klbs overpull allowance for all strings;
- Casing running speed is assumed to be 1 ft/s for all operations;
- A 25m air gap is assumed for all wells;
- The available casing and connections are as per below for conventional well designs, but unrestricted for slender well designs. This is because the slender wells are assumed to be drilled in a campaign, where equipment is batch ordered and thereby tailored to suit the design criteria.

OD (in)	Weight (lb/ft)	Grade	ID (in)	Drift (in)	Burst (psi)	Collapse (psi)	Axial (lbf)
7	26.00	L-80	6.276	6.151	7,240	5,411	603,929
7	29.00	L-80	6.184	6.059	8,160	7,026	675,954
7	29.00	P-110	6.184	6.059	11,220	8,532	929,437
7	32.00	P-110	6.094	6.000	12,458	10,781	1,024,904
9 5/8	53.50	P-110	8.535	8.500	10,900	7,950	1,710,113
9 7/8	66.40	P-110	8.625	8.469	12,184	10,283	1,997,857
9 7/8	66.40	Q-125	8.625	8.469	13,845	11,135	2,270,292
10 3/4	60.70	P-110	9.66	9.504	9,759	5,877	1,921,994
13 3/8	72.00	P-110	12.347	12.250	7,398	2,882	2,284,443
13 5/8	88.20	P-110	12.375	12.250	8,830	4,574	2,807,798
13 5/8	88.20	Q-125	12.375	12.250	10,034	4,802	3,190,680
14	114.00	P-110	12.4	12.244	11,000	8,132	3,649,274
14	114.00	Q-125	12.4	12.244	12,500	8,646	4,146,902
20	133.00	N-80	18.73	18.543	4,445	1,603	3,090,517

Table 6 - List of standard tubulars as provided by unnamed Norwegian Operator

Name	OD (in)	Weight (lb/ft)	Grade	Conn_O D (in)	Conn_l D (in)	Int yield (psi)	Tensile (lbf)	Compressio n (lbf)
TSH ER	20	133.0	N-80	21.000	18.754	4,450	3,091,000	3,091,000
Vam TOP KB	14	114.0	Q-125	15.282	12.667	12,500	4,147,000	4,147,000
Vam TOP KB	14	114.0	P-110	15.282	12.667	11,000	3,649,000	2,189,000
Vam TOP	13 5/8	88.2	Q-125	14.681	12.443	10,030	3,191,000	1,915,000
Vam TOP	13 5/8	88.2	P-110	14.681	12.443	8,830	2,808,000	1,685,000

Vam 21	13 3/8	72.0	P-110	14.286	12.557	7,400	2,284,000	2,284,000
Vam 21	10 3/4	60.7	P-110	11.711	9.858	9,760	1,922,000	1,922,000
Vam TOP	9 7/8	66.4	P-110	10.949	8.789	12,670	2,072,000	1,243,000
Vam TOP	9 7/8	66.4	Q-125	10.949	10.789	14,400	2,355,000	1,413,000
Vam 21	9 5/8	53.5	P-110	10.542	8.772	10,900	1,710,000	1,710,000
Vam TOP HC	7	32.0	P-110	7.717	6.059	12,460	1,025,000	1,025,000
Vam TOP HC	7	29.0	L-80	7.644	6.118	8,160	676,000	676,000
Vam TOP HC	7	29.0	P-110	7.644	6.118	11,220	929,000	929,000
Vam TOP HC	7	26.0	L-80	7.565	6.281	7,240	604,000	604,000

Table 7 - List of standard connections as provided by unnamed Norwegian Operator

# 3.3.1 Barents Sea Conventional Well Design

Using the data in the foregoing sections, one is able to construct a wellbore profile and design this in accordance with the available casing and connection inventory specified above. The wellbore schematic (Figure 32) shows the final well design.

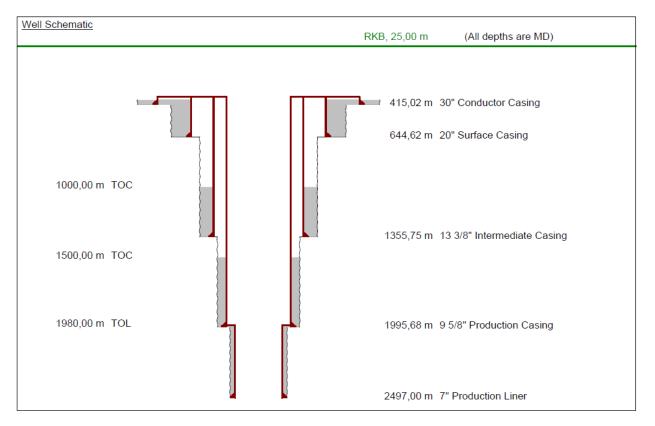


Figure 32 - Barents Sea wellbore schematic (conventional architecture)

# 3.3.1.1 Basis of Design and Results

Casing Summary					
Conductor Casing 30" 157.5 lb/ft X-42 BTC (Range III)					
Surface Casing	20" 113 lb/ft N-80 TSH-ER (Range III)				
Intermediate Casing 1	13-3/8" 72 lb/ft P-110 VAM21 (Range III)				
Intermediate Casing 2	9-5/8" 53.5 lb/ft P-110 VAM21 (Range III)				
Production Liner	7" 29 lb/ft L-80 VAMTOPHC (Range III)				

Table 8 - Barents Sea Conventional Well: Casing Summary

The load cases used to design the conventional well are as follows:

# 30" Conductor

Collapse, burst and axial forces were not considered as part of this analysis, since they are typically not an issue for this casing string.

# 20" Surface Casing

The collapse criteria assumed collapse during cementing, which assumed wet cement in the annulus and seawater as the displacement fluid. Cement is brought up to surface. Additionally, a fluid drop due to thief zone was assumed as the second worst-case collapse scenario. The inside fluid level drops until the bottom hole pressure is equal to that of a sea water gradient.

The burst criteria assumed the maximum possible internal being equal to the next hole section. An oil gradient has been assumed, since a gas kick is very unlikely. The external profile assumes cement mix water. Two pressure testing scenarios are also presented – a grey test<sup>16</sup> and green test<sup>17</sup>. Both tests are considered since in practice, we often need to conduct green tests where grey tests are not possible. The test pressure is 1650 psi, which is based on the maximum oil to surface pressure.

The axial design criteria assumes the weight of casing and mud as the primary factor. Since this is a vertical well, there are no bending forces incorporated. Pressure testing axial loading has been considered.

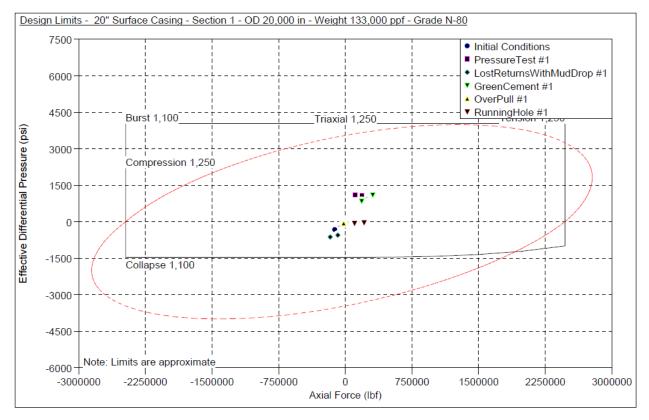


Figure 33 – Design limits plot for 20" surface casing

# 13-3/8" Intermediate Casing

A fluid drop due to thief zone was assumed as the second worst-case collapse scenario. The inside fluid level drops until the bottom hole pressure is equal to that of a sea water gradient.

The burst design is based once again on an oil-filled casing scenario, with figures adjusted for wear and tear of the pipe. The external pressure assumes the cement mix water, with mud above. The test pressure is 2550 psi, which is based on the maximum oil to surface pressure.

Axial design criteria as per previous string.

<sup>&</sup>lt;sup>16</sup> A grey test refers to a casing pressure test where cement has cured

<sup>&</sup>lt;sup>17</sup> A green test refers to a casing pressure test which is conducted immediately after the top cement plug (or wiper plug) has landed on the bottom plug (aka. Plug bump)

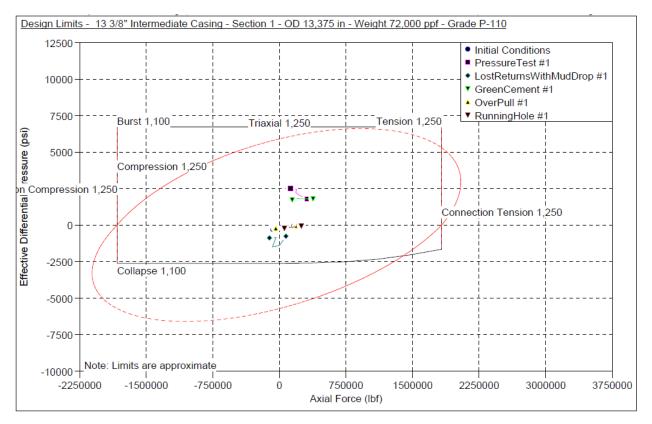


Figure 34 - Design limits plot for 13-3/8" intermediate casing

# 9-5/8" Intermediate Casing

The collapse loading involves a thief zone as per previous string. The outer profile assumes cement mix water, with mud above. In addition, full evacuation to gas has been assumed as worst-case collapse loading with the same external profile as the thief zone. Calculations are adjusted for slight corrosion (10% reduction in burst/collapse/tensile performance), since this is a post-drill load.

The worst-case burst loading is a shallow tubing leak, which assumes a leak in the production tubing, below the tubing hanger. There is assumed to be kill weight brine in the casing with wellhead gas production pressure above. Calculations incorporate casing wear. The test pressure is 4400 psi, which is based on the maximum gas to surface pressure. All production burst loads assume deteriorated mud in the external profile (8.6 ppg).

The axial design criteria are assumed to be similar to the previous string.

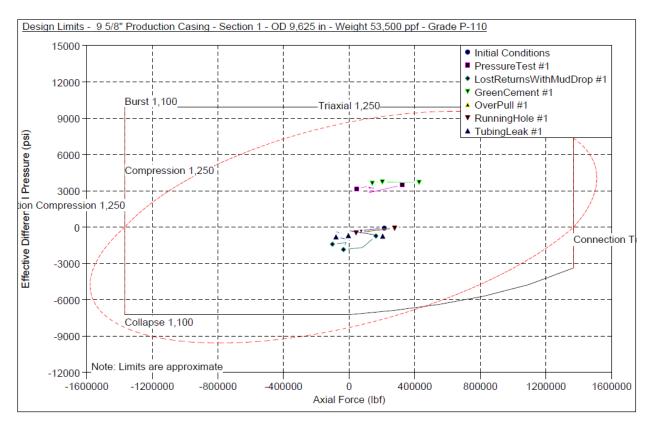


Figure 35 - Design limits plot for 9-5/8" intermediate casing

#### 7" Production Liner

The collapse scenario for the production liner involves formation pressure acting on plugged perforations during normal production. The inner liner is assumed to be filled with produced gas and the external profile is assumed to be formation pressure. Loads adjusted for corrosion (10% reduction in burst/collapse/tensile performance).

The burst criteria is based on bullheading operations. The internal pressure profile is equal to the kill weight mud and the external profile is assumed to be cement mix water. The test pressure is 6600 psi (at liner hanger), which is based on the maximum gas to surface pressure. All production burst loads assume deteriorated mud in the external profile (8.6 ppg).

Note: Shallow tubing leak has been factored in, to the calculations, to allow for flexibility in placing the tubing packer either in the liner, or in the previous casing string.

The axial design is based on casing installation and cementing.

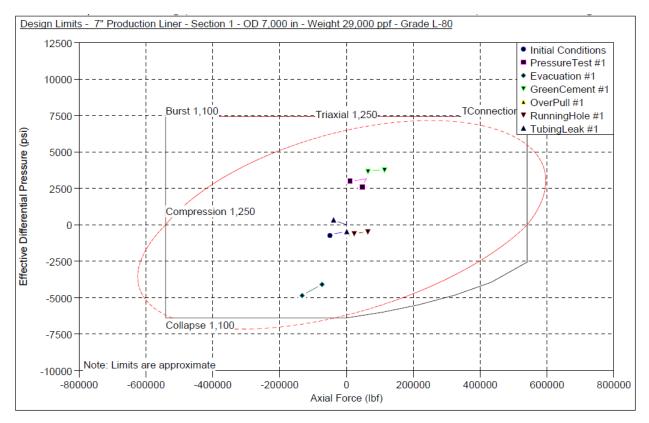


Figure 36 - Design limits plot for 7" production liner

# 3.3.1.2 Analysis and Discussion

One of the most eye-catching facets of the results is the abundance of "white space" between the load curves and the limit curves. When one considers that this is a realistic well design for a representative pressure profile, we see that the well is in fact overdesigned.

An interesting point to make is the overuse of premium connections<sup>18</sup>. Premium connections allow metal-to-metal sealing and highly improved tensile and collapse ratings<sup>19</sup>. Premium connections are designed for special applications, where the axial or torsional loading usually exceeds that which typical API threads will accommodate, or otherwise where downhole conditions dictate their use (Byrom, 2007). Whilst this is a hypothetical wellbore example, it is worth highlighting the lack of API threaded casing available for design. This argument may be invalid for a highly deviated well, but when looking at a vertical exploration well, the use of standard API threaded casing may be all that is required for shallow strings based on the remote risk of gas migration through three casing strings.

The well is drilled with commonplace large hole sizes to accommodate the respective casing strings. Whilst this reduces the risk of downhole problems when running casing (e.g. becoming stuck), it does introduce the adverse effect of cuttings build-up at the casing shoe. As fluid flows from one hole diameter to a larger, annular velocities will decrease. This is typically not a problem with 8-1/2" open hole into 9-5/8" casing, but can be a problem from 12-1/4" open hole into 17-1/2" casing. The sudden decrease in annular velocity may cause cuttings to fall out of suspension.

<sup>&</sup>lt;sup>18</sup> Otherwise known as proprietary thread casing connections

<sup>&</sup>lt;sup>19</sup> Some of the higher end premium connections offer equal tension and collapse performance.

Raising the flow rate may help to abate this issue, but one must be mindful of ECD's and ensure the minimum horizontal stresses is not exceeded. This well design is typical of exploration wells in the Barents Sea, since the casing selection is seldom dictated by the downhole pressure profile.

# 3.3.2 Norwegian Sea Conventional Well Design

# 3.3.2.1 Basis of Design and Results

One of the major challenges associated with Norwegian Sea drilling is the variation in water depth. The selected location of the well has taken the waters depths of a 20km radius into account and used the weighted average to establish a baseline. From here, the well design is based on regional practices with reasonable assumptions made throughout. The general well schematic is shown below in Figure 37.

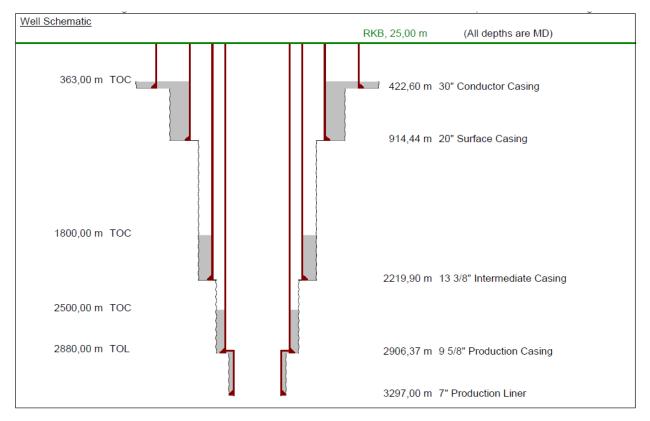


Figure 37 – Norwegian Sea study well general schematic

Casing Summary					
Conductor Casing 30" 157.5 lb/ft X-42 BTC (Range III)					
Surface Casing	20" 113 lb/ft N-80 TSH-ER (Range III)				
Intermediate Casing 1	13-3/8" 72 lb/ft P-110 VAM21 (Range III)				
Intermediate Casing 2	9-5/8" 53.5 lb/ft P-110 VAM21 (Range III)				
Production Liner	7" 32 lb/ft P-110 VAMTOPHC (Range III)				

Table 9 - Norwegian Sea Conventional Well: Casing Summary

30" Conductor

Collapse, burst and axial forces were not considered as part of this analysis, since they are typically not an issue for this casing string.

#### 20" Surface Casing

The collapse criteria assumed collapse during cementing, which assumed wet cement in the annulus and seawater as the displacement fluid. Cement is brought up to surface. Additionally, a fluid drop due to thief zone was assumed as the second worst-case collapse scenario. The inside fluid level drops until the bottom hole pressure is equal to that of a sea water gradient.

The burst criteria assumed the maximum possible internal being equal to the next hole section. An oil gradient has been assumed, since a gas kick is very unlikely. The external profile assumes cement mix water. Two pressure testing scenarios are also presented – a grey test and green test. Both tests are considered since in practice, we often need to conduct green tests where grey tests are not possible. The test pressure is 2250 psi, which was calculated based on the maximum oil to surface pressure.

The axial design criteria assumes the weight of casing and mud as the primary factor. Since this is a vertical well, there are no bending forces incorporated. Pressure testing axial loading has been considered.

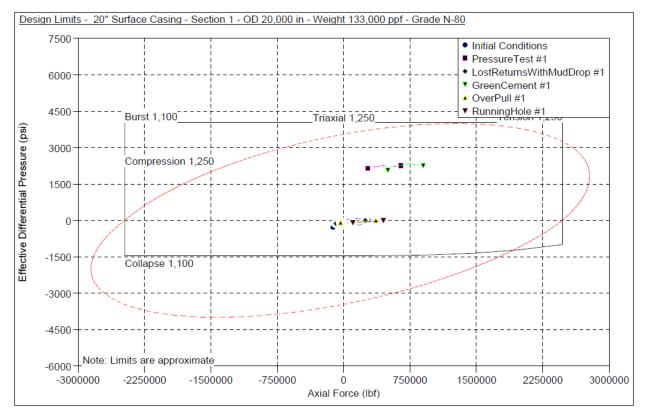


Figure 38 - Design limits plot for 20" surface casing

#### 13-3/8" Intermediate Casing

A fluid drop due to thief zone was assumed as the second worst-case collapse scenario. The inside fluid level drops until the bottom hole pressure is equal to that of a sea water gradient.

The burst design is based once again on an oil-filled casing scenario, with figures adjusted for wear and tear of the pipe. The external pressure assumes the cement mix water, with mud above. The test pressure is 4650 psi, which is based on the maximum pressure.

Axial design criteria as per previous string.

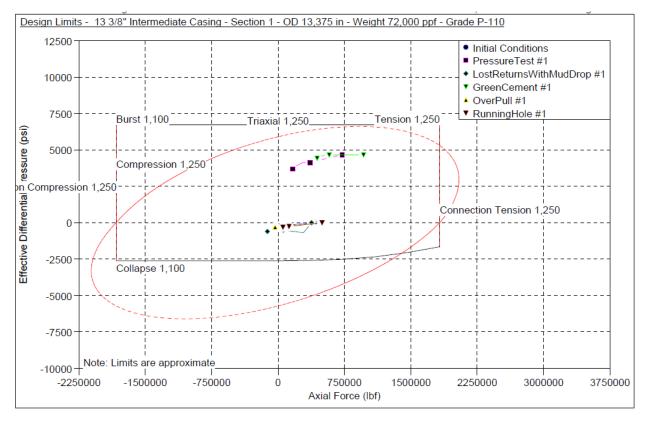
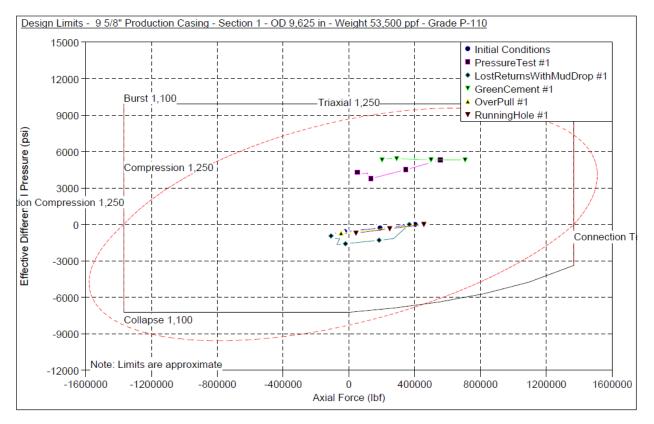


Figure 39 - Design limits plot for 13-3/8" intermediate casing

# 9-5/8" Intermediate Casing

The collapse loading involves a thief zone as per previous string. The outer profile assumes cement mix water, with mud above. In addition, full evacuation to gas has been assumed as worst-case collapse loading with the same external profile as the thief zone. Calculations are adjusted for slight corrosion (10% reduction in burst/collapse/tensile performance), since this is a post-drill load.

The worst-case burst loading is a shallow tubing leak, which assumes a leak in the production tubing, below the tubing hanger. There is assumed to be kill weight brine in the casing with wellhead gas production pressure above. Calculations incorporate casing wear. The test pressure is 5300 psi, which is based on the maximum gas to surface pressure. All production burst loads assume deteriorated mud in the external profile (8.6 ppg).



The axial design criteria are assumed to be similar to the previous string.

Figure 40 - Design limits plot for 9-5/8" intermediate casing

# 7" Production Liner

The collapse scenario for the production liner involves formation pressure acting on plugged perforations during normal production. The inner liner is assumed to be filled with produced gas and the external profile is assumed to be formation pressure. Loads adjusted for corrosion.

The burst criteria is based on bullheading operations. The internal pressure profile is equal to the kill weight mud and the external profile is assumed to be cement mix water. The test pressure is 9400 psi (at liner hanger), which is based on the maximum gas to surface pressure. All production burst loads assume deteriorated mud in the external profile (8.6 ppg).

Note: Shallow tubing leak has been factored in, to the calculations, to allow for flexibility in placing the tubing packer either in the liner, or in the previous casing string.

The axial design is based on casing installation and cementing.

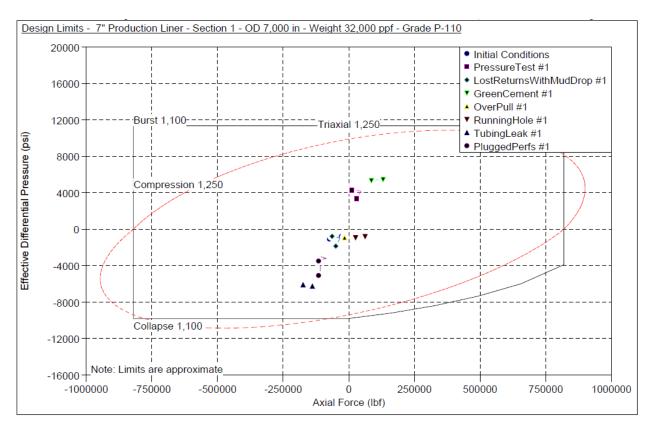


Figure 41 - Design limits plot for 7" production liner

# 3.3.2.2 Analysis and Discussion

This well is very similar in design to the foregoing Barents Sea example. In this example, however, we notice slightly better design fits, due to the higher pressures experienced downhole and the tighter mud window. The casing design in this instance is overdesigned for compressive effects, and no doubt a lower strength casing may still suffice. The Norwegian Sea is unique for its varying water depths and whilst this analysis has assumed its water depth based on the assumptions stated previously, it would be important to consider the thermal effects for any wells designed in this region. Heat from production fluids interacting with a near sub-zero wellhead will result in cyclic thermal loading.

# 3.3.3 North Sea Conventional Well Design

# 3.3.3.1 Basis of Design and Results

The North Sea conventional well design is based on regional similarities for exploration and appraisal wells, with a weighted average water depth. The schematic for the North Sea study well is shown below in Figure 42.

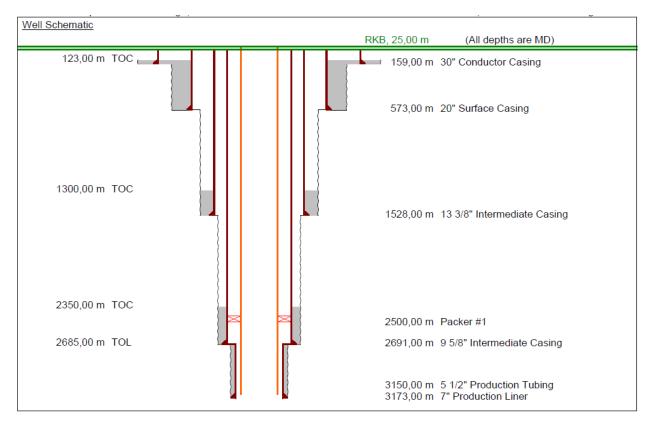


Figure 42 - North Sea study well general schematic

Casing Summary					
Conductor Casing	30" 157.5 lb/ft X-42 BTC (Range III)				
Surface Casing	20" 113 lb/ft N-80 TSH-ER (Range III)				
Intermediate Casing 1	13-3/8" 72 lb/ft P-110 VAM21 (Range III)				
Intermediate Casing 2	9-5/8" 53.5 lb/ft P-110 VAM21 (Range III)				
Production Liner	7" 32 lb/ft P-110 VAMTOPHC (Range III)				
Table 10 - North Sea Conventional Well: Casing Summary					

# 30" Conductor

Collapse, burst and axial forces were not considered as part of this analysis, since they are typically not an issue for this casing string.

#### 20" Surface Casing

The collapse criteria assumed collapse during cementing, which assumed wet cement in the annulus and seawater as the displacement fluid. Cement is brought up to surface. Additionally, a fluid drop due to thief zone was assumed as the second worst-case collapse scenario. The inside fluid level drops until the bottom hole pressure is equal to that of a sea water gradient.

The burst criteria assumed the maximum possible internal being equal to the next hole section. An oil gradient has been assumed, since a gas kick is very unlikely. The external profile assumes cement mix water. Two pressure testing scenarios are also presented – a grey test and green test. Both tests are considered since in practice, we often need to conduct green tests where grey tests are not possible. The test pressure is 2400 psi, which was calculated based on the maximum oil to surface pressure.

The axial design criteria assumes the weight of casing and mud as the primary factor. Since this is a vertical well, there are no bending forces incorporated. Pressure testing axial loading has been considered.

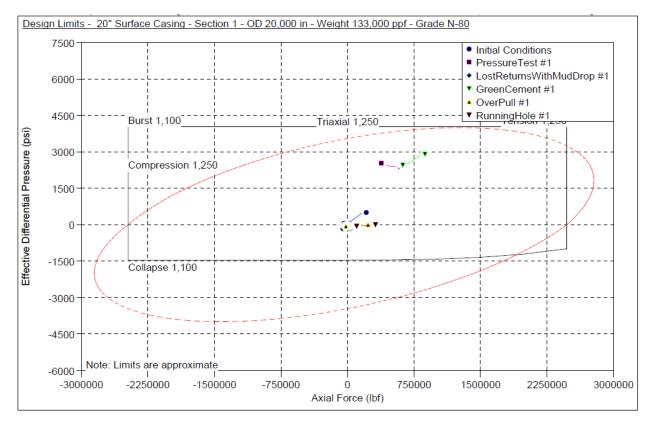


Figure 43 - Design limits plot for 20" surface casing

# 13-3/8" Intermediate Casing

A fluid drop due to thief zone was assumed as the second worst-case collapse scenario. The inside fluid level drops until the bottom hole pressure is equal to that of a sea water gradient.

The burst design is based once again on an oil-filled casing scenario, with figures adjusted for wear and tear of the pipe. The external pressure assumes the cement mix water, with mud above. The test pressure is 4300 psi, which is based on the maximum pressure.

Axial design criteria as per previous string.

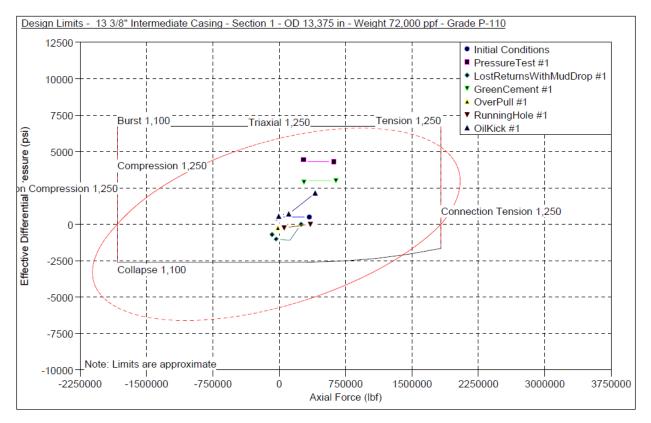


Figure 44 - Design limits plot for 13-3/8" intermediate casing

# 9-5/8" Intermediate Casing

The collapse loading involves a thief zone as per previous string. The outer profile assumes cement mix water, with mud above. In addition, full evacuation to gas has been assumed as worst-case collapse loading with the same external profile as the thief zone. Calculations are adjusted for slight corrosion (10% reduction in burst/collapse/tensile performance), since this is a post-drill load.

The worst-case burst loading is a shallow tubing leak, which assumes a leak in the production tubing, below the tubing hanger. There is assumed to be kill weight brine in the casing with wellhead gas production pressure above. Calculations incorporate casing wear. The test pressure is 6200 psi, which is based on the maximum gas to surface pressure. All production burst loads assume deteriorated mud in the external profile (8.6 ppg).

The axial design criteria are assumed to be similar to the previous string.

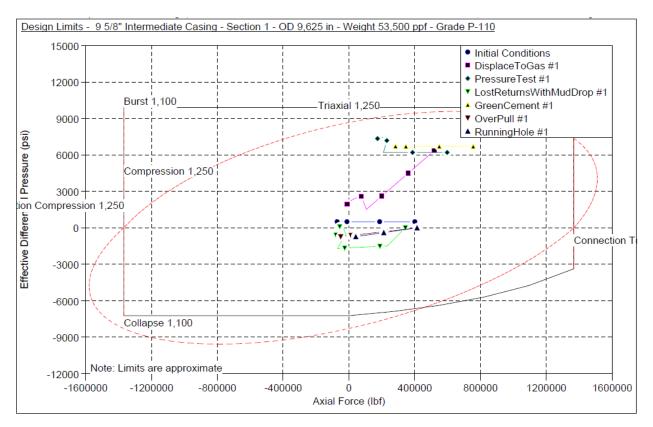


Figure 45 - Design limits plot for 9-5/8" intermediate casing

#### 7" Production Liner

The collapse scenario for the production liner involves formation pressure acting on plugged perforations during normal production. The inner liner is assumed to be filled with produced gas and the external profile is assumed to be formation pressure. Loads adjusted for corrosion.

The burst criteria is based on bullheading operations. The internal pressure profile is equal to the kill weight mud and the external profile is assumed to be cement mix water. The test pressure is 6800 psi (at liner hanger), which is based on the maximum gas to surface pressure. All production burst loads assume deteriorated mud in the external profile (8.6 ppg).

Note: Shallow tubing leak has been factored in, to the calculations, to allow for flexibility in placing the tubing packer either in the liner, or in the previous casing string.

The axial design is based on casing installation and cementing.

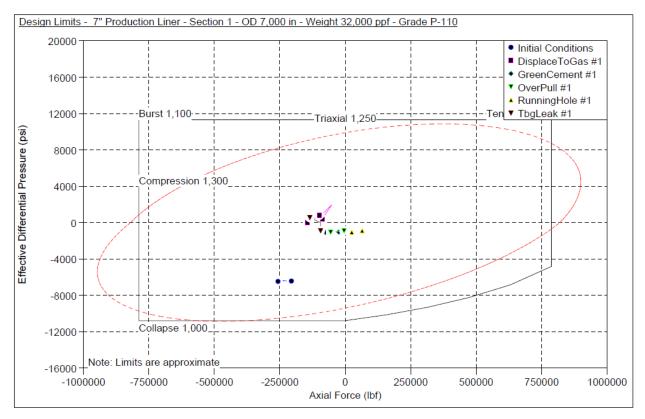


Figure 46 - Design limits plot for 7" production liner

# 3.3.3.2 Analysis and Discussion

This well is similar to the two other conventional wells, and a similar analysis applies. The casing design in this instance, whilst being the best fit of the three conventional study wells, is still overdesigned for its purposes.

# 3.4 Slender Well Design Opportunities

# 3.4.1 General Assumptions

As with the conventional well designs, one design is provided for each region of the Shelf. The purpose of these designs is to demonstrate the technical acceptability of scaling down from the conventional designs to slimmer wellbore profiles. One notes that for each proposed design, the final string is unchanged from 7", thereby leaving production potential unhindered. For each design, the casing is assumed open to selection from all API/proprietary tubulars/connections – i.e. the designs are intended to be "made to measure", rather than calling on one's available inventory. For each design, the von Mises design plots are presented, with a subsequent analysis for each well.

Note: all design reports for each region are displayed at length in Appendix 5.2.

# General Assumptions

For all well designs herein, we assume that the aforementioned unnamed company performs all operations. In addition, the general assumptions for the following well designs are:

• All designs are calculated using NORSOK D-010 design factors, as depicted below in Table 11. Note: the casing loads are unchanged from the conventional designs, so as to allow an "apples-to-apples" comparison;

Parameter	Design factor*	Supplementary requirement/information
Burst	1,10	
Collapse	1,10	
Axial	1,25	For well testing a design factor of 1,50 should be used to cater for pulling the packer free at the end of the test.
Tri-axial	1,25	Tri-axial design factors are not relevant for connections

\*The above design factors are based on wall thickness manufacturing tolerance of minus 12,5%.

Table 11 - NORSOK D-010 wellbore design factors (Standards Norway, 2013)

When designing for burst, collapse and axial loading, the following load cases have been considered, as directed by NORSOK D-010:

Item	Description	Comments
1.	Gas kick	Size/volume and intensity to be defined
2.	Gas filled casing	Applicable to last casing above the reservoir and subsequent casings
3.	Production and/or Injection tubing leaks	Based on WDP. See 7.7.2 for multipurpose wells
4.	Cementing of casing	
5.	Leak testing casing	See 7.7.2 for multipurpose wells
6.	Thermal expansion of fluid in enclosed annuli	Collapse and burst
7.	Dynamic loads from running of casing, including over pull to free stuck casing	
8.	Permanent abandonment	See section 9.3.2

Table 12 - Load cases as required by NORSOK D-010 (Standards Norway, 2013)

- No calculations which require inputs from rig specifications have been performed, since doing so would remove the objectivity of the study;
- The study has only considered vertical exploration/appraisal wells, due to lack of available data to draw reasonable analogues for production wells;
- A flow diversion shoe (discussed in Chapter 2) is assumed to be run for any casing strings where the hole section has been under-reamed, so as to reduce ECD;
- Rotary-steerable BHA's with bi-centred drill bits are assumed for the purposes of ECD calculations where this is required, else fully-packed assemblies are used;
- No shallow gas is assumed present to be present;
- The gas gradient is assumed to be 0.1 psi/ft;
- The oil gradient is assumed to be 0.276 psi/ft;
- All cement columns (except the conductor strings) have a 150m tail cement;
- Friction factors are as per Landmark default settings;

- Casings de-rated for temperature effects;
- Casing corrosion effects (10% reduction in burst/collapse/tensile performance);
- Casing set depths based on allowable kick tolerances (as per NORSOK D-010) and competent formations;
- Casing running speeds are assumed to be 1ft/s for all cases;
- A 25m air gap is assumed for all wells;
- 50klbs overpull allowance for all strings

#### 3.4.2 Barents Sea

#### 3.4.2.1 Basis of Design and Results

The slender well design proposal for the Barents Sea is shown below in Figure 47. Casing loading criterion unchanged from earlier conventional design.

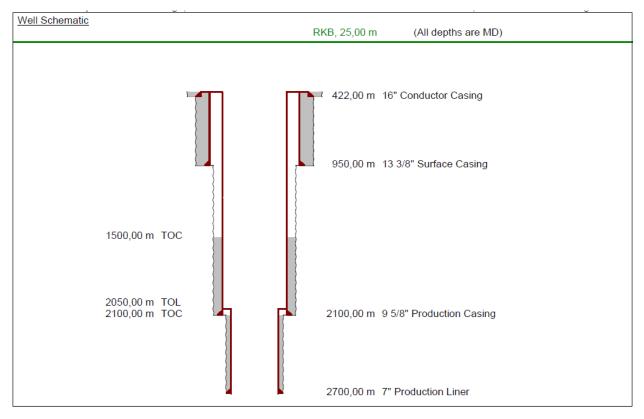


Figure 47 - Barents Sea slender well design proposal

Casing Summary							
Conductor Casing	16" 65 lb/ft H-40 BTC (Range III)						
Surface Casing	13-3/8" 54.5 lb/ft J-55 BTC (Range III)						
Intermediate Casing	9-5/8" 40 lb/ft M-56 BTC (or premium if desired) (Range III) 9-5/8" 47 lb/ft C-75 BTC (or premium if desired) (Range III)						
Production Liner	7" 29 lb/ft C-75 BTC (or premium thread if desired) (Range III)						

Table 13 - Barents Sea Slender Well Casing Summary

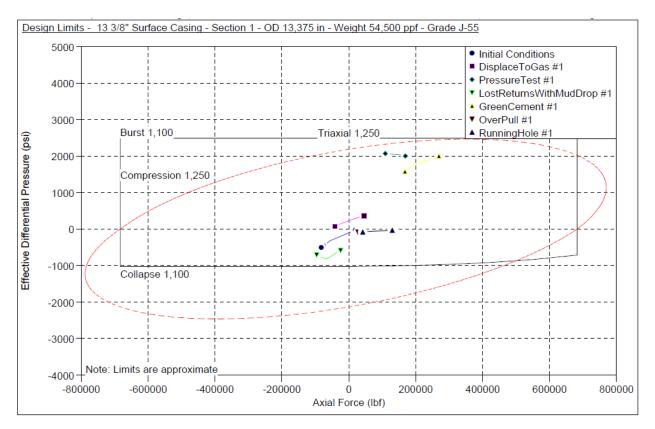


Figure 48 - Design limits plot for 13-3/8" surface casing

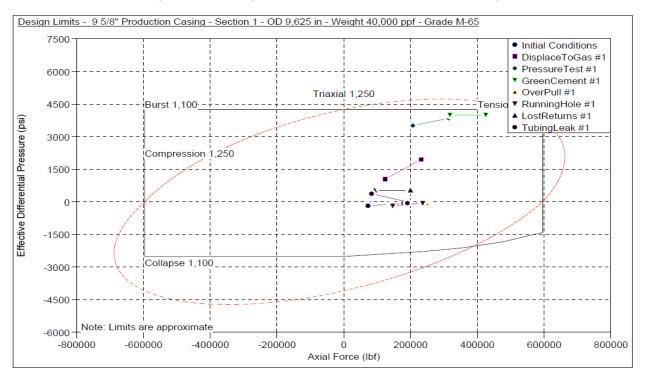


Figure 49 - von Mises design plot for 9-5/8" intermediate casing

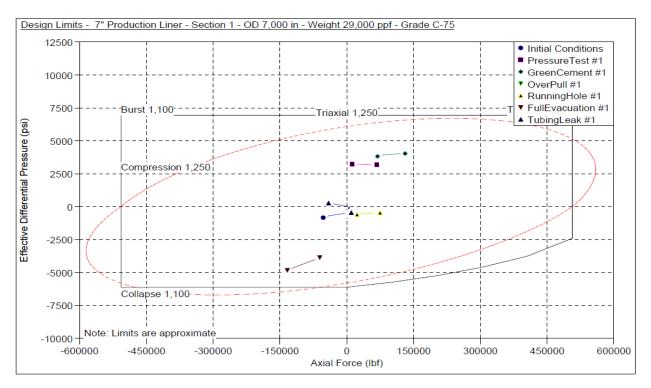


Figure 50 - Design limits plot for 7" production liner

# 3.4.2.2 Analysis and Discussion

It was decided to set the 13-3/8" surface casing at 950mMDRT. Normally, this would be too long of a surface hole section, but since the water depth dictates a 422mMDRT conductor set depth, we need only drill a 528m surface hole section. Since there is no overpressure, so it is assumed that the section can be drilled with a 9 ppg mud or else as low as possible. It is assumed that seepage losses due to the unconsolidated nature of shallow formations are acceptable.

The 9-5/8" string is designed to handle production loads. The section can be drilled with a 9ppg mud, with gradual weighting-up to 11.5 ppg by section TD. Due to the unconsolidated nature of Barents Sea drilling, it would be recommended to drill this section with an oil based mud or MEG treated mud, to avoid the formation of hydrates, all while paying close attention to mud returns.

The 7" liner running and setting is carries similar design limitations as the conventional design.

This particular well takes us from five casing strings, down to four, with the progression of sizes starting smaller (with the 16" conductor) and finishing with the required 7" production liner. We note that with standard API casing and couplings, it is indeed possible to execute a slimmer version of the Barents Sea standard conventional well. The risk of ECD's is acute, since we use a common progression of casing and hole sizes, whilst starting with a smaller diameter conductor. The use of alternate-path flow tools is unnecessary, since good hole clearance is obtained. Whilst standard API connections have been assumed throughout, the argument could be made to use premium connections, but this would only be required for the 9-5/8" and 7" casing strings (since the risk of formation fluid leaking through to the surface casing is minute), if and only if there gas is the expected produced fluid.

# 3.4.3 Norwegian Sea

# 3.4.3.1 Basis of Design and Results

The slender well design proposal for the Norwegian Sea is shown below in Figure 51. Casing loading criterion unchanged from earlier conventional design.

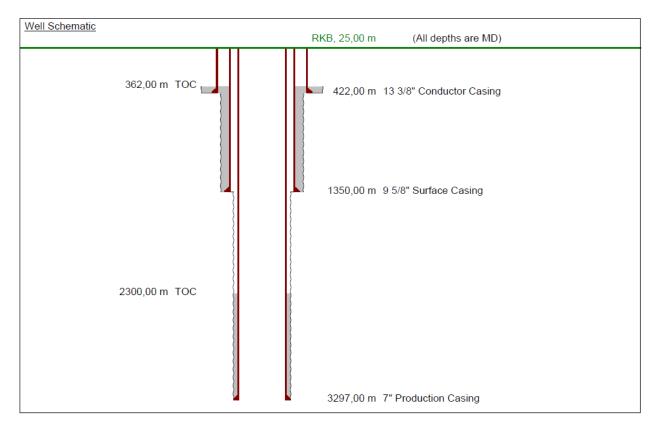


Figure 51 – Norwegian Sea slender well design proposal

Casing Summary							
Conductor Casing	13-3/8" 54.5 lb/ft J-55 BTC (Range III)						
Surface Casing	9-5/8" 47 lb/ft P-110 BTC (Range III)						
Production Liner	7" 32 lb/ft P-110 BTC (or premium if desired) (Range III)						
Table 14 - Norwegian Sea Slender Well Casing Summary							

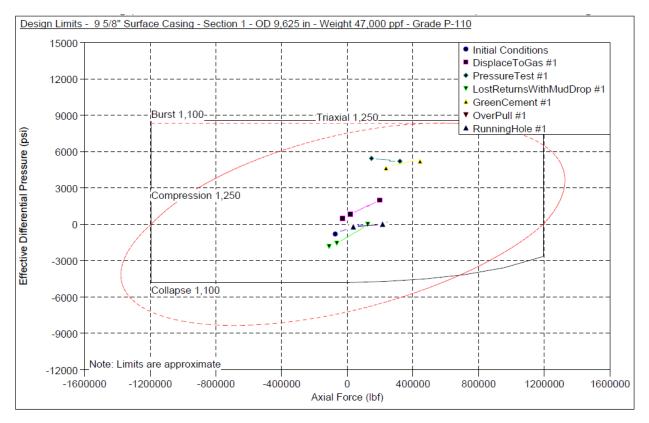


Figure 52 - Design limits plot for 9-5/8" surface casing

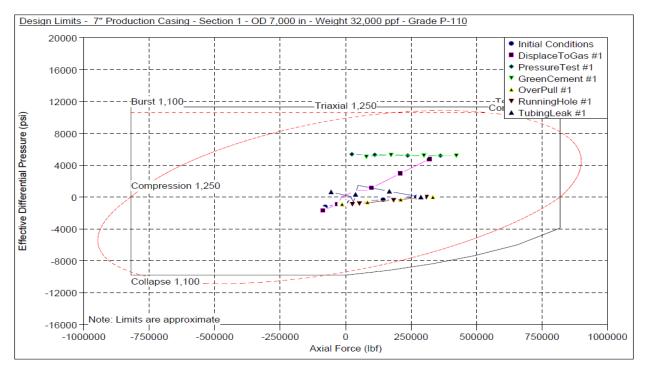


Figure 53 - Design limits plot for 7" production casing

#### 3.4.3.2 Analysis and Discussion

The surface casing is cemented to surface in order to provide structural integrity for the production casing string. This section can be commenced with a 9 ppg mud or ALARP, eventually weightingup to 10.5 ppg at section TD. The greatest risk with this design is becoming stuck when drilling production hole, or running the production casing. The long hole section may become unstable if left open for long periods of time. Drilling with casing would be a feasible option for this type of well since it would reduce the time between drilling and cementing casing (since borehole instability is time dependent) and hence it would be recommended to weight up drilling fluid by 0.5 ppg before pulling out of hole, if conditions allow. Surface hole casing drilling has been successfully implemented in other offshore markets and has a longstanding history of delivering stable wellbores (Askew, et al., 2011).

This well is the best representation of how fewer casing strings can achieve the same result – less is more. We note that it is indeed possible to achieve this design from a technical standpoint.

### 3.4.4 North Sea

### 3.4.4.1 Basis of Design and Results

The slender well design proposal for the North Sea is shown below in Figure 54. Casing loading criterion unchanged from earlier conventional design.

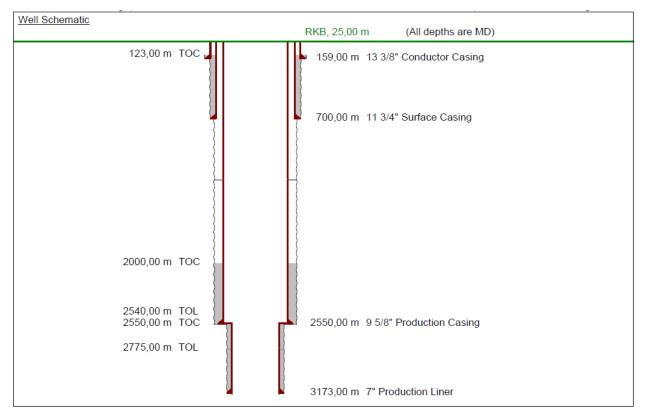


Figure 54 - North Sea slender well design proposal

Casing Summary								
Conductor Casing	13-3/8" 48 lb/ft H-40 BTC (Range III)							
Surface Casing	11-3/4" 5 lb/ft J-55 BTC (Range III)							
Intermediate Casing	9-5/8" 53.5 lb/ft C-90 BTC <i>(or premium if desired)</i> (Range III) 9-5/8" 53.5 lb/ft C-75 BTC <i>(or premium if desired)</i> (Range III)							
Production Liner	7" 32 lb/ft P-110 BTC (or premium if desired) (Range III)							

Table 15 - North Sea Slender Well Casing Summary

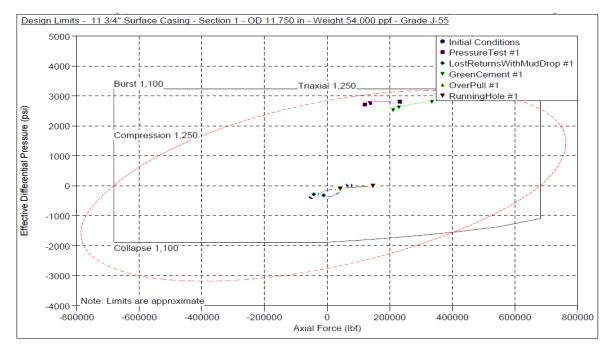


Figure 55 - Design limits plot for 11-3/4" surface casing

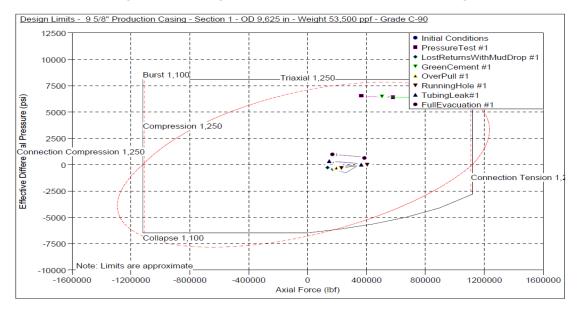


Figure 56 - Design limits plot for 9-5/8" intermediate casing

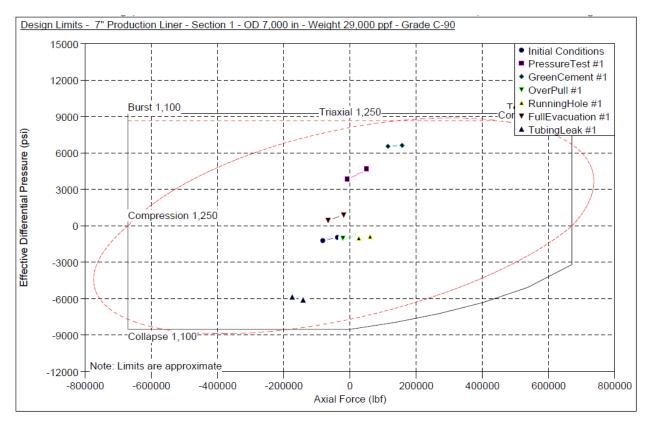


Figure 57 - Design limits plot for 7" production liner

#### 3.4.4.2 Analysis and Discussion

A 13-3/8" conductor sits within a 15" hole section. Because of the short conductor length and low costs of steel, this could easily be upsized to a 16" or 17-1/2" hole without any significant economic impact, if desirable.

The 11-3/4" casing string is run in a 13/1-2" hole section. The main limiting factor with this string was the kick tolerance, which has been the limiting factor is selecting casing set depth. Higher mud weights than would normally be desired are required for this section. Due to the risk of severe losses in shallow, unconsolidated formations, it is recommended to drill this section with casing, using a bi-centred drill bit. This section is under-reamed from the previous 13-3/8" casing string. The tight annular clearance between the concentric casing strings and subsequent open hole, dictate the use of an annular flow diversion tool. This tool has been shown to reduce ECD's by 20% and it is shown that the ECD's in this case do not render the design unfeasible (results of ECD study discussed in section 3.4.7).

For the intermediate casing string, our casing set depth is once again limited by kick tolerance. A standard 12-1/4" hole is under-reamed out of the 11-3/4" casing to run and set the 9-5/8" string. Again, due to the small clearances (though this time, only within the concentric casing strings), the use of an annular flow diversion tool is required. The ECD study shows no issues with this hole section.

The 7" production liner is run in an 8-1/2" as per previous design, with no unique features.

Centralisation is a key issue in this well design. Poor centralisation could lead to excessive casing wear, which would be highly pronounced due to the low annular clearances. In addition, the casing running best practices alluded to in earlier sections need special attention on this well. The North Sea slender design best represent the possibilities in true slim hole drilling, whilst removing unnecessary casing – however its execution would ultimately depend on the Operator's risk appetite. The architecture is a North Sea rendition of the study conducted by (Howlett, et al., 2006). The results show that the design is technically feasible, however this assumes that one achieves a break-even ROP to make the casing-drilling surface hole economically feasible.

## 3.4.5 Well Control

Well control for slim hole drilling has been discussed previously. Figure 58, below, presents a comprehensive well control flow chart and is highly relevant to slim hole drilling. The risk assessment, ahead, will outline further risks and proposed mitigation strategies.

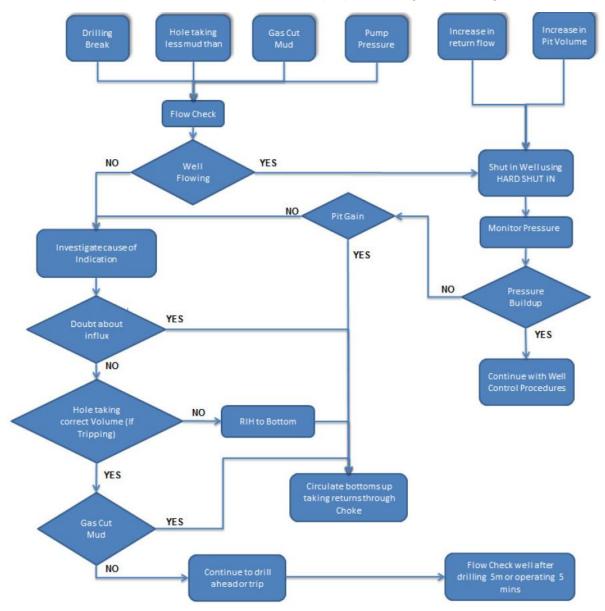


Figure 58 - Well control flow chart (Harness Energy, 2014)

#### 3.4.6 Kick Tolerances

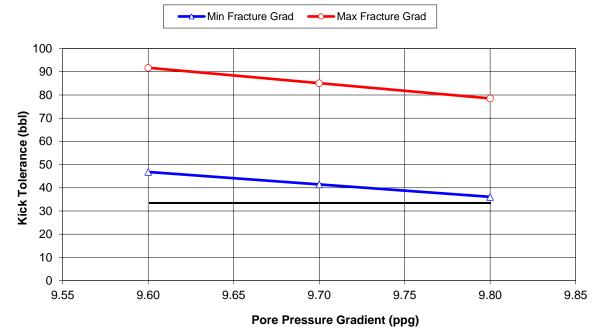
Kick tolerances have been calculated in accordance with section 3.1.14 of NORSOK D-010 (Standards Norway, 2013), which stipulates that kick tolerance should be equal to the equivalent MAASP<sup>20</sup>. Where kick tolerances are too low, adjustments to casing set depths were made. Each conventional design meets the requirements of NORSOK D-010, however it is important to examine the kick tolerances of the slender well proposals. A summary of the kick tolerances for each slender well design is shown below. For each chart, it is shown that the range of kick margins are above the NORSOK D-010 requirement of 4m<sup>3</sup> (or 33.5 bbl). (Standards Norway, 2013). The 4m<sup>3</sup> requirement is shown as a black line on each of the charts.

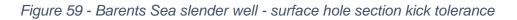
#### 3.4.6.1 Barents Sea

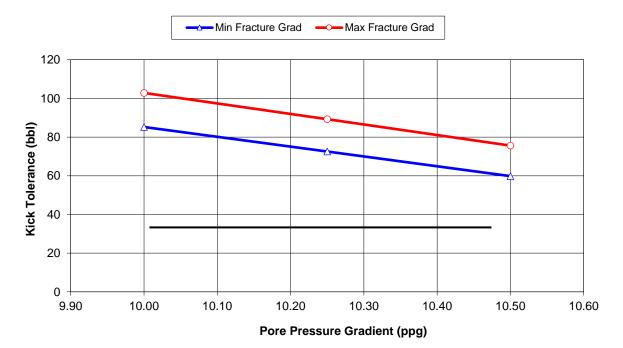
Kick Zone Parameters:		<u>Surface</u>	Intermediate	Production
Open hole Size ?	(inch)	17.5	12.25	8.5
Measured Depth ?	(m)	950	2100	2700.40
Vertical Depth ?	(m)	950	2100	2700.40
Horizontal Length (>87 deg) ?	(m)	0	0	0
Tangent Angle Above Horizontal?	(deg)	0	0	0
Min Pore Pressure Gradient ?	(ppg)	9.600	10	10
Max Pore Pressure Gradient ?	(ppg)	9.800	10.5	10.5
Kick Zone Temperature ?	(deg.F)	70	150	200
Weak Point Parameters:				
Measured Depth ?	(m)	422	950	2100.0
Vertical Depth ?	(m)	422	950	2100.0
Section Angle (<87 deg) ?	(deg)	0	0	0
Min Fracture Gradient / EMW ?	(ppg)	12.000	12.9	12.9
Max Fracture Gradient / EMW	(ppg)	13.500	13.5	13.5
Weak Point Temperature ?	(deg.F)	40	100	150
Other Parameters:				
Drill Collar OD ?	(inch)	8	6.75	6.75
Drill Collar Length ?	(m)	40	152	182.9
Drill pipe OD ?	(inch)	5.5	5.5	4
Surface Pressure Safety Factor ?	(psi)	100	100	100
Mud Weight in Hole ?	(ppg)	10.500	11.5	11.5
Annular Capacity Around BHA:	(bbl/ft)	0.23530	0.101503	0.0
Annular Capacity Around DP:	(bbl/ft)	0.26808	0.116376	0.1
Circulating MAASP	(psi)	8	126.4055	400.6
Gas Gradient at Weak Point	(psi/ft)	0.0213	0.046745	0.1
At Min Frac Gradient				
For Min Pore Pressure:				
Max Allowable Gas Height:	(m)	90	367	644.3
Kick Tolerance:	(bbl)	44.5	85.2	Infinite
For Max Pore Pressure:				
Max Allowable Gas Height:	(m)	70	268	508.4
Kick Tolerance:	(bbl)	34.3	59.8	73.9
Circulating MAASP	(psi)	116	223.4365	615.2
Gas Gradient at Weak Point	(psi/ft)	0.0243	0.049011	0.1
At Max Frac Gradient	-			

<sup>&</sup>lt;sup>20</sup> Calculations made using methodology outlined in theory, Section 2.3.1.3.

For Min Pore Pressure:				
Max Allowable Gas Height:	(m)	153	423	774.8
Kick Tolerance:	(bbl)	87.3	102.8	Infinite
For Max Pore Pressure:				
Max Allowable Gas Height:	(m)	134	323	638.3
Kick Tolerance:	(bbl)	74.7	75.5	Infinite







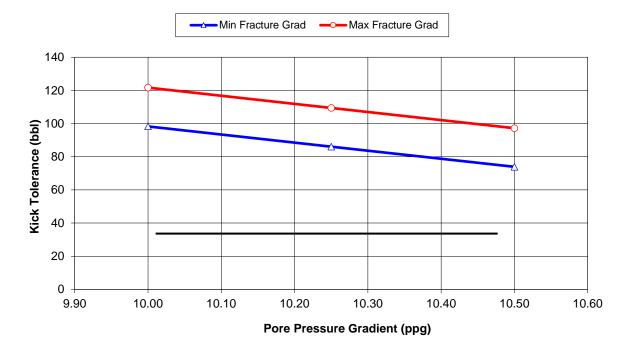


Figure 60 - Barents Sea slender well - intermediate hole section kick tolerance

#### Figure 61 - Barents Sea slender well – production hole section kick tolerance

#### **Discussion**

For this wellbore design, all kick tolerances are acceptable as per NORSOK-D010. An ECD check will be conducted ahead to ensure drill-ability of each section.

#### 3.4.6.2 Norwegian Sea

Kick Zone Parameters:		Old Surface	New Surface	Production
Open hole Size ?	(inch)	12.25	12.25	8.5
Measured Depth ?	(m)	1350.20	1649.802	3299.9
Vertical Depth ?	(m)	1350.20	1649.802	3299.9
Horizontal Length (>87 deg) ?	(m)	0	0	0.0
Tangent Angle Above Horizontal ?	(deg)	0	0	0.0
Min Pore Pressure Gradient ?	(ppg)	9.0	9	11.2
Max Pore Pressure Gradient ?	(ppg)	9.6	9.5795	11.5
Kick Zone Temperature ?	(deg.F)	150	150	70.0
Weak Point Parameters:				
Measured Depth ?	(m)	422.13	670.5273	1650.1
Vertical Depth ?	(m)	422.13	670.5273	1650.1
Section Angle (<87 deg) ?	(deg)	0	0	0.0
Min Fracture Gradient / EMW ?	(ppg)	11.662	11.662	14.6
Max Fracture Gradient / EMW	(ppg)	12	12	15.2
Weak Point Temperature ?	(deg.F)	70	70	150.0
Other Parameters:				
Drill Collar OD ?	(inch)	6.75	6.75	6.8
Drill Collar Length ?	(m)	152.39	152.3926	152.4

Drill pipe OD ?	(inch)	5.5	5.5	5.5
Surface Pressure Safety Factor ?	(psi)	100	100	100.0
Mud Weight in Hole ?	(ppg)	10	10	12.0
Annular Capacity Around BHA:	(bbl/ft)	0.10	0.101503	0.0
Annular Capacity Around DP:	(bbl/ft)	0.12	0.116376	0.0
Circulating MAASP	(psi)	19.47	89.76462	624.2
Gas Gradient at Weak Point	(psi/ft)	0.02	0.031537	0.1
At Min Frac Gradient				
For Min Pore Pressure:				
Max Allowable Gas Height:	(m)	151.96	231.7507	601.7
Kick Tolerance:	(bbl)	27.27	56.9298	73.1
For Max Pore Pressure:				
Max Allowable Gas Height:	(m)	70.77	129.9721	519.6
Kick Tolerance:	(bbl)	11.92	33.06034	<b>62.1</b>
Circulating MAASP	(psi)	43.76	128.3569	799.1
Gas Gradient at Weak Point	(psi/ft)	0.02	0.032571	0.1
At Max Frac Gradient				
For Min Pore Pressure:				
Max Allowable Gas Height:	(m)	166.96	256.4208	705.2
Kick Tolerance:	(bbl)	30.91	65.05623	86.9
For Max Pore Pressure:				
Max Allowable Gas Height:	(m)	85.68	154.4262	622.7
Kick Tolerance:	(bbl)	14.88	36.88773	75.9

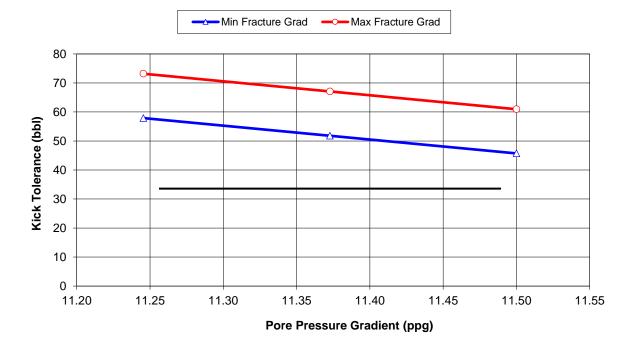


Figure 62 - Norwegian Sea slender well – surface hole (new) section kick tolerance

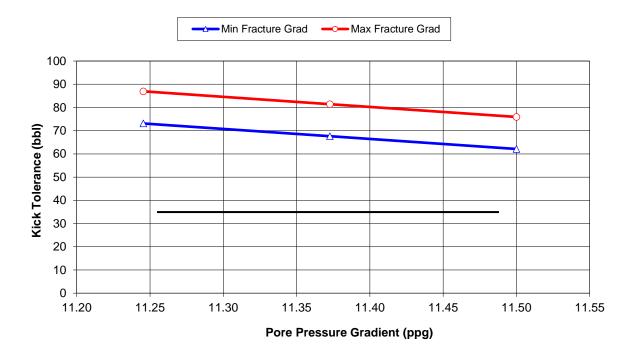


Figure 63 - Norwegian Sea slender well - production hole section kick tolerance

### Discussion

The well design initially does not satisfy the requirements of NORSOK D-010. The surface casing kick tolerance in setting casing at 1350mMDRT is too low to be accepted in practise. There are a number of changes that were made to remedy this:

- Increased the conductor set depth (or run a second conductor string): This method gives the largest increase in kick tolerance since the weak point is the driving factor in kick volume calculations;
- Increased the mud weight;
- Increased hole depth;
- Added another casing string.

In our study, we increased both the conductor set depth (to 670mMDRT, hence a 250m conductor string) and the surface hole depth (to 1650mMDRT). This is for two reasons; first, as will be shown in the next section, the ECD's dictate a deeper surface hole and second, we wish to avoid adding another casing string. This change does little to alter the results shown in the von Mises plots and has been taken into account in the economic modelling below. However, these kick tolerance calculations have been performed using a gas density of 0.1 psi/ft. In practice however, the chance of any hydrocarbons being present at these depths is nearly negligible. This means we will have a much higher kick tolerance on the surface casing string since we assume the produced fluid is sea water.

### 3.4.6.3 North Sea

Kick Zone Parameters:		Surface	Intermediate	Production
Open hole Size ?	(inch)	13.5	12.25	8.5
Measured Depth ?	(m) ´	701	2550.00	3173.0
Vertical Depth ?	(m)	701	2550.00	3173.0
Horizontal Length (>87 deg) ?	(m)	0	0.00	0.0
Tangent Angle Above Horizontal?	(deg)	0	0.00	0.0
Min Pore Pressure Gradient ?	(ppg)	8.6	11.00	13.4
Max Pore Pressure Gradient ?	(ppg)	8.6	11.20	13.6
Kick Zone Temperature ?	(deg.F)	150	250.00	270.0
Weak Point Parameters:				
Measured Depth ?	(m)	159	700.00	2550.0
Vertical Depth ?	(m)	159	700.00	2550.0
Section Angle (<87 deg) ?	(deg)	0	0.00	0.0
Min Fracture Gradient / EMW ?	(ppg)	12.2	13.33	15.4
Max Fracture Gradient / EMW	(ppg)	12.5	13.70	15.8
Weak Point Temperature ?	(deg.F)	70	150.00	250.0
Other Parameters:				
Drill Collar OD ?	(inch)	6.75	6.75	6.8
Drill Collar Length ?	(m)	152	152.39	152.4
Drill pipe OD ?	(inch)	4	4.00	4.0
Surface Pressure Safety Factor ?	(psi)	100	100.00	100.0
Mud Weight in Hole ?	(ppg)	10	12.00	12.0
Annular Capacity Around BHA:	(bbl/ft)	0.132	0.10	0.0
Annular Capacity Around DP:	(bbl/ft)	0.161	0.13	0.1
Circulating MAASP	(psi)	40.43	58.29	1380.9
Gas Gradient at Weak Point	(psi/ft)	0.007	0.03	0.1
At Min Frac Gradient				
For Min Pore Pressure:				
Max Allowable Gas Height:	(m)	75.42	253.38	354.4
Kick Tolerance:	(bbl)	14.79	48.31	49.2
For Max Pore Pressure:		0	0.00	0.0
Max Allowable Gas Height:	(m)	75.42	208.70	293.0
Kick Tolerance:	(bbl)	14.79	39.25	38.2
Circulating MAASP	(psi)	32.31	102.64	1550.0
Gas Gradient at Weak Point	(psi/ft)	0.007	0.03	0.1
At Max Frac Gradient	· · · /			-
For Min Pore Pressure:				
Max Allowable Gas Height:	(m)	80.28	276.61	451.4
Kick Tolerance:	(bbl)	16.14	<b>54.29</b>	<b>66.6</b>
For Max Pore Pressure:	(~~)	0	0.00	0.0
Max Allowable Gas Height:	(m)	80.28	231.87	390.0
Kick Tolerance:	(bbl)	16.14	<b>44.89</b>	55.5

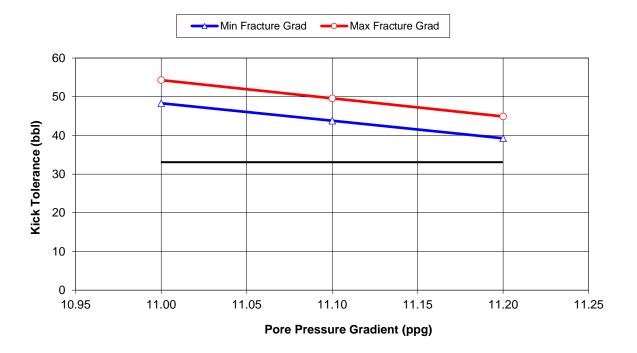


Figure 64 - North Sea slender well - intermediate hole section kick tolerance

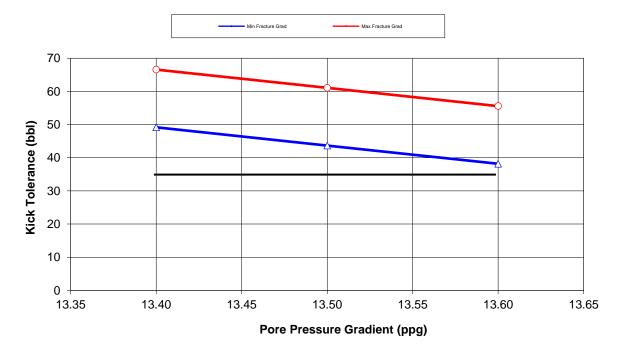


Figure 65 - North Sea slender well - production hole section kick tolerance

#### Discussion

With the exception of surface hole section, the well meets the criteria set out in NORSOK D-010. In this example, we are once more able to state that since these calculations are performed with

a gas gradient of 0.1psi/ft, and since there is unlikely to be any hydrocarbons present near surface, we can neglect this and proceed to drill the surface hole section.

## 3.4.7 Equivalent Circulating Densities

#### 3.4.7.1 Barents Sea Slender Architecture

We note that there are no ECD issues in the Barents Sea well design. The analysis is presented below<sup>21</sup>.

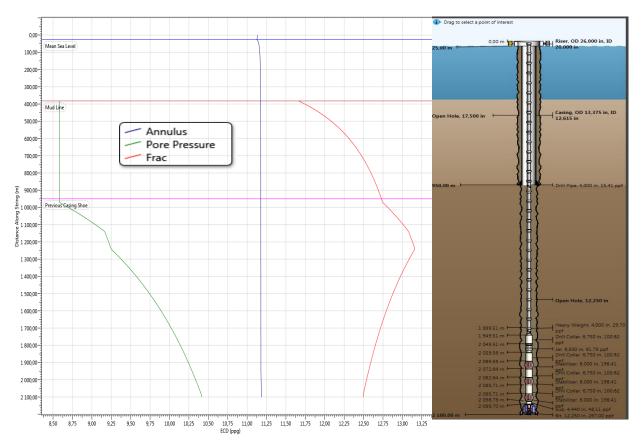


Figure 66 – Estimated ECD: Barents Sea slender well – intermediate hole drilling

<sup>&</sup>lt;sup>21</sup> All ECD calculations were performed with Halliburton Landmark. Results show screenshots from analysis

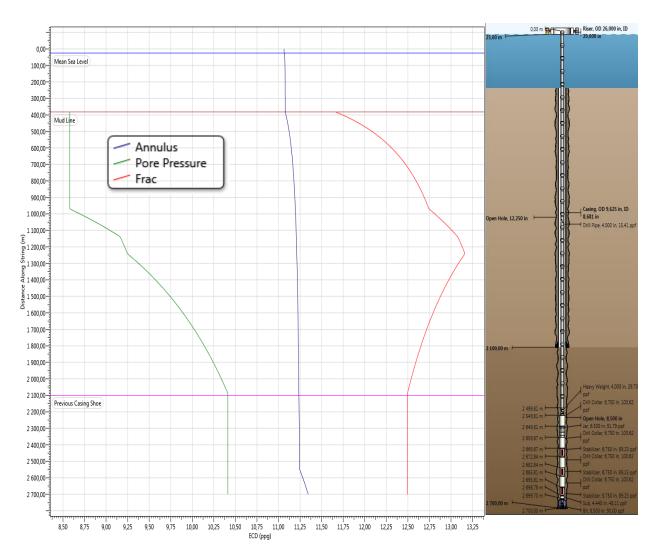
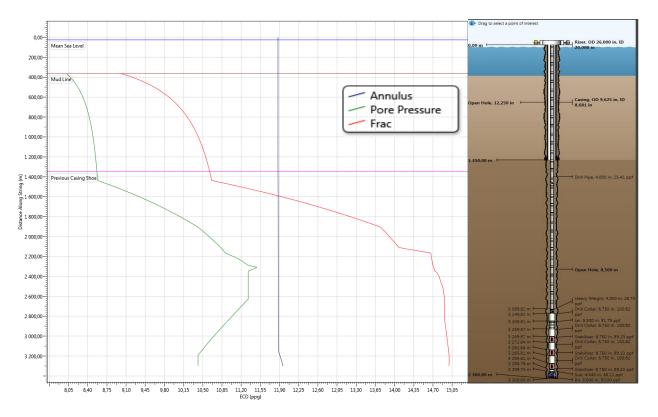


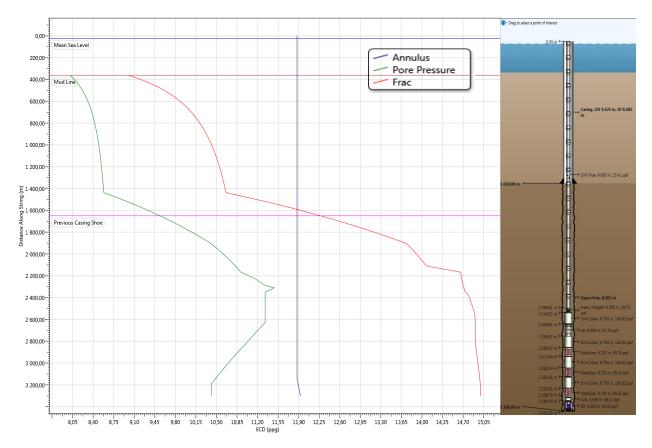
Figure 67 - Estimated ECD: Barents Sea slender well – production hole drilling

#### 3.4.7.2 Norwegian Sea Slender Architecture

The Norwegian Sea downhole pressure profile initially dictated a surface casing set depth of 1350mMDRT. At this depth, we notice the ECD fracturing the formation just below the shoe. It was therefore required to re-run the analysis with a 1650mMDRT surface casing string. This essentially leaves two options; if one were comfortable with the risk of such a long surface hole section, a 10-10.5 ppg surface hole could be drilled (being mindful of possible shallow losses) down to 1650mMDRT. If one were uncomfortable with this option, it would be advisable to set surface casing at 750mMDRT and drill an intermediate hole section to 1650mMDRT. Either way, the economic merits are evident. See analysis below.







# Figure 69 - Estimated ECD: Norwegian Sea slender well w/ deep int. casing set depth

#### 3.4.7.3 North Sea Slender Well Architecture

We note that there are no ECD issues in the North Sea well design. The analysis is presented below.

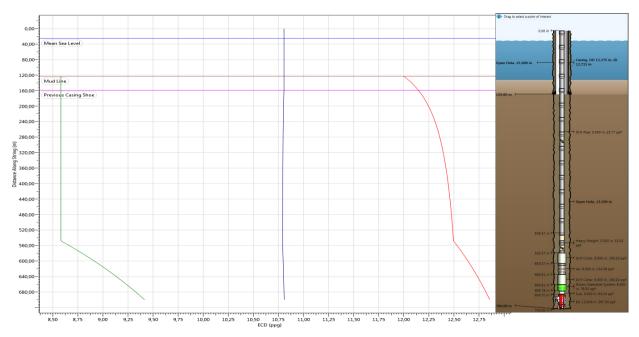
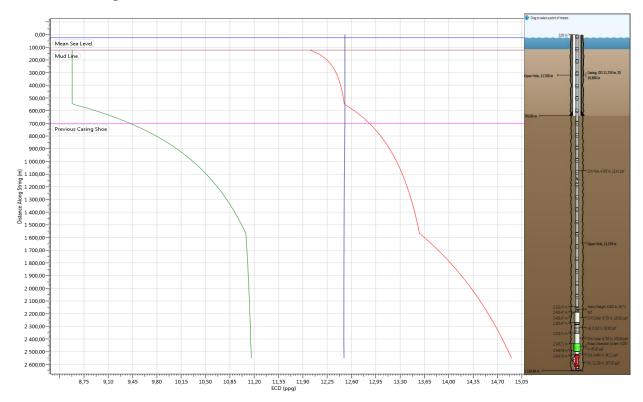


Figure 70 - Estimated ECD: North Sea first intermediate hole section



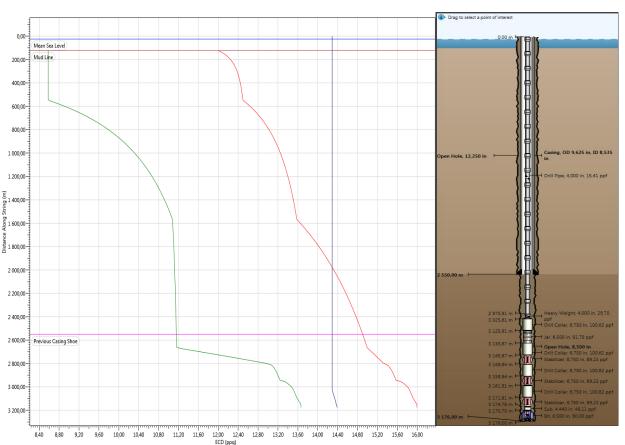


Figure 71 - Estimated ECD: North Sea second intermediate hole section



# 3.5 Economic Considerations

# 3.5.1 Financial Assumptions

This section will seek to outline the economic merits of slender vs. conventional well designs by presenting deterministic cost estimates for each scenario and comparing the outcomes. The following assumptions closely reflect the economics of an undisclosed operating company in Norway. A full discussion of the overall economic implications is presented in the following subsection. Where figures are unavailable, realistic assumptions are made. *Note: all figures quotes are in United States Dollars (USD) unless otherwise stated*<sup>22 23</sup>.

- Rig spread rate: \$145,000/-
- Assuming dynamically positioned rig, no anchor issues
- Class charges written over five years: \$154,000/- (NOK 75MM over 60 months, which amounts to NOK 1.2MM)
- Two days mobilisation: \$1.15MM/- (2 x NOK 4.5MM)
- Demobilisation when rig is handed to next well in field: \$260,000/- (NOK 2MM)
- DP assumed 2 hours: \$58,000/- (2/12 x NOK 4.5MM)

<sup>&</sup>lt;sup>22</sup> Exchange rate as at 12/03/2018 (time of writing): 1 Norwegian Krone equals 0.13 US Dollar.

 $<sup>^{23}</sup>$  M = thousand, MM = million, B = billion.

- P&A assumed 5 days: \$2.9MM/- (5 x NOK 4.5MM)
- Site survey: \$1.3MM/- (NOK 10MM)
- Overheads (operator planning and execution costs): \$3.2 MM/- (NOK 25MM)
- Reporting: \$260,000/- (NOK 2MM)
- Coring (120m/27m = 5 runs, i.e. 2.5 days) = \$1.5MM/- (NOK 11.25MM)
- Conductors are all pre-installed and included in the site survey cost (above)
- NPT due to extreme weather: 15% total operating time
- Contingency: 10%
- Estimates consider case and suspend (w/ eventual P&A). Wellbore completion is assumed not to take place exploration wells

Note: for each estimate presented, a full day-by-day cost breakdown is available in Appendix 5.3.

# 3.5.2 Barents Sea

The Barents Sea cost estimate for the conventional design is displayed below in Figure 73.

T				- 50 4						w/o co Good	d we	ather			veathe	r		contin od we	ather		-	ontingency. d weather
Total Cost to P&A: No Discovery (No Total Cost to Case and Suspend: Disc					P&A							6,877,7 0,035,1			30,909 33,390				,565,4 .,938,6			\$33,597,134 \$36,293,935
Revision 0 Phase		Detaile	ed Phase I	Descript	ion					Numł	her o	of Days		Sacti	on Cost		Renta	s and I	Person	nel	Lump	Sum Material
			ads, class			s, insu	rance p	oremiun	15				\$				(Inclu \$	ding R	ig Rate		\$	Costs
Predrill			and environmental costs Pre-spud includes all rig move costs incl. mobilisation,				n		N/A				2,834							-		
Pre-spud			ng, DP et a		move	20323 11	101.1110	omsacio	,	2	.1 da	iys	\$		431	,548	\$		388,8	339	\$	42,708
Surface Hole to 644 mMDRT		Drill to	section T	D only						1	.3 da	iys	\$		605	,179	\$		414,5	54	\$	190,625
Surface Casing			es wiper tr sing and c			BHA, r	ig up c	asing ge	ar,	1	.9 da	iys	\$		1,068	,268	\$		621,8	330	\$	446,438
Nipple Up BOP's		Include	es full onli	ne BOP	test					3	.3 da	iys	\$		1,373	,809	\$	1	L,105,4	176	\$	268,333
Intermediate Hole 1 to 1355 mMDRT		Drill to	section T	D only						4	.0 da	iys	\$		1,796	,607	\$	1	L,300,8	378	\$	495,729
Intermediate Casing 1			es wiper ti sing and c			BHA, r	ig up c	asing ge	ar,	3	.5 da	iys	\$		2,151	,500	\$	1	L,150,2	250	\$	1,001,250
LOT and Test			es full onli		-					2	.8 da	iys	\$		995	,893	\$		912,0	018	\$	83,875
Intermediate Hole 2 to 1995 mMDRT			section T								.9 da		\$		2,889		\$	1	2,259,4		\$	629,688
Intermediate Casing 2		Include	es wiper ti	ip and li		BHA, r	ig up c	asing ge	ar,		.7 da		\$		2,270				L,205,0			1,065,167
			sing and c										\$				\$ \$	-			\$ \$	
LOT and Test			es full onli oduction				10 2011	addition		2	.5 da	195			975	,357			829,1			146,250
Production Hole to 2497 mMDRT			tion while				as diiy	audition	a	7	.1 da	iys	\$		2,594	,345	\$	2	2,349,1	137	\$	245,208
Evaluation		wirelin	es wiper ti e logging	not co	ring					5.4 days		\$		2,157	,440	\$	:	L,796,3	399	\$	361,042	
Production Liner			es wiper tr g and cem			post-lo	ogging,	then		4	.3 da	iys	\$		2,381	,357	\$	1	L,409,4	182	\$	971,875
Rig Release		Requir	es final tre	e instal	lation	and re	ease o	f the rig		0	.3 da	iys	\$		460	,048	\$		110,5	548	\$	349,500
TOTALS										48	3.9 di	ays	\$		24,985	,148	\$	15	5,852,9	960	\$	6,297,688
210 500 710 1000	<u> </u>																		Barents 7120/7-: 7120/9-:	3 Actua	•	
E 1129 E																						
E 1750			$\mathbf{\lambda}$		-				_		_	_			_	-						
			<u> </u>						$\overline{}$					_		-						
2250										<u> </u>				-								
2750											_			_	-		$\sim$	_				
3000						-			_		-	-		_	-	-						
3250 0 5 10		15	20		25		30	35 Days fron	n Spud	40		45		50		55		0	65		7	D
Assumptions and Scope Change									c	Cost Cate	egory	,									т	otal Cost
<ul> <li>Performance: common drilling and casing work (BOP N/U, testing, logging etc.);</li> </ul>	g running s	peeds f	or both w	ells in ad	dition	to eq	ual inte	er-sectio	n N	Mobilisat	tion /	/ Demo	oilisati	on Costs	5						\$	1,410,000
<ul> <li>No bit trips;</li> </ul>									6	Staff Sala Overhead		ocation									\$ \$	488,750 3,200,000
<ul> <li>Wiper trip TD to surface on second interresection, 15 hours for production section);</li> </ul>	nediate an	d produ	uction hol	e section	ns (30 l	hours	or inte	ermediat	.e _	Rig Costs		Jeation									\$	10,438,542
<ul> <li>10 days post-drilled TD time (incl. logging</li> </ul>	and corin	g for pr	oduction l	nole sec	tion &	casing	and ce	ementin	-	HSE and A		ting									\$	1,300,000
assuming discovery);	od above								E	Evaluation						\$	5,204,375					
<ul> <li>P&amp;A assumed as lump-sum cost as detail</li> <li>Evaluation in intermediate hole sections</li> </ul>		nbo or e	equivalent	). No si	urface I	hole lo	gging;		-	bubsea W											\$	58,000
<ul> <li>CBL for second intermediate casing and p</li> </ul>	roduction	liner or	nly;				00 0.		- H	Commun Franspor		ons									\$ \$	284,438
<ul> <li>No DST's/MDT's (omitted from offset we</li> <li>Drill times commensurate with offset we</li> </ul>								10 davs	-			cessori	es								\$ \$	1,321,875
added for post drill activities.					- H	Casing and Accessories Wellhead						\$	1,110,000									
Incremental Costs From a Standard Well						Cementir											\$	910,000				
Activity / Item			Time				Cos			Vlud											\$	609,375
Coring (120m / 27m = 5 runs) Plug and Abandonment			2.5 day 5.0 day		\$			1,150, 2,900,		Miscellan Drilling Te											\$ \$	276,144 395,400
			5.0 ua	3	\$			2,300,		Class Cha			ment								\$ \$	154,000
					\$				_	ield Prof	-		vices								\$	557,500
					\$							Y OF 1									\$	2,903,515
										Continue												

Figure 73 - Barents Sea conventional study well cost estimate

The cost estimate for the slender well design is presented below. Due to the lack of economic data for materials and services, it is important to note the following assumptions and scaling factors:

- Casing price reductions have been assumed as a percentage of change in OD from the conventional to slender well design. Likewise with wellheads. Service charges remain unchanged;
- The mud chemical costs are assumed to decrease proportionally to the change in wellbore volume from the conventional to slender design (section by section), whereas cement chemical costs assumed to decrease proportionally to change in annular volume. Service charges remain unchanged;
- Drill bit charges assumed to reduce proportionally to hole OD changes;
- No change to any evaluation costs;
- Personnel charges remain unchanged;

The scaling factors are shown in Table 16.

Casing			
-	Surface	Intermediate	Production
Original casing OD (in)	20	13 3/8	7
New casing OD (in)	13 3/8	9 5/8	7
% change	67%	72%	100%
Wellheads			
	Surface	Intermediate	Production
Original casing OD (in)	20	13 3/8	7
New casing OD (in)	13 3/8	9 5/8	7
% change	67%	72%	100%
Mud			
	Surface	Intermediate	Production
Original hole OD (in)	26	17 1/2	8 1/2
Original depth interval (m)	230	710	505
Original Volume (bbl)	496	693	116
New hole OD (in)	17 1/2	12 1/4	8 1/2
New depth (m)	528	1150	400
New Volume (bbl)	515	550	92
% change	104%	79%	79%
Cement			
	Surface	Intermediate	Production
Original hole OD (in)	26	17 1/2	8 1/2
Original casing OD (in)	20	13 3/8	7
Original annular capacity	0.0-	0.10	0.00
(bbl/ft)	0.27	0.12	0.02
Original depth (m)	645	1355	2500

Original TOC (m)	415	1000	1980							
Original CMT vol (bbl)	202	144	39							
New hole OD (in)	17 1/2	12 1/4	8 1/2							
New casing OD (in)	13 3/8	9 5/8	7							
New annular capacity (b/ft)	0.12	0.06	0.02							
New depth (m)	950	2100	2500							
New TOC (m)	422	1500	2100							
New CMT vol (bbl)	214	110	30							
% change	106%	76%	77%							
Bits										
	Surface	Intermediate	Production							
Original hole OD (in)	26	17 1/2	8 1/2							
New hole OD (in)	17 1/2	12 1/4	8 1/2							
% change	67%	70%	100%							
Table 16 - Scaling factors for Barents Sea slender well										

The Barents Sea cost estimate for the slender design is displayed below in Figure 74.

Total Cost to P&A: No Discovery (No	ovaluati	n) - I	modiat	D9 4							od w	inger eath	er		ad we	ingen eathei	r		od w	ngeno eathe	er		contingency. ad weather
Total Cost to P&A: No Discovery (No					P&A							4,141				7,762 0,291				6,555 8,974			\$30,176,567 \$32,925,468
······································																					<u> </u>		
Revision 0		r –																Rental	sand	Perso	nnel	Lum	o Sum Material
Phase		Detaile	Phase D	escript	ion					Nu	nber	of Day	ys	9	Section	n Cost		(Inclu				cum	Costs
Predrill		Overheads, class charges, levies, insurance premiums and environmental costs N/A								'A		\$		2,834	,500	\$			-	\$	-		
Pre-spud			l includes , DP et al		move	costs ir	ncl. mo	obilisatic	n,		2.1 d	lays		\$		447	,579	\$ 404,870				\$	42,708
Surface Hole to 950 mMDRT			ection TE								4.6 d	lays		\$		2,039	,324	\$		1,541	,548	\$	497,777
Surface Casing			Includes wiper trip and lay out BHA, rig up casing gear, run casing and cement casing						ar,		3.5 d	lays		\$		1,882	,329	\$		1,177	,182	\$	705,147
LOT and Test		Include	full onlir	e BOP	test						2.8 d	lays		\$		1,017	,054	\$		933	,179	\$	83,875
Intermediate Hole to 2100 mMDRT		Drill to :	ection TE	) only							7.9 d	lays		\$		3,284	,371	\$		2,662	,674	\$	621,698
Intermediate Casing		Include	wiper tri ng and ce	p and l		BHA, r	ig up c	casing ge	ar,		3.7 d			\$		2,173		\$		1,233		\$	940,010
LOT and Test			full onlin								2.5 d	lavs		\$		994	594	\$		848	,344	\$	146,250
Production Hole to 2497 mMDRT		Drill pro	duction h	ole to s	ection		us any	additior	nal		7.1 d			\$		2,637		\$		2,403		\$	233,773
Evaluation		Include	on while wiper tri	p and l	ayout I	-	pplica	ble to			544	lave		\$		2 1 9 9	121	\$		1 8 2 9	079	\$	361,042
Production Liner		wireline logging - not coring     5.4 days     \$ 2,199,121     \$ 1,838,079       Includes wiper trip during and post-logging, then     4.3 days     \$ 2,318,227     \$ 1,442,185								\$ \$	876,041												
		running and cementing casing																					
Rig Release									\$	349,500													
TOTALS											44.1 (	days		\$	2	2,290	,374	\$	1	4,598	,054	\$	4,857,820
																					7-3 Actu 9-1 Actu		-
2250		$\sim$									/												
2500				_																			-
2750															$\sim$			$\sim$	_				-
3000				_		_																	
3250 0 5	10	15	20		25		30	35		40			45		50	5	s	6	5		65		70
								Days from	n Spud														
Assumptions and Scope Change										Cost Ca													Total Cost
<ul> <li>Performance: common drilling and casir work (BOP N/U, testing, logging etc.);</li> </ul>	ig running s	peeds fo	r both we	ells in ad	dition	to equ	ual inte	er-sectio	n	Mobilis			nobilis	ation	Costs							\$	1,410,000
<ul> <li>No bit trips;</li> </ul>										Staff Sa Overhe			on									\$ \$	440,833 3,200,000
<ul> <li>Wiper trip TD to surface on second inter- contingent 15 hours for production section)</li> </ul>		d produ	tion hole	section	ns (30 l	hours f	or inte	ermedia	te	Rig Cos		JUCALI	011									\$ \$	9,425,000
<ul> <li>section, 15 hours for production section);</li> <li>10 days post-drilled TD time (incl. loggir</li> </ul>		g for pro	duction h	ole sec	tion &	casing	and re	ementin		HSE an		liting										\$	1,300,000
assuming discovery);	0 00.111	0.2. p.0							5	Evaluat		6										\$	5,180,417
P&A assumed as lump-sum cost as deta					,					Subsea		ks										\$	58,000
<ul> <li>Evaluation in intermediate hole sections</li> <li>CBL for second intermediate casing and</li> </ul>				. No su	irtace l	nole lo	gging;			Comm												\$	282,042
<ul> <li>No DST's/MDT's (omitted from offset w</li> </ul>	ell TVD curv	ves), cori	ig assume							Transp	ort											\$	1,202,083
Drill times commensurate with offset w	ells. Offset	wells ha	e been c	urtailed	at dri	illed T	), with	10 days	;	Casing	and A	Access	ories									\$	705,850
added for post drill activities.										Wellhe												\$	825,888
Incremental Costs From a Standard Well Cementing												\$	686,156										
Activity / Item         Time         Cost         Mud           Coring (120m / 27m = 5 runs)         2.5 days         \$ 1,150,000         Miscellaneous Equipment										\$	460,583												
Coring (120m / 27m = 5 runs)		<u> </u>	2.5 day		\$			1,150,		Miscell Drilling												\$ \$	249,071
Plug and Abandonment			5.0 day	3	\$			2,900,	-	Class C			upme									\$ \$	265,451 154,000
					\$				-	Field Pi			Servic	es								\$ \$	495,000
					\$				-	CONTI												\$	2,634,037
TOTAL			7.50 day	/5	\$			4,050,		TOTAL				Weat	her)							\$	28,974,412
		1		~	, I			-,050,	200	- SIAL	,, . <u>.</u>		2000	aut	,							*	

Figure 74 - Barents Sea slender study well cost estimate

Also presented is a cost/time comparison for two options. See Figure 75 and Figure 76.

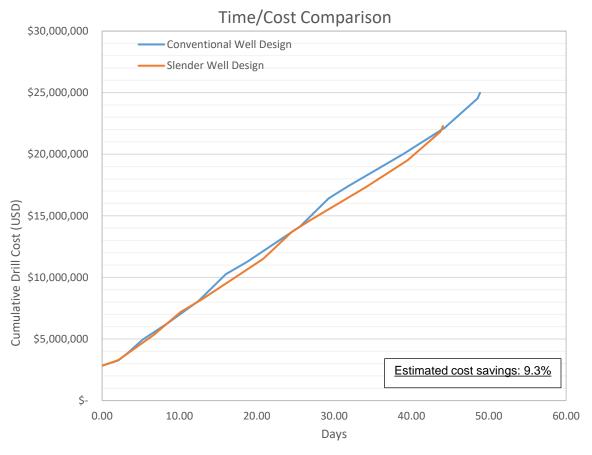
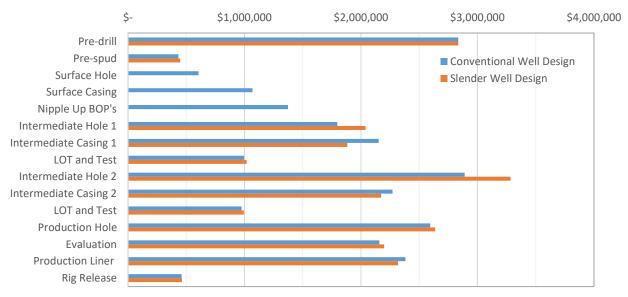


Figure 75 - Barents Sea time/cost comparison



# Phase Cost Comparison



# 3.5.3 Norwegian Sea

The Norwegian Sea cost estimate for the conventional design is displayed below in Figure 77.

				w/o conting Good wea		-	ontingency. weather	w/ contingency. Good weather		/ contingency. Bad weather
Total Cost to P&A: No Discovery (No evaluatio				\$25,	558,594		\$29,392,383	\$28,114,453	3	\$31,948,243
Total Cost to Case and Suspend: Discovery (w/	Evaluation) + Future P&	A		Ş27,	772,260		\$31,938,099	\$30,549,486		\$34,715,326
Revision 0				T						
Phase	Detailed Phase Description			Number of	Days	See	tion Cost	Rentals and Personne (Including Rig Rates)		np Sum Material Costs
Predrill	Overheads, class charges, le and environmental costs			N/A		\$	2,834,500	\$-	\$	-
Pre-spud	Pre-spud includes all rig mov mooring, DP et al.	ve costs incl. m	obilisation,	2.1 day	s	\$	453,173	\$ 410,465	\$	42,708
Surface Hole to 915 mMDRT	Drill to section TD only			1.5 day	s	\$	693,679	\$ 498,784	\$	194,896
	Includes wiper trip and lay o run casing and cement casin		casing gear,	1.7 day	s	\$	1,118,538	\$ 570,038	\$	548,500
Nipple Up BOP's	Includes full online BOP test			2.3 day	S	\$	1,045,887	\$ 798,054	\$	247,833
Intermediate Hole 1 to 2220 mMDRT	Drill to section TD only			4.0 day	s	\$	1,837,695	\$ 1,341,966	\$	495,729
Intermediate Casing 1	Includes wiper trip and lay o run casing and cement casin		casing gear,	2.6 day	s	\$	2,101,268	\$ 875,809	\$	1,225,458
LOT and Test	Includes full online BOP test			1.7 day	s	\$	620,872	\$ 570,038	\$	50,833
Intermediate Hole 2 to 2906 mMDRT	Drill to section TD only			6.9 day	s	\$	2,960,471	\$ 2,330,783	\$	629,688
	Includes wiper trip and lay o run casing and cement casin		casing gear,	2.9 day	s	\$	2,207,309	\$ 988,817	\$	1,218,492
LOT and Test	Includes full online BOP test			2.5 day	s	\$	1,001,308	\$ 855,058	\$	146,250
	Drill production hole to sect evaluation while drilling i.e.	4.6 day	s	\$	1,761,564	\$ 1,567,606	\$	193,958		
Evaluation	Includes wiper trip and layo wireline logging - not coring	5.4 day	s	\$	2,213,666	\$ 1,852,625	\$	361,042		
Production Liner	Includes wiper trip during ar running and cementing casir		, then	4.3 day	s	\$	2,408,823	\$ 1,453,598	\$	955,225
Rig Release	Requires final tree installation	on and release	of the rig	0.3 day	'S	\$	463,508	\$ 114,008	\$	349,500
TOTALS				42.6 da	ys	\$	23,722,260	\$ 14,227,648	\$	6,660,113
Language de la companya de la compan	1 2 2 2 2 2 2 2 2 2 2 2	20	a construction of the second s		45	50	55	69 65	al	
Assumptions and Scope Change				Cost Category						Total Cost
Performance: common drilling and casing running sp	eeds for both wells in addit	ion to equal in	ter-section	Mobilisation /	Demobili	sation Co	sts		\$	1,410,000
<ul><li>work (BOP N/U, testing, logging etc.);</li><li>No bit trips;</li></ul>				Staff Salaries					\$	426,250
<ul> <li>Wiper trip TD to surface on second intermediate and section, 15 hours for production section);</li> </ul>	d production hole sections (3	30 hours for in	ermediate	Overhead Alloo Rig Costs	ation				\$ \$	3,200,000 9,067,292
<ul> <li>10 days post-drilled TD time (incl. logging and coring</li> </ul>	for production hole section	& casing and	cementing	HSE and Auditi	\$	1,300,000				
<ul> <li>assuming discovery);</li> <li>P&amp;A assumed as lump-sum cost as detailed above;</li> </ul>				Evaluation					\$	5,173,125
Evaluation in intermediate hole sections (Quad-Com		ce hole logging	;	Subsea Works Communicatio	\$ \$	58,000 281,313				
<ul> <li>CBL for second intermediate casing and production</li> <li>No DST's/MDT's (omitted from offset well TVD curve)</li> </ul>	Transport	\$	1,165,625							
<ul> <li>Drill times commensurate with offset wells. Offset warded for post drill activities.</li> </ul>	Casing and Acc	\$	1,834,800							
Incremental Costs From a Standard Well	Wellhead Cementing	\$ \$	1,110,000 910,000							
Activity / Item	Time	Co	st	Mud					\$	578,125
Coring (120m / 27m = 5 runs)	2.5 days	\$	1,150,000	Miscellaneous					\$	240,831
Plug and Abandonment	5.0 days	\$	2,900,000	Drilling Tools &	Equipm	ent			\$	375,400
		\$ \$	-	Class Charges Field Profession	nal Servic	es			\$ \$	154,000 487,500
		\$	-	CONTINGENCY					\$	2,777,226

Figure 77 - Norwegian Sea conventional study well cost estimate

The cost estimate for the slender option is presented below, together with the appropriate scaling factors (which draw on the same assumptions outlined in 3.5.2.

The scaling factors are shown below in Table 17, and the cost estimate shown in Figure 78. Note there is no need to scale the production hole section, since there is no change in hole size and negligible change in casing specifications.

### Wellheads and Casing

	Surface
Original casing OD (in)	20
New casing OD (in)	9 5/8
% change	48%
Mud	
	Surface
Original hole OD (in)	26
Original depth interval (m)	492

Original depth interval (m)	492
Original Volume (bbl)	1060
New hole OD (in)	12 1/4
New depth (m)	928
New Volume (bbl)	444
% change	42%

### Cement

	Surface
Original hole OD (in)	26
Original casing OD (in)	20
Original annular capacity	
(b/ft)	0.27
Original depth (m)	914
Original TOC (m)	363
Original CMT vol (bbl)	485
New hole OD (in)	12 1/4
New casing OD (in)	9 5/8
New annular capacity (b/ft)	0.06
New depth (m)	1350
New TOC (m)	363
New CMT vol (bbl)	181
% change	37%

### Bits

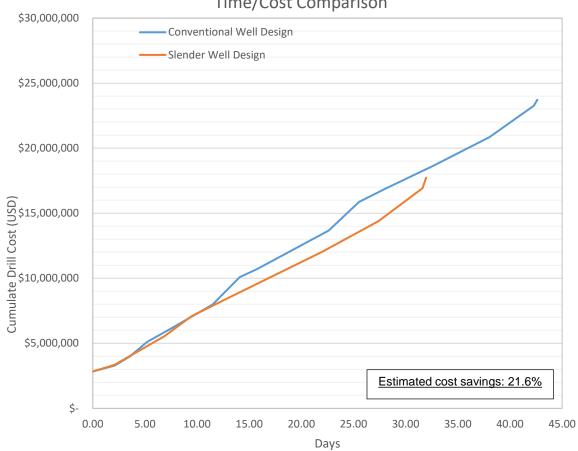
	Surface
Original hole OD (in)	26
New hole OD (in)	12 1/4
% change	47%

Table 17 - Scaling factors for Norwegian Sea slender well design cost estimate

Total Cost to P&A: No Discovery (No e			w/o contingency. Good weather \$19,418,070		o contingency. Bad weather \$22,330,780	Go	contingency. Dod weather \$21,359,877		/ contingency. Bad weather \$24,272,587
Total Cost to Case and Suspend: Disco	very (w/ Evaluation) + Future P	&A	\$21,778,490		\$25,045,263		\$23,956,338		\$27,223,112
Revision 0									
Phase	Detailed Phase Description	ı	Number of Days		Section Cost		als and Personnel	Lur	np Sum Material
	Overheads, class charges, I	evies insurance premiums					uding Rig Rates)		Costs
Predrill	and environmental costs	ove costs incl. mobilisation,	N/A	\$	2,834,500	\$		\$	
Pre-spud	mooring, DP et al.	ve costs incl. mobilisation,	2.1 days	\$	509,617	\$	466,908	\$	42,708
Surface Hole to 1350 mMDRT	Drill to section TD only		4.8 days	\$	2,205,937	\$	1,754,306	\$	451,631
Surface Casing	Includes wiper trip and lay run casing and cement casi	out BHA, rig up casing gear, ng	2.6 days	\$	1,523,744	\$	945,800	\$	577,944
LOT and Test	Includes full online BOP tes	st	2.9 days	\$	1,165,547	\$	1,076,588	\$	88,958
Production Hole to 3300 mMDRT	Drill production hole to see evaluation while drilling i.e	tion TD plus any additional . coring	9.6 days	\$	3,778,820	\$	3,537,361	\$	241,458
Evaluation	Includes wiper trip and lay wireline logging - not corin		5.4 days	\$	2,360,420	\$	1,999,378	\$	361,042
Production Casing	oduction Casing Includes wiper trip during and post-logging, then running and cementing casing					\$	1,568,743	\$	978,625
Rig Release	Requires final tree installat	ion and release of the rig	0.3 days	\$	802,539	\$	123,039	\$	679,500
TOTALS			32.0 days	\$	17,728,490	\$	11,472,123	\$	3,421,867
		20 25 Days from Spud			59 55				2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Assumptions and Scope Change • Performance: common drilling and casing i	running speeds for both wells in add	ition to equal inter-section	Cost Category Mobilisation / Demobilis	ation	Costs			\$	Total Cost 1,410,000
work (BOP N/U, testing, logging etc.);	0		Staff Salaries					\$ \$	319,583
<ul> <li>No bit trips;</li> <li>Wiper trip TD to surface on second interm</li> </ul>	ediate and production hole sections	(30 hours for intermediate	Overhead Allocation					\$	3,200,000
section, 15 hours for production section);	care and production noic sections	1.2.2	Rig Costs					\$	6,671,875
• 10 days post-drilled TD time (incl. logging a	and coring for production hole sectio	n & casing and cementing	HSE and Auditing					\$	1,300,000
assuming discovery); • P&A assumed as lump-sum cost as detailed	d above:		Evaluation					\$	4,799,792
Evaluation in intermediate hole sections (Content of the sections)		ace hole logging;	Subsea Works					\$ ¢	58,000
<ul> <li>CBL for second intermediate casing and pr</li> </ul>	oduction liner only;		Communications		\$ \$	275,979			
No DST's/MDT's (omitted from offset well TVD curves), coring assumed as lump sum cost;     Drill times commensurate with offset wells. Offset wells have been curtailed at drilled TD, with 10 days     Casing and Accessories									898,958
<ul> <li>Drift times commensurate with onset wells added for post drill activities.</li> </ul>	a. Griset wens nave been turtdiled a	Conneu 10, with 10 udys	Casing and Accessories Wellhead					\$ \$	658,208 406,250
Incremental Costs From a Standard Well			Cementing					\$ \$	406,250 532,361
Activity / Item	Time	Cost	Mud					ې \$	347,008
Coring (120m / 27m = 5 runs)	2.5 days	\$ 1,150,000	Miscellaneous Equipmer	nt				\$ \$	180,565
Plug and Abandonment	5.0 days							\$	179,536
		\$ -	Class Charges					\$	154,000
		\$ -	Field Professional Service	es				\$	386,375
		ş -	CONTINGENCY OF 10%					\$	2,177,849
		1						•	,,545

Figure 78 - Norwegian Sea slender well drill cost estimate

Also presented is a cost/time comparison for two options. See Figure 79 and Figure 80.









Time/Cost Comparison

# 3.5.4 North Sea

The Norwegian Sea cost estimate for the conventional design is displayed below in Figure 81.

	to P&A: No Discovery	(No evalu	ation	1) + In	media	ate P	۶Δ							od we	gency. ather 225,35		o continge Bad weathe \$25,55	r	Goo	ontingeno od weathe \$24,447	r		ontingency. I weather \$27,781,690
	to Case and Suspend:							P&A							570,86		\$28,25			\$27,027			\$30,713,586
Revision 0 Phase				Detaile	d Phase	e Des	criptio	on					Nun	nber of	Davs		Section Cos			and Perso		Lump	Sum Material
Predrill					ads, cla		-		, insur	ance p	oremiun	ns		N/A		\$		1,500	(Inclu	ding Rig Rat		\$	Costs
				and environmental costs Pre-spud includes all rig move costs incl. mobilisation,						m.											-		
Pre-spud				mooring, DP et al.						,		2.1 da	/S	\$	50	3,885	\$	461,		\$	42,708		
Surface Hole	e to 573 mMDRT				section							_		0.8 da	/S	\$	48	7,387	\$	305,	.304	\$	182,083
Surface Casir	ng				s wiper ing and				3HA, ri	ig up c	asing ge	ear,		1.0 da	/s	\$	77	5,517	\$	381,	630	\$	393,888
Nipple Up BC	OP's		Ir	nclude	s full or	nline I	BOP to	est						1.3 da	/s	\$	68	8,581	\$	457,	956	\$	225,625
Intermediate	e Hole 1 to 1528 mMDRT		D	orill to	section	TD o	nly							2.4 da	/s	\$	1,32	5,839	\$	878,	131	\$	448,708
Intermediate	e Casing 1				s wiper ing and				BHA, ri	ig up c	asing ge	ear,		1.8 da	/s	\$	1,65	5,152	\$	666,	168	\$	988,983
LOT and Test	t				s full or									2.1 da	/s	\$	82	5,801	\$	763,	260	\$	63,542
Intermediate	e Hole 2 to 2691 mMDRT		D	Orill to	section	TD o	nly							4.2 da	/s	\$	2,06	L,103	\$	1,514,	.019	\$	547,083
Intermediate	e Casing 2				s wiper				BHA, ri	ig up c	asing ge	ear,		2.1 da	/S	\$	1,90	),418	\$	757,	.010	\$	1,143,408
LOT and Test			_		ing and s full or			-						1.9 da		\$	81	,121	\$	686,		\$	127,188
	Hole to 3173 mMDRT		D	Drill production hole to section TD plus any additional evaluation while drilling i.e. coring					nal		3.1 da		\$		3,952		1,144,		\$	164,063			
Evaluation			Ir	Includes wiper trip and layout BHA. Applicable to wireline logging - not coring							5.4 da	/s	\$	\$ 2,345,517		\$ 1,984,475		.475	\$	361,042			
Production L	Liner			Includes wiper trip during and post-logging, then running and cementing casing								4.3 da	/s	\$	2,52	5,475	\$	1,557,	.050	\$	968,425		
Rig Release			R	tequire	es final t	tree ii	nstalla	ation a	nd rel	ease o	f the rig			0.3 da	/s	\$	47	L,622	\$	122,	122	\$	349,500
TOTALS													3	32.8 da	ys	\$	20,52	),869	\$	11,680,	123	\$	6,006,246
mMDRT)																					Sea Plar 5 Actual		
Depth	2250	-+	$\square$	_	1	_												-					
	2750				+							_						-					
	3000				D		-/		_	-													
	3500			_			_							_	_	_		-					
	4000 0 5	10	15		20		2	5		10	35		40		45		50	55	60		65	70	
								-			Days from	n Spud											
	s and Scope Change ace: common drilling and c	asing runni	ing spe	eeds fo	or both	wells	in ad	dition	to equ	ial inte	er-sectio	n	Cost Cat Mobilisa		Demob	ilisatio	n Costs					т \$	otal Cost 1,410,000
	I/U, testing, logging etc.);												Staff Sal									\$	327,917
	s; TD to surface on second i	ntermediate	e and	produ	ction h	ole se	ection	s (30 h	ours f	or inte	rmedia	te	Overhea		cation							\$	3,200,000
	nours for production section ost-drilled TD time (incl. lo		a sin a d	for pre	- du atio	n hold	. conti		acing		montin	~	Rig Cost HSE and									\$ \$	6,892,708 1,300,000
assuming dis		gging and co	Uning I	ioi pic	Junction	ITTIOIC	secu		asing		mentin	Б	Evaluati		ing							\$	5,123,958
	ned as lump-sum cost as o in intermediate hole sect			o or o	quivala	nt) P	No cui	rfaca h		aging.			Subsea									\$	58,000
<ul> <li>CBL for sec</li> </ul>	cond intermediate casing	and product	tion lir	ner on	ily;								Commu		ns							\$	276,396
No DST's/MDT's (omitted from offset well TVD curves), coring assumed as lump sum cost;     Drill times commensurate with offset wells. Offset wells have been curtailed at drilled TD, with 10 days     Casing and Accessories											\$ \$	919,792											
added for post drill activities.												\$ \$	1,110,000										
Incremental	Costs From a Standard V	Vell						-					Cement	ing								\$	910,000
	em		$\rightarrow$		Tim			\$		Cos	t 1,150,		Mud		Equipm	ont						\$ \$	528,958 185,273
Activity / Ite	m/27m = Ermc														CUUIDN	ien(							185,2/3
Activity / Ite	m / 27m = 5 runs) andonment				2.5 d			\$			2,900					nent						\$	343,933
Activity / Ite Coring (120n														Tools 8		nent							
Activity / Ite Coring (120n								\$				-	Drilling	Tools & narges ofessic	& Equip	rices						\$	343,933

Figure 81 - North Sea conventional study well cost estimate

As previous, the scaling factors for the North Sea estimate are presented below in Table 18.

Casing			
	Surface	Intermediate	Production
Original casing OD (in)	20	13 3/8	7
New casing OD (in)	11 3/4	9 5/8	7
% change	59%	72%	100%
<b></b>			
Wellheads			
	Surface	Intermediate	Production
Original casing OD (in)	20	13 3/8	7
New casing OD (in)	11 3/4	9 5/8	7
% change	59%	72%	100%
Mud			
	Surface	Intermediate	Production
Original hole OD (in)	26	17 1/2	8 1/2
Original depth interval (m)	414	1369	623
Original Volume (bbl)	892	1336	143
New hole OD (in)	13 1/2	12 1/4	8 1/2
New depth (m)	541	1850	623
New Volume (bbl)	314	885	143
% change	35%	66%	100%
Cement			
	Surface	Intermediate	Production
Original hole OD (in)	26	17 1/2	8 1/2
Original casing OD (in)	20	13 3/8	7
Original annular capacity			
(b/ft)	0.27	0.12	0.02
Original depth (m)	573	1528	3173
Original TOC (m)	123	1300	2550
Original CMT vol (bbl)	396	93	46
New hole OD (in)	13 1/2	12 1/4	8 1/2
New casing OD (in)	11 3/4	9 5/8	7
New annular capacity (b/ft)	0.04	0.06	0.02
New depth (m)	700	2550	3173
New TOC (m)	123	2000	2550
New CMT vol (bbl)	81	101	46
% change	21%	109%	100%
Bits			
	Surface	Intermediate	Production
Original hole OD (in)	26	17 1/2	8 1/2
New hole OD (in)	13 1/2	12 1/4	8 1/2
% change	52%	70%	100%

Table 18 - Scaling factors for North Sea slender design cost estimate

The cost estimate for the North Sea slender well design is shown below in . In addition to the assumptions stated above and herein, there is an addition US2000- per day for directional services and 2 x US2000- per day for directional drilling engineers. US20,000- has been allowed for pre-well directional drilling mobilisation charges. These charges are due to the need for RSS services and under-reaming in the surface and intermediate hole sections.

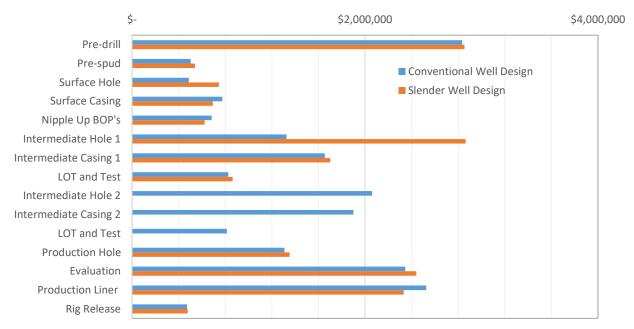
Total Cost to P&A: No Discovery (W Evaluation) + Future P&A         512,067,272         521,061,287         521,065,489         522,050,649           Total Cost to Case and Suspend: Discovery (W Evaluation) + Future P&A         521,537,733         524,765,514         522,651,649         522,651,649           Maxe         Detailed Phase Description         Number of Days         Section Cost         Rendal and Personnel (Moduling RR Bates)         Immediate PA         5         2,654,500         \$         -         \$           Presipud         Overheads, class charges, levies, insurance preniums and environmental costs         N/A         \$         2,854,500         \$         -         \$           Surface Casing         mooring, Det etal.         Droll to section TD only         1.7 days         \$         745,659         \$         640,008         \$           Nipble Up BOP's         includes full online BOP test         1.3 days         \$         643,043         \$         480,006         \$           LOT and Test         Includes full online BOP test         1.3 days         \$         1.320,117         \$         1.200,014         \$           Production Hole to 3173 mMDRT         Drill porduction hole to section TD pilk any additional evaluation         S         1.430,43         \$         1.320,115         \$         1.200,016	ntingency. weather
Name       Description       Description       Nome       Particip       Particip<	\$23,870,96
manage       Decalled Place Description       Number of Day       Section CP       Network of Day (Refer to the Construction of Day (Refer to	\$26,922,29
main	
network       normal ords, das, das, das, das, das, das, das, d	im Material Costs
memory         memory         Det al.         Z.1 day         3 <th3< th="">         3         <th3< th=""> <th3< th=""></th3<></th3<></th3<>	-
Surface kide to 700 mMQRT       OPI to section TO only       I.7 days       S       7.45,500       S       6.40,000       S         Nighe to 700 mMQRT       Includes wher trip and up out PMA, rig up casing gener       I.0 days       S       6.00,20,00       S       4.40,000       S         Nighe to 705       Includes full online 500 twit       I.0 days       S       0.20,000       S       0.20,000       S       0.000       S       0.0000       S <td< td=""><td>42,708</td></td<>	42,708
Diract Cating         mun casing and cenent casing         1.1 days         3         0.00,00         3         0.00,00         5           Nipple Up DOPS         notudes full online BOP test         1.3 days         5         0.23,131         5         0.23,137         5         0.20,000         5           Production hole to 2173 mMDPT         Diright optic fung and post logging, then unitide wing and dost logging and ant post logging and ant post logging ant an	105,651
Intermediate Hole 1 to 250 mMORT         Drill to section TD only         6.3 days         \$ 2,864,903	293,425
Intermediate Casing 1       Includes wijer if yand by out BMA, ris up casing gear. In casing and cenert casing       1.8 days       \$       1.700,700       \$       608,000       \$         COT and Text       Includes fuil online BOP text       2.1 days       \$       8.83,351       \$       800,000       \$         Production Hole to 3173 mMDRT       Drill production hole to section TD plax any additional englation while of Hilling i.c. cording       3.1 days       \$       2.44,006       \$       2.080,005       \$         Production Liner       Includes while risting and post-logging, then making and cementing casing       0.3 days       \$       4.77,502       \$       1.86,000       \$         TotAL       Production Liner       Includes where trip during and post-logging, then making and cementing casing       0.3 days       \$       4.77,502       \$       1.98,000       \$         TotAL       Production Liner       Includes where trip during and post-logging, then making and cementing casing       Includes where trip during and post-logging, then production Liner       1.8 days       \$       4.7,602,800       \$       1.98,000       \$         TotAL       Production Liner       Includes where trip during and post-logging, then production Liner       1.99,000       1.99,000       1.99,000       1.99,000       1.99,000       1.99,000       1.99,000 <t< td=""><td>143,125</td></t<>	143,125
Intermediate Cading 1         run cading and generatic cading         I. J. Outry 3         S         I. J. Outry 3         S         I. J. Outry 3         S         I. Outry 3         S <th< td=""><td>482,625</td></th<>	482,625
Production Hole to 3373 mMDRT       Orill production hole to section TD plus any additional evaluation while the gene action much evaluation while the gene action much evaluation while the gene action much evaluation much evaluation while the gene action much evaluation much evaluatin much evaluatin much evaluation much eval	1,002,242
Production note: US JY Similar, Vieweight ending Lie. coring       S. Luyrs       S       1,352,217       S       1,000,014       S         Caluation       Includes wiper trip and layout BHA. Applicable to writene logging - not coring       S. Luyrs       S       2,331,594       S       1,632,013       S         Production Liner       Includes wiper trip during and penetroling caning       G. S. duyrs       S       2,331,594       S       1,632,013       S         TOTALS       29.3 days       S       1,742,7302       S       1,032,013       S         Total       29.3 days       S       1,742,7302       S       1,032,013       S         Total       0       <	63,542
valuation       wireline loging - not coring       3 4 anys       3 4 anys       3 4 anys       5 1 anys       5	152,103
And Data Starting       And Starty       S       2,33,1394       S       1,162,003       S         TOTALS       233, days       S       4,3,0 days       S       477,502       S       128,000       S         TOTALS       293, days       S       17,487,838       S       10,937,800       S       10,937,800       S         Total       293, days       S       17,487,838       S       10,937,800	361,042
TOTALS       29.3 days       \$       17,487,838       \$       10,937,800       \$         Totals	699,575
Assumptions and Scope Change         Cost Category         Tot           Performance: common drilling and casing running speeds for both wells in addition to equal inter-section Spate         Source Spate         Source Spate           Performance: common drilling and casing running speeds for both wells in addition to equal inter-section Spate         Source Spate         Source Spate           Performance: common drilling and casing running speeds for both wells in addition to equal inter-section Spate         Source Spate         Source Spate           10 days post-drilled TD time (incl. logging and coring for production hole sections & (30 hours for intermediate assign and production hile sections & (30 hours for intermediate assign and production hile sections & (30 hours for intermediate assign and production hile sections & casing and cementring Spate         Source-spate         Source-spate           10 days post-drilled TD time (incl. logging and coring for production hole sections & casing and cementring Spate         Source-spate         Source-spate         Source-spate           10 days post-drilled TD time (incl. logging and coring for production hile sections & casing and cementring Spate         Source-spate         Source-spate         Source-spate           10 days post-drilled TD time (incl. logging and coring for production hile sections (20 down or equivalent). No surface hole logging:         Source-spate         Source-spate           10 dimes commensate with offset well No coursel, coring assumed as lump sum cost;         Source-spate         Source-spate	349,500
Assumptions and Scope Change       Cost Category       Tori         • Performance: common drilling and casing running speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds for both wells in addition to equal inter-section scope speeds in the section scope speed spee	3,695,538
Assumptions and Scope Change       Cost Category       Tot         4. Sevenptions and Scope Change       Cost Category       Tot         • Performance: common drilling and casing running speeds for both wells in addition to equal inter-section work (BOP N/U, testing, logging etc.);       Mobilisation / Demobilisation Costs       \$         • No bit trips;       Staff Salaries       \$         • Wiper trip TD to surface on second intermediate and production hole sections (30 hours for intermediate section, 15 hours for production section);       \$       No bit strips;       \$         • 10 days post-drilled TD time (incl. logging and coring for production hole section & casing and cementing assuming discovery);       HSE and Auditing       \$         • P&A assumed as lump-sum cost as detailed above;       Evaluation       \$       \$         • CBL for second intermediate casing and production liner only;       Evaluation       \$       \$         • Drill times commensurate with offset well TVD curves), coring assumed as lump sum cost;       Transport       \$       \$         • Drill times commensurate with offset wells. Offset wells have been curtailed at drilled TD, with 10 days       \$       \$       \$         • Incremental Costs From a Standard Well       Time       Cost       Mud       \$         • Coring (120m / 27m = 5 runs)       2.5 days       \$ 1,150,000       Miscelaneous Equipment       \$ <t< td=""><td></td></t<>	
Performance: common drilling and casing running speeds for both wells in addition to equal inter-section work (BOP N/U, testing, logging etc.);     No bit trips;     Wiper trip TD to surface on second intermediate and production hole sections (30 hours for intermediate section, 15 hours for production section);     10 days post-drilled TD time (incl. logging and coring for production hole section & casing and cementing assuming discovery);     P&A assumed as lump-sum cost as detailed above;     Evaluation in intermediate hole sections (Quad-Combo or equivalent). No surface hole logging;     CBL for second intermediate casing and production liner only;     No DST's/NDT's (omitted from offset well's ND been curtailed at drilled TD, with 10 days added for post drill activities.     Incremental Costs From a Standard Well     Coring (120m / 27m = 5 runs)         2.5 days         5.0 days         \$         2.5 days         5	al Cost
work (BOP N/U, testing, logging etc.);       Staff Salaries       \$         • No bit trips;       Staff Salaries       \$         • Wiper trip TD to surface on second intermediate and production hole sections (30 hours for intermediate section, 15 hours for production section);       Staff Salaries       \$         • 10 days post-drilled TD time (incl. logging and coring for production hole section & casing and cementing assuming discovery);       Rig Costs       \$         • P&A assumed as lump-sum cost as detailed above;       • Vealuation       \$       \$         • Cast for second intermediate casing and production liner only;       Subsea Works       \$         • Dolft limes commensurate with offset wells. Offset wells have been curtailed at drilled TD, with 10 days added for post drill activities.       \$         Incremental Costs From a Standard Well       Time       Cost       Mule       \$         Coring (120m / 27m = 5 runs)       2.5 days       \$ 1,150,000       Miscelaneous Equipment       \$         Plug and Abandonment       5.0 days       \$ 2,900,000       Miscelaneous Equipment       \$         Plug and Abandonment       \$       \$       Class Charges       \$	1,410,000
• Wiper trip TD to surface on second intermediate and production hole sections (30 hours for intermediate action, 15 hours for production section);     • Overhead Allocation     \$       • No post-Ardilled TD time (incl. logging and coring for production hole section & casing and cementing assuming discovery);     • Rig Costs     \$       • P&A assumed as lump-sum cost as detailed above;     • Veluation     \$       • Evaluation in intermediate hole sections (Quad-Combo or equivalent). No surface hole logging;     • Subsea Works     \$       • CBL for second intermediate casing and production liner only;     • Communications     \$       • No DST's/MDT's (omitted from offset well TVD curves), coring assumed as lump sum cost;     • Transport     \$       • Drill times commensurate with offset wells. Offset wells have been curtailed at virilied TD, with 10 days     \$     \$       • Activity / tem     • Cementing     \$       • Coring (120m / 27m = 5 runs)     2.5 days     \$ 1,150,000     Miscellaneous Equipment     \$       • Plug and Abandonment     5.0 days     \$ 2,900,000     Miscellaneous Equipment     \$       • Plug and Abandonment     \$     \$     \$     \$	293,333
Section (), Divide production production production hole section & casing and cementing assuming discovery); <ul> <li>P&amp;A assumed as lump-sum cost as detailed above;</li> <li>Evaluation in intermediate hole sections (Quad-Combo or equivalent). No surface hole logging;</li> <li>CBL for second intermediate casing and production liner only;</li> <li>No DST's/MDT's (omitted from offset well TVD curves), coring assumed as lump sum cost;</li> <li>Transport</li> <li>Communications</li> <li>Casing and Accessories</li> <li>Wellhead</li> <li>Cententing</li> </ul> <ul> <li>Activity / tem</li> <li>Time</li> <li>Cost</li> <li>Musclandomment</li> <li>S.0 days</li> <li>S.0 days</li> <li>S.0 days</li> <li>S.0 class Charges</li> <li>S.0 class Charges</li> </ul>	3,200,000
assuming discovery); + P&A assumed as lump-sum cost as detailed above; + P&A assumed as lump-sum cost as detailed above; + CBL for second intermediate casing and production liner only; + No DST's/MDT's (omitted from offset well TVD curves), coring assumed as lump sum cost; + Orill times commensurate with offset wells. Offset wells have been curtailed at drilled TD, with 10 days added for post drill activities. Haremental Costs From a Standard Well Activity / Item Time Cost Mud Coring (120m / 27m = 5 runs) 2.5 days \$ 1,150,000 Miscellaneous Equipment \$ Plug and Abandonment 5.0 days \$ 2,900,000 Miscellaneous Equipment \$ Class Charges \$ Class Charges \$ Case Charges \$	6,106,250
	1,300,000
Evaluation in intermediate hole sections (Quad-Combo or equivalent). No surface hole logging; CBL for second intermediate casing and production liner only; No DST's/MDT's (omitted from offset wells Coring assumed as lump sum cost; Drill times commensurate with offset wells. Offset wells have been curtailed at drilled TD, with 10 days dided for post drill activities. Incremental Costs From a Standard Well Coring (120m / 27m = 5 runs) Plug and Abandonment So days So days	4,786,667
• No DSTS/MDT's (omitted from offset well TVD curves), coring assumed as lump sum cost;     Transport     \$       • Do DSTS/MDT's (omitted from offset wells. Offset wells have been curtailed at drilled TD, with 10 days added for post drill activities.     Transport     \$       • Dremental Costs From a Standard Well      \$     Wellhead     \$       • Activity / Item     Time     Cost     Mud     \$       Coring (120m / 27m = 5 runs)     2.5 days     \$ 1,150,000     Miscelaneous Equipment     \$       Plug and Abandonment     5.0 days     \$ 2,900,000     Drilling Tools & Equipment     \$	274,667
Wellhead         \$           Wellhead         \$           Incremental Costs From a Standard Well         \$           Cementing         \$           Activity / Item         Time         Cost         Mud         \$           Coring (120m / 27m = 5 runs)         2.5 days         \$ 1,150,000         Miscelaneous Equipment         \$           Plug and Abandonment         5.0 days         \$ 2,900,000         Drilling Tools & Equipment         \$           S         2,000,000         Class Charges         \$         \$         \$	833,333
Incremental Costs From a Standard Well         Cementing         Second Standard Well         \$           Activity / Item         Time         Cost         Mud         \$           Coring (120m / 27m = 5 runs)         2.5 days         \$ 1,150,000         Miscellaneous Equipment         \$           Plug and Abandonment         5.0 days         \$ 2,900,000         Drilling Tools & Equipment         \$	926,631
Activity / Item         Time         Cost         Mud         \$           Coring (120m / 27m = 5 runs)         2.5 days         \$ 1,150,000         Miscellaneous Equipment         \$           Plug and Abandonment         5.0 days         \$ 2,900,000         Drilling Tools & Equipment         \$           \$         Class Charges         \$         \$         \$	643,388 374,495
Coring (120m / 27m = 5 runs)         2.5 days         \$ 1,150,000         Miscellaneous Equipment         \$           Plug and Abandonment         5.0 days         \$ 2,900,000         Drilling Tools & Equipment         \$           Very and Abandonment         5.0 days         \$ 2,900,000         Drilling Tools & Equipment         \$	259,653
Plug and Abandonment         5.0 days         \$ 2,900,000         Drilling Tools & Equipment         \$            \$         -         Class Charges         \$	165,733
	398,938
S     -     Field Professional Services     \$	154,000
\$	352,750 <b>2,153,78</b> 4
TOTAL     7.50 days     \$ 4,050,000     TOTAL (Assuming Good Weather)     \$	23,691,622

Figure 82 - North Sea slender well drill cost estimate

The time/cost and phase cost comparisons for the North Sea slender well are shown below in Figure 83 and Figure 84.



Figure 83 - North Sea slender well time/cost comparison



### Phase Cost Comparison

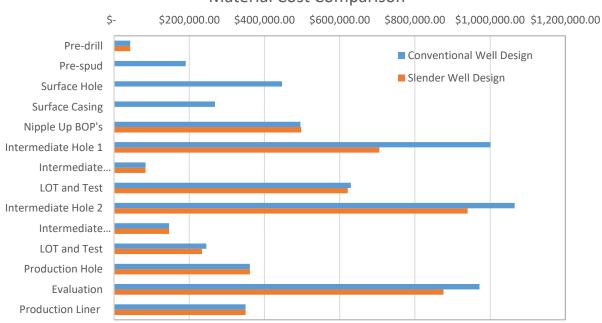


#### 3.5.5 Discussion

The upshot of this study is that slender wells are indeed cheaper than their conventional counterparts. However, this conclusion does not accurately represent the full picture. The author hypothesised at the commencement of this thesis that the saving in material costs (regardless of the number of casing strings) would be the primary cost driver for cheaper wellbores by slimming down. This shall be examined more thoroughly below.

Upon closer inspection, we note that some phases are more expensive for slender wells than for conventional wells. One might argue that this is simply the result of the new slender well section being deeper and thereby taking longer to drill. When we examine the phase cost comparisons for each well at similar hole depths, however, we notice that there is very little difference in costs (with savings ranging from 2-5%). The primary cost saving comes from removing one or two sections of casing. This is obvious, but it begs the question: what happens when we slim down our wells and in fact require the same number of casing strings? What then becomes of our economics and is there any benefit to this practise? What is the primary cost driver?

To attempt to resolve this question, let us examine Figure 85 below, which depicts the differences in material costs on a phase-by-phase basis. We notice that there is much to be saved on a phase-by-phase basis from a materials standpoint. However, looking again at our overall phase cost comparisons in Figure 76, Figure 80 and Figure 84, we still do not seem to be reaping the economic benefits so desired. While the majority of phases see cheaper material costs for slender wells, some of those same phases can be overall more expensive when considering total drill costs. Therefore, we conclude that material costs alone cannot be the primary cost driver of making slender wells economically viable.



Material Cost Comparison

Figure 85 – Average material cost comparison for all wells

Before proceeding, it is worth making a note about market pricing and its effect on material costs. These cost estimates are based on the assumption that material costs decrease linearly with either hole/annular volume, casing size or hole diameter. In practise however, this is often not the case. Different operating companies will be able to secure different pricing for tubulars and wellheads depending on a few factors (among others):

- The relationships that the operating company has built with its vendors;
- Market capitalisation of the operating company;
- The size of the project (i.e. one usually is able to obtain a lower cost per unit material for a 20 well campaign rather than a five well campaign);
- Whether or not equipment is ordered on a consignment basis.

OCTG vendors and service companies often stock commonly used materials, thereby reducing their per-unit purchase cost. This is because it is desirable to avoid excessive slow-moving-stock costs. In our case, the casing strings and connections listed in Table 6 and Table 7 may well be cheaply available, whereas ordering slim casing may be more expensive than simply using OCTG in one's warehouse, since consignment orders may be required. This is because they are and have been widely used for decades. However, given a long campaign and a commitment to use slimmer casing strings, the net effect will be a long-term saving in material costs, which will offset a short-term loss. *These concepts will be discussed in greater depth in <u>Chapter 4</u>.* 

When drilling a well, there are broadly speaking, two types of costs; recurring costs (summarily known as "spread rate") and one-off daily costs. Material costs tend to straddle both categories (e.g. mud chemical costs are loosely pegged to drill time and particularly wellbore conditions, whereas casing costs are purely on-off expenses at the time of running). Recurring costs however, are fixed and typically much higher than our one-off costs. Therefore, if we assume for a moment that all of our slender wells were drilled with similar casing set depths and the same number of strings, our cost savings would be a function of two factors: material and volume reduction (one-off costs) and time. Nevertheless, since we have ruled out material costs, time must be the overriding factor.

Why time? To illustrate the importance of time to our analysis, let us look at Figure 86 below, which shows the variance in time/depth performance for similar wells drilled by the same (or similar) rigs in one field (Directorate, 2018)<sup>24</sup>. What stands out is not so much the variance in ROP's, but rather the variance in flat time (e.g. nippling-up BOP's, LOT's etc.). Given that these wells were drilled under very similar conditions, with either the same or a very similar rig, it stands to reason that their end-of-well final costs will vary based solely on drill time. Since material costs are masked by the drill costs (pegged to time) for slim well drilling, the driving factor in making slim wells economic must be rig crew performance. A poor performing crew could easily tarnish the merits of slim well drilling, thereby making the extra risk unnecessary. Conversely, a high performing crew may produce the opposite effect. The variance in drill times highlights the importance of crew performance in wellbore economics. In order to substantiate this argument, a field comparison from an unnamed Australian onshore operator has been included. The chart shows variance in rig crew performance for one rig in one onshore field, with NPT excluded.

<sup>&</sup>lt;sup>24</sup> For an "apples-to-apples" comparison, NPT has been removed from the time/depths curves.

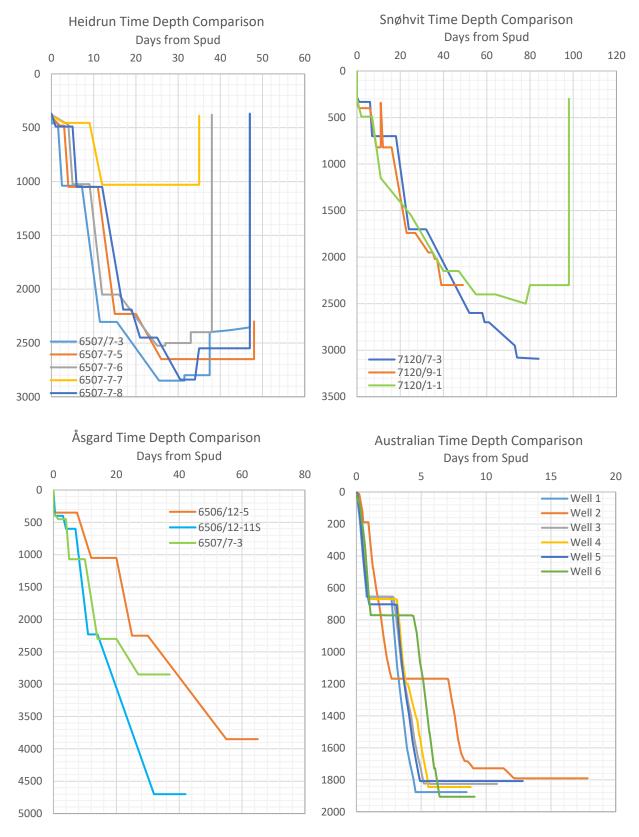


Figure 86 - Time/Depth curves for Norwegian & Australian fields (Directorate, 2018)

In a recent interview with Petoro (Petoro, 2018), it was highlighted that one of the key challenges facing the Norwegian section is to reduce "hidden NPT", or to state otherwise – improve efficiency. The charts above are a clear example of how efficiency and hence, reducing hidden NPT could lead to improved wellbore economics. Even where performance seems not to vary in any significant manner, it is worth pointing out that today's spread rate for offshore drilling in Norway is roughly ~US\$580,000<sup>25</sup>. This equates to ~US\$24,200 per hour. Therefore, we can clearly see the effect of hidden NPT on our wellbore costs.

To conclude our economic analysis of slender wells, we are able to draw the following conclusions:

- Yes drilling slender wells, with reduced casing strings is (obviously) cheaper than drilling conventional wells;
- Simply slimming down a well, all casing points remaining equal may not necessarily be economically beneficial. This will depend entirely on operating time;
- Material cost savings, while significant, only play a minute role in reducing wellbore costs. These savings will fluctuate depending on the operating company's competitive market advantage in securing lower per-unit material costs;
- The primary cost driver of economically successful slender well drilling is rig crew performance;
  - High performing rig crews will allow a more clear view of the material cost savings;
  - Poor performing rig crews will mask any benefits gained by slimming down wells.

Note: in <u>Chapter 4</u>, we will analyse a number of ways which Norwegian operators can improve rig crew performance.

#### 3.6 Risk Assessment

In this section, a number of key risk factors are analysed with respect to slim well drilling. The section will present a risk matrix and register which is applicable to these types of wells. The risk matrix has been adapted from DNV-RP-G101 (DNV GL, 2010).

The risk matrix selected for our analysis is presented below in Figure 87. This is a commonly applied type of matrix, which any operating company could "plug in and play".

<sup>&</sup>lt;sup>25</sup> Figure taken from drill cost estimate for an unnamed Norwegian operating company.

					Consequence		
		HEALTH AND SAFETY	First Aid Injury	Medical Treatment	Lost time Injury	Permanent Disability	Fatality
		FINANCIAL IMPACT	Up to \$100k	\$100k - \$1M	\$1M - \$10M	\$10M - \$25M	\$25M +
		REPUTATION	Minimal impact on business reputation, land holder only	Some impact on business reputation, local community exposure	Moderate impact on business reputation, local media exposure	Significant impact on business reputation, national media exposure	Critical impact on reputation, international media exposure
		ENVIRONMENT	Incident. No breach of regulations. Minimal and short term impact to any local environment.	Minor breach of regulations / resulting in notification to regulator. Localised, short term, recoverable minor impact on flora and fauna.	Serious breach of regulations / resulting in reporting to regulator, investigation, environment notice or fines. Significant localised but short term environmental impact.	Major breach of legislation resulting in prosecution or litigation and regulatory intervention. Serious and long term ecological impact and environmental harm.	Significant compliance breach resulting in prosecution / class action or loss of licence. Severe environmental harm with widespread or permanent
			1	2	3	4	5
			Insignificant	Minor	Moderate	Major	Catastrophic
	A common event that is likely to occur in the industry many times per year	A Highly Likely	Intermediate A1	Intermediate A2	High A3	Extreme A4	Extreme A5
	An event likely to occur more than once a year in the industry	B Likely	Low B1	Intermediate B2	Intermediate B3	High B4	Extreme B5
Likelihood	An event that may occur in the industry over 10 years	C Possible	Low C1	Low C2	Intermediate C3	Intermediate C4	High C5
	An event not likely to occur in the industry over 10 years	D Unlikely	Negligible D1	Negligible D2	Low D3	Low D4	Intermediate D5
	An event that has not previously been experienced in the industry but may occur in exceptional circumstances	E Remote	Negligible E1	Negligible E2	Low E3	Low E4	Intermediate E5

Figure 87 - Risk matrix (DNV GL, 2010)

A few key notes regarding the risk register below (Table 19):

- No operation (or indeed any activity in our daily lives) is free from risk;
- Risk cannot be eliminated, only controlled. There must be an acceptable level of risk for any in-field operation;
- The register is not intended to replace a complete wellbore drilling risk register, but rather serve as a complement to the same, with a focus purely on slim well drilling;
- A number of risks presented herein draw on Gibson's paper on the Advantages and Requisite Considerations of Slim-Hole Drilling (Gibson, 2016).

Type / Phase	Activit y, Produ ct or Servic e	Hazards / What ifs? (Energy Source)	Associat ed Risks / Contribu ting Factors	Conseq uence	Likeli hood	Risk Level	Current Controls	Risk reduction measures	Updat ed Conse quenc e	Updat ed Likeli hood	Residu al Risk	Risk Owner	Responsible?
Cemen ting	Cemen ting operati ons in slende r wells	Excessiv e ECDs due to low annular clearance between hole and casing	Formatio n breakdow n Poor cement quality Loss of well integrity Future remdedia tion	Major	Likely	High B4	Cementing program ECD modelling	Under- reaming to improve cement quality and reduce annular pressure losses	Major	Unlik ely	Low D4	Drilling Engineer	Cementing Crew Driller 3P bit provider
Compl etions and Worko ver	New comple tion or workov er design	Slim wells may lead to excessive loads New design does not cover full range of anticipate d productio n rates	Deferred productio n Lost time Financial loss	Minor	Possi ble	Extrem e B5	Signed Well Spec forms - tubing pumps selected Slimhole completions options report	Input from 3P equipment providers. CWOP	Minor	Possi ble	Interm ediate D5	Completions Engineer Completions Super	Company Man Driller
Drilling	Directi onal drilling operati ons in slim wells	Downhol e equipmen t limitation s when using smaller diameter tools/tubu lars, which leads to: Poor ROPs Poor directiona	Sidetrack ing Technical failure (drill target not achieved)	Major	Possi ble	Interm ediate C4	Directional modelling (in-house and 3rd party) Pre- qualification of contractors 3P equipment certification processes	Coordinati on with subsurface asset teams to better understan d downhole conditions Directional drilling crews on- site for any DD operations	Major	Unlik ely	Low E4	Drilling Engineer DD crews	DD crews Driller

		l control Sub- optimal drilling paramete rs											
	Under- reamin g operati ons	Formatio n breakdow n in unconsoli dated sections	Lost time Poor cement quality	Minor	Possi ble	Extrem e B5	Underreamin g guidelines 3P bit provider on- site during UR ops Drilling program SOP's JHA's	Detailed geomecha nics studies to assess formation strengths - adjust drill parameter s accordingl y Regular hole cleaning	Minor	Remo te	Interm ediate D5	Drilling Engineer Drilling Superintende nt	Driller 3P bit provider
	Drilling ahead with slim drilling equip ment	Excessiv e torque on slender equipmen t Stick slip caused by high torque in low- clearance sections	Parting of tubulars Fishing job Damage to equipme nt Lost time	Modera te	Likely	Interm ediate C4	Drilling Program outlining drill procedures Drilling supervision on-site SOP's	Soft- torque rotary table / TD Modern rigs: use of auto- torque dampener to adjust parameter s during periods of excessive torque	Moder ate	Unlik ely	Low D4	Drilling Engineer Drilling Superintende nt Company Man Driller	Driller Company Man
Evaluation	Runnin g smaller diamet er logging tools	Lower than normal tensile strengths in tight formation s: Lost tools downhole	Fishing Breach of environm ental regulatio ns (if R/A sources involved)	Major	Possi ble	Interm ediate C3	Wireline program included within Drilling Program Max pull to 50% of cable weak point	Wiper trip always before running logging tools in- hole PJSM with WL crews Use of jars and flywheels on all	Major	Unlik ely	Low D3	Drilling Engineer Company Man	WL logging crews

								logging runs					
	Calibra tion of WL data	Current software interpreta tion charts/alg orithms optimised for conventio nal wellbore sizes. Slim wells require new correlatio ns	Innaccur ate downhole data Incorrectl y selected perforatio n intervals Lost productio n Sidetrack ing	Major	Likely	High B4	System of checks and balances by subsurface asset teams and third party interpretatio n providers Empirical analogues	Developm ent of experimen tal interpretati on charts for the prevailing conditions, together with operator and service company	Major	Unlik ely	Low D4	Subsurface	Subsurface WL logging provider
	Coring operati ons in slim open hole section s	Swabing and surging due to excessive running speeds in tandem with a very low annular clearance	Uncontrol led release of fluids Loss of core samples or unrepres entative samples Blowout Loss of rig / well Crew injuries of death	Major	Possi ble	Interm ediate A2	3P pre- qualification Min/max trip speeds dictated in the drilling program	Thinning of drilling fluid prior to running coring tools to avoid excessive gels and well control issues	Major	Remo te	Negligi ble D2	Mud Engineer Coring Crew Drilling Engineer	Coring Crew Mud Engineer
Hydraulics	Drilling hydrau lics - cutting s lift, wellbor e stabilit y, hole cleanin g	High rotational speeds in sediment ary formation s with slender well equipmen t	Pack-off Wellbore wall breakdow n Differenti al sticking	Modera te	Possi ble	Interm ediate C4	Mud Engineer on- site Dedicated drilling fluids program Set drilling parameters	Ensuring laminar flow in soft sedimenta ry formations Uniform annular velocity profile	Moder ate	Unlik ely	Low D4	Drilling Engineer Drilling Superintende nt Mud Engineer	Mud Engineer Rig Crew

	Drilling hydrau lics - eccent ric pipe rotatio ns in slim hole drilling	Uncontrol ed eccentrici ty in drill pipe rotation, thereby inducing high pressure losses	Formatio n breakdow n due to excessiv e ECD's	Minor	Likely	Low C2	Drilling Progam Detailed mud specification s Experienced crews, best practices	On-site pre-spud meetings Pre-tour breifings Instruction s to driller Crew training	Minor	Unlik ely	Negligi ble E2	Drilling Engineer Drilling Superintende nt Company Man Driller	Driller
	Increa sing mud weight s in slim hole section s using conven tional chemic als	Use of coarse grained agents for weighting -up	Depositio n and buildup of fines onto borehole wall Increase ECD's and annular pressure s Stuck pipe Fishing	Modera te	Likely	Interm ediate B3	Mud program Mud Engineer on- site	Use of finer weighting agents	Moder ate	Possi ble	Low D3	Drilling Engineer Mud Engineer Derrickman	Derrickman Mud Engineer
	Swellin g clays in slim wells (very small annula r cleara nce)	Swelling clays due to poor mud paramete rs	Pack-off Differenti al Sticking Loss of tubulars Fishing	Modera te	Possi ble	Interm ediate B3	Mud program Mud Engineer on- site	Salinity study to ensure compatibili ty between salinity of prevailing shale and drilling fluid	Moder ate	Unlik ely	Interm ediate C3	Drilling Engineer Mud Engineer Derrickman	Mud Engineer Rig Crew
Planning	Introdu ction of slim hole drilling into a region where it has previo usly not been done	Drilling program not executed correctly. Unfamilia r rig crews	Cold crews: crew compete ncies with specific equipme nt, or with new rig if desired	Major	Likely	High B4	FFP and On site supervision Drilling Supervisor Prequalificati ons for crew SOPs JHA's Experience review and transfer	Crew icebreaker DWOP HSE on site inspectors Crew training to handle smaller diameter pipe (most notably for overpull	Major	Unlik ely	Low D4	Drilling Engineer Drilling Superintende nt	OIM Company Man Toolpusher

							limitations due to tensile strength differences					
Backu p fishing tools availab le on- hand	Loss of equipmen t downhole without immediat e access to fishing equipmen t and personnel	Lost time waiting on personne I and equipme nt	Minor	Highl y Likely	Interm ediate B3	Dependent on operating company	Slim hole overshot fishing tools for slim BHA/WL/C oring etc. readily available on-site, with fishing crew able to be hot- shot to rig ASAP	Minor	Unlik ely	Low D3	Drilling Engineer Drilling Superintende nt Company Man	Fishing Crews Company Man
Tool string design (drill pipe / casing / etc.)	Tool joint failure due to excessive vibrations (particula rly prevalent for highly deviated wells) Excessiv e wellbore pressure during shut-in on conventio nal pipe in slim holes	Fishing Failed tubulars Blowout Loss of well / rig Deaths	Catastr ophic	Likely	High A3	Tensile/com pressional stress modelling Casing design 3P modelling of tubular runs SOPs JHAs	Use of premium connection s if conditions dictate (metal-to- metal sealing) Use small external upset on connection s Well control modelling for premium threaded connection s	Catast rophic	Unlik ely	Low D3	Drilling Engineer	Drilling Engineer Drilling Superintendent Company Man Rig Crews

	Drilling fluid design in slim wells	Poor drilling hydraulic s Differenti al Sticking Fishing	Loss of well	Major	Likely	Interm ediate C4	Mud program Fluid modelling	Maintain thin, hard filter cake at BHT Minimise the use of LG solids by utilising solids control equipment or aggressive dumping (although costly) Tension meters on all WL runs Use of TD and power swivel	Major	Unlik ely	Low D4	Drilling Engineer Company Man Mud Engineer	Mud Engineer Rig Crew Company Man
	Transp ort of casing to site	Casing is damaged en route to site, or else damaged due to poor storage on-site Casing is poorly handled when running in hole	Waiting on equipme nt Lost time Financial damage Loss of well	Major	Possi ble	Interm ediate C4	Third party chain of responsibility for transport of tubular goods	Backup joints readily available on-site. As minimal handling of tubulars as possible See "Running Tubulars - Running casing into slim hole/casin g sections	Major	Unlik ely	Low D4	Logistics Coordinator 3P transport crews Drilling Superintende nt	3P transport crew Company Man Rig crews
Running Tubulars	Excess ive overpu II on tubular s during drilling operati	Crews unfamiliar with running practices for smaller diameter tubulars	Parting of tubulars Fishing job Damage to equipme nt Lost time	Modera te	Likely	Low C2	Drilling Program outlining drill procedures Drilling supervision on-site SOP's	Drilling Superinten dent on- site for first two wells Crew training	Moder ate	Unlik ely	Low C2	Drilling Engineer Drilling Superintende nt	Drilling Superintendent Toolpusher Company Man Rig Crew

ons or while runnin g casing (use of slimme r and normal tubular s)												
Setting and removi ng tubular s in/fron slips	Unfamilia rity with lower tubular loads Lost tubing downhole	Fishing	Modera te	Possi ble	Interm ediate B2	SOP's Correct slip- dies on-site Written instructions to driller	Crew training for handling smaller tubulars	Moder ate	Unlik ely	Negligi ble D2	Drilling Engineer Drilling Superintende nt Company Man Driller	Driller Company Man
Runnin g casing into slim hole/ca sing section s	High ECD's due to low annular clearance	Formatio n breakdow n Lost well integrity Stuck tools Fishing	Modera te	Highl y Likely	Interm ediate C3	Trip speed schedule ECD modelling Mud Program SOPs JHAs	Use of annular flow- through diversion tool to reduce ECD's	Moder ate	Unlik ely	Low D3	Drilling Engineer Drilling Superintende nt	Driller Company Man
Runnin g tubular s in and out of hole in deplet ed section	Differenti al sticking	Sidetrack ing Technical failure (drill target not achieved)	Major	Likely	High B4	Mud program Diff sticking modelling Drilling Program SOPs	Constant pipe movement where possible LCM for depleted sections Pipe-free pills readily available on-site Diff sticking contingenc y plan	Major	Unlik ely	Low D4	Drilling Engineer Drilling Superintende nt Company Man	Driller Company Man
Runnin g casing into slim	Impassab le sections of casing Poor	Loss of well Financial and reputatio	Major	Possi ble	Extrem e B5	Strapping and drifting best practices SOPs	Backup joints readily available on-site.	Major	Unlik ely	Interm ediate D5	Logistics Coordinator 3P transport crews Drilling	3P transport crew Company Man Rig crews

	hole/ca sing section s	transport, storage and running practices	nal damage				JHAs PJSMs Drilling program - casing running practices	As minimal handling of tubulars as possible				Superintende nt	
trol	Well control during normal drilling	Drilling slim well sections with very small annular clearance s. Low kick tolerance s	Uncontrol led release of fluids Blowout Loss of rig / well Crew injuries of death	Catastr ophic	Likely	Interm ediate C4	Drilling Superintend ent on-site for first two wells Company man supervising drilling Well control plan and contingency On-site kick detection gauges (pit gain measureme nts etc.) JHA's SOP's	All personnel from Assistant Driller upwards possessin g Well Control ticket (IADC/IW CF supervisor s' level) Enhanced crew training matrix	Catast rophic	Unlik ely	Low D4	Drilling Engineer Drilling Superintende nt Company Man Driller	Drilling Superintendent Toolpusher Company Man Rig Crew
Well Control	Well control while runnin g tubular s	Swabing and surging due to excessive running speeds in tandem with a very low annular clearance	Uncontrol led release of fluids Blowout Loss of rig / wellCrew injuries of death	Catastr ophic	Likely	High B4	Drilling Superintend ent on-site for first two wellsCompa ny man supervising drillingWell control plan and contingency	Hard shut- in methodIm proved kick detection systemsTri p speed modelling. Trip speed schedule (max/min) communic ated to driller. Use of auto-drill features on modern rigs to max out at too- high a	Catast rophic	Unlik ely	Low D4	Drilling EngineerDrilli ng Superintende ntCompany ManDriller	Drilling SuperintendentToolp usherCompany ManRig Crew

							pull/run speed Mud:Avoid progressiv e gelation Keep YP/PV ALARP					
Contin gency plannin g: Losing a given hole section , drilling a slimme r relief section	Lower open- hole productio n potential Higher annular pressures	Financial loss Deferred productio n Lost well control	Major	Possi ble	Interm ediate C3	Drilling Program outlining drill procedures Drilling supervision on-site SOP's	Well control contingenc y plan Agreed upon back-up strings	Major	Unlik ely	Low D3	Drilling Engineer Asset teams	Driller

Table 19 - Slim hole drilling risk register

# Chapter 4: Industry Opportunities and Limitations

To close this study, we will now consider the current market forces and industry state of play, as it relates to slim hole drilling. It would be very easy to state that the techno-economic merits of slim hole drilling imply that an operator could simply commence this sort of work, say tomorrow. However, there are a number of mitigating factors, which need to be discussed, and an equal number of solutions to those same factors that will be proposed.

#### 4.1 Limitations on Slim Well Drilling in Norway

#### 4.1.1 Regulatory Restrictions on Rig Supply

One of the largest considerations when planning a slim well is the choice of rig. Currently, the choice of rigs in Norway would be considered too large to drill these sorts of wells. This is because the rigs on the market were brought in and compliance-cleared for conventional wells. It is indeed possible to drill slim wells with these size rigs, but for many operators this would be akin to "shooting a fly with an RPG", for want of a better phrase. Considering our previous section on the economics of slim hole design, the success of these wells hinge on crew performance and hence, drill costs. Using a conventional rig to drill a slim well, where this has not previously been done may well prove uneconomic. This is one of the key reasons that these types of wells are not currently being drilled in Norway.

In attempting to commercialise slim wells, one might propose bringing in a fit-for-purpose rig. However, in Norway, this is not as a simple as it sounds. To explain why, let us briefly digress. (Oftedal, 2016) was recently published in an article detailing the prevailing economic differences in the rig market between the UK and Norway. For many major companies operating in the North Sea, it would be highly desirable to be able to move rigs freely between the UK and Norwegian sectors. This would improve rig utilization rates, would decrease operating costs and in so doing, would avoid rigs and crews working sporadically. Simple though this sounds, it is a prohibitively expensive process due to Norwegian HSE regulations mandating several hundred million Kroner to bring rigs up to local standards (HSE SUT – samsvarsuttalelse), which often leads to three to four months of inactive service.

Consider this: Two rigs are drilling the same type of well, at the same time. One sits in the UK North Sea and the other, a mere stone's throw away, sits in the Norwegian North Sea. It is equally safe to work on both rigs and the wells being drilled are equally challenging. However, even if we are talking about the same rig, made by the same manufacturer, the operator on the Norwegian side will have to take the rig out of service for many months and spend many millions of dollars to do what the exact same rig is doing on the UK side. Due to the bureaucratic nature of Norwegian regulations, daily life will vary drastically depending which side of the proverbial fence you sit. Oftedal, in the piece mentioned above, stresses that the levels of bureaucracy have reached the point where paperwork can often take so long as to delay operations (Oftedal, 2016).

Reverting our focus back to slim wells, we can see how simply bringing on a new rig may be a very risky and costly decision for operators. Since a slim wells' economic success depends on the performance of its rig crew, an operator may well be hesitant to invest in these sorts of wells where the risk may not justify doing so. Should the industry remain in this current state, it is unlikely that slim well drilling will take off in any significant manner. There are a number of recommendations that will be discussed ahead, which aim to assist industry in commercialising slim well drilling.

#### 4.1.2 Market Restrictions

An important consideration in our analysis is the market for wellbore materials and consumables. We have shown in our analysis (see Figure 85) that there is much to be saved in material costs with slim well design. In practice however, oil companies in Norway cannot simply order these materials tomorrow and see the immediate cost benefits. To explain why, it is important to discuss some fundamentals of oil and gas supply chain management. When an operator wishes to drill a well, it will order the equipment it needs from a given supplier, who will then deliver that same equipment to site or the operator's warehouse. Operators will seldom drill just one well at a time, but will drill similar wells in a campaign fashion. In campaign drilling, operators are often able to secure lower per-unit costs on the equipment they need. When multiple operating companies do this, for one given region, there tends to be a handful of commonly applied well designs that are implemented. Equipment suppliers, with this knowledge, will tailor their stock to suit the current well design practises. For conventional well designs at least, this means that equipment is readily and (relatively) cheaply available for operators, since suppliers usually have equipment locally available.

In Norway, slim wells (from an equipment standpoint) are a completely different kettle of fish and require equipment that is either uncommon or else not readily available. Bespoke, long-lead items of this nature will often need to be manufactured abroad (OCTG are typically sourced from Japan) and shipped into Norway. This makes it highly likely that the first batch of slim wells drilled in Norway may well be more expensive than their conventional counterparts.

This is an important point, since it speaks to an operators' line of sight for the market. An operator with a short-term industry outlook may be uncomfortable with this sort of investment. This operator may understand that their current well architecture is indeed over-designed, but since much of this equipment is readily and cheaply available in their warehouse, they may be more inclined to accept an overdesigned well in lieu of a risky investment. An operator with a longer-term view of profits may instead opt to make the investment in slim hole drilling. This operator is willing to take a loss on the first one or two campaigns of slim wells, but understands that in the long term, re-stocking their warehouses with slimmer, fit-for-purpose equipment will ultimately offset the initial loss. There is currently little industry appetite for the latter, since the majority of operators are often unwilling to delve into new investments until they are proven by larger (or the largest) local operators.

#### 4.2 Opportunities and Industry Recommendations

#### 4.2.1 Streamlining of Rig Requirements for Drilling (DK/NO/UK)

Oftedal, 2016, outlined a number of recommendations for industry to improve their drill costs. In addition, a recent interview with Petoro unveiled a number of opportunities for improved wellbore operations on the Norwegian Continental Shelf.

Oftedal asserts that the market forces behind rig rates do not reflect the current state of the North Sea's rig fleet (particularly the UK sector, which has a much older fleet than Norway). For the last few decades, rig rates have fluctuated in line with the oil price. As the oil price increases and there is more drilling activity, rig rates hike accordingly. The converse has been true. However, while the rig rates have changed, the hard product has not. Oftedal notes that rigs which are some 30-40 years old have been priced at near half a million dollars a day, while similar rigs of a much younger age are priced equally (Oftedal, 2016). Many of the older rigs in North Sea fleets have been retrofit to match prevailing regulations, thereby resulting in gradually increasing NPT for rig repairs, whilst their younger counterparts do not face this problem. In order to improve rig pricing, the challenge facing industry is to develop a pricing structure that is not dominated by supply and demand. Bringing fairer controls to rig pricing will help improve drill times and lower drilling investment costs.

Another viable option to increase rig utilisation, which is currently being discussed, is a common North Sea operating area, shared by Denmark, Norway and the UK. This would imply a tripartisan regulatory input on drilling rig HSE standards. In so doing, rigs would be able to move freely between each country's territorial waters. Considering our slim wells, we can see how this would be cost effective, since smaller more effective rigs would be able to be mobilised from the UK sector with ease (Petoro, 2018). One concern that remains, however, is the stringency of new regulations on newly built rigs entering the common North Sea area. It is currently unclear whether they would make slim wells more or less attractive.

#### 4.2.2 Industry Standardisation

One of the most fore frontal issues in industry today is standardisation. This is particularly true given the recent recession. Amid high operating costs and low oil prices, the general feeling among operators has been that they may not be able to realise future field developments. Equinor provides one example of how standardisation can benefit industry. Through collaboration with Aker Solutions, it has standardised subsea tree maintenance. Through this process, Aker and Equinor have developed processes to provide more efficient maintenance and refurbishment to subsea trees. This has taken the process from one year down to 17 weeks. The concept came about in 2011 when Equinor agreed to treat its tree maintenance program for its 17 trees as a collective project, rather than having individual projects for each tree. This meant that parts and equipment could be ordered some six months ahead of time, thereby allowing for more cost-effective planning (Criscione, 2016).

Another aspect of the industry that is in need of an overhaul (and one, which is particularly cumbersome as far as Norway is concerned) is the eye watering levels of bureaucracy and documentation. It was highlighted by Tord Lien, Norwegian Minister of Petroleum and Energy, that there has been a ten-fold increase in topside documentation in the past ten years. Some of the more complex subsea projects can involve up to 80,000 documents (Criscione, 2016). There are a number of initiatives in motion, such as those coordinated by DNV GL, who have initiated a joint industry project aiming to reduce these same volumes of paperwork in industry and improving efficiency.

Finally, to illustrate the need for industry standardisation, let us examine a quote. In a recent DNV GL interview, Margareth Øvrum, EVP for technology, Projects and Drilling for Statoil (now Equinor), stated:

"We tend to make things complex. There are more regulations than ever before and we ask for more documentation, which drives up engineering hours. Statoil itself has comprehensive technical requirements. The supply chain has things to improve on, as do we. And there is certainly potential to improve how we manage the interfaces between all parties as well.

"We are working in more remote areas and in deeper waters than before. An increase in cost is to be expected, but we have to turn this trend around. If we don't, the subsea industry will be priced out of the game." (Øvrum, 2017)

#### 4.2.3 Performance Incentive Schemes

In our analysis, we have concluded that the economic success of slim wells hinges most critically on rig crew performance. In Norway, prevailing social mores (Janteloven), whilst being successful in fostering social cohesion and underscoring what it means to be Norwegian, have (in some circumstances) created a business environment that stymies global competitiveness. This is because the benchmarks of corporate performance are based on the collective, rather than the individual. Put simply: no one individual or group should strive to put themselves above the level of the collective group, or team. Whilst the author is not intending on writing a social studies piece, this is in fact a very important concept for slim well drilling.

In Australia, the UK and US, drill crews are commonly paid bonuses based on their individual (or team) performance measures against other crews on the same rig. For example, an operating company may be willing to pay bonuses to rig crews if a well is drilled within a certain period. Alternatively, rewards may be doled out based on average trip speeds, rig move times, or any other important metric. These performance incentive schemes are purely meritocratic and reward the best performing individuals. Ultimately, operating companies have seen much success in implementing these programs.

This begs the question of Norway. These sorts of performance incentive schemes are presently uncommon in Norwegian waters, due mostly to the prevailing social conditions (above) mandating that all levels of performance should be compensated equally, with no one group or individual being placed above others<sup>26</sup>. However, where rig crew performance is concerned, this is counter-productive and the author asserts that rig crew performance incentives would have a net positive effect on the bottom-lines of both operator and rig crew member.

Incubating the right performance incentive plan need not be arduous, nor complex. There are a number of key elements outlined by Border States (a leading supply chain corporation to the US electric utility industry), which, if implemented, would lead to improved rig crew performance (and eventually, commercially viable slim wells) (Border States, Supply Chain Solutions, 2017).

1. Measureable goals

Whether instigating in incentive scheme to mandate that wells are drilled in a certain number of days, or that casing is run at a certain number of joints per hour; whatever the goal, it needs to be both physically achievable and measureable. For example: it would be pointless to set a goal as being "delivery of a safe and successful well", since there is no measureable definition in place for what is safe and what is successful for this well. On the other hand: setting a goal of drilling

<sup>&</sup>lt;sup>26</sup> Whether or not these type of performance incentive programmes would be in keeping with the national psyche in Norway is beyond the scope of this body of work.

production hole in six days with no lost time injuries is a much clearer and directly measureable goal.

2. Rewards schemes should be a pure meritocracy, with no room for luck

This goes to fairness. Rewarding performance on the back of pure luck defeats the merits of a performance incentive scheme. This practice will ultimately demoralise crews to a greater extent than if there was no scheme in place to begin with.

3. Performance incentive schemes cannot come at the expense of HSE

No operation is worth doing if HSE is compromised. Performance incentive schemes need close monitoring to ensure that efficiency breeds speed, rather than the illusion of speed breeding efficiency. The latter will always lead to negative HSE consequences. Therefore, to maintain checks and balances on performance incentive schemes, measureable HSE targets need to be in place to ensure HSE integrity.

Each operating company will implement these schemes differently, as befits their own circumstances. In a recent interview with Petoro, it was indicated that some operators in Norway are trialling these practices and so far, are seeing positive results (Petoro, 2018).

#### 4.2.4 Risk Sharing Models

McKinsey recently published an article detailing a number of strategies to transform the oil and gas supply chain (McKinsey & Company, 2017). They noted that new revenue models have emerged across industry, including performance-based contracts which combine equipment and services. In addition, these models stipulate a bi-partisan participation in project financing, thereby increasing the amount of flexibility operators have in reducing their costs. Whilst this places a heavier burden on oilfield service providers, McKinsey indicated that this could lead to more stable cash flow.

As an example, GE recently signed a deal with Diamond Offshore, where GE would maintain ownership of a number of BOPs and guarantee their performance through payments tied to the rig's activity. This shifts the burden to GE, while allowing for up-front financing. Where slim well drilling is concerned, the increased risk of these sorts of wells could be shared) or imparted to some degree) to the service companies (McKinsey & Company, 2017).

#### 4.2.5 Digital & Automated Well Planning

In closing, it is worth mentioning one important development, which, while not directly relevant to slim hole drilling, does have massive potential in revolutionising industry and eventually optimising drill costs (which is the broader aim of this thesis). We speak of course about digital well planning.

With the advent of Data Science and the latest big corporate buzzwords such as "big data" and "digitalisation" being on the end of every Executive's lips, it is worth postulating how these concepts will optimise the well delivery process. Pro Well Plan, one of Norway's newest frontrunners in the drilling start-up space, is making much headway in this area. With digital well planning, computer based algorithms instruct computers to follow set rules, instead of writing documents of governance and experience transfer reports. A digital well plan is made automatically when a dataset is applied. The dataset consists of all well information, and the computer implements the appropriate algorithms to make plans, risk matrices, schematics, barrier diagrams and decision reports. In so doing, this has the end user performing data analysis, rather than data entry (Tvedt, 2017).

Digital well planning will eventually remove the elements of human error and incorporate wider datasets to allow wells to be drilled more efficiently. As live well data changes, so too will wellbore models, which will be able to continuously update and learn. Looking long term, the implications of automation and digitalisation will eventually lead to lower overheads, improved HSE (due to mitigated human-machine interface) and finally, lower wellbore costs. Digitalisation is an important step in the industry's long-overdue push for innovation.

# Chapter 5: Conclusions

This body of work has proved the techno-economic benefits and possibilities of slender well design for the Norwegian Continental Shelf. For each region of the Norwegian Continental Shelf, it has been shown (by analysing hypothetical wells typical of these areas) that slim well architecture is technically sound, given the requirements set out in NORSOK-D010 and best practices.

One of the prime concerns for slim well drilling that was examined is maintaining well control. Each well design has been shown to have an acceptable kick tolerance. Modern day rigs, being equipped with excellent kick detection instruments, would be well suited to maintain control of these sorts of wellbore sections. One of the main issues identified with well control in slim well drilling is the reduced annular space. In our designs, the annular space is either maintained through under-reaming, or else becomes a non-issue, since rather than slimming down a given hole section, we remove it, thereby employing commonly-used hole sizes, though fewer of them. In this regard, well control is no greater an issue for our slim wells than it is for any other conventional well design.

Thinking more about annular clearance, another issue that was analysed was the effect of ECD's in slim wells. It was shown that the use of under-reaming in our North Sea design was able to abate the issue of excessively high ECD's during drilling or cementing. In addition, it was shown that since our reduced casing string designs do not employ casing and hole sizes out of the ordinary, ECD's are no bigger an issue in slim wells than they are in conventional wells.

The economic analysis of slim well drilling turned up a number of interesting conclusions. Whilst there is indeed much to be saved in material costs, this saving is overshadowed by oftenpreventive rig operating spread rates. Since rig rates are linked to operating time, which is a function of crew performance, it can be deduced that commercialising slim well drilling is only possible given a consistently high performing rig crew.

Finally, a number of roadblocks and regulatory issues have been presented, with a number of solutions proposed to allow Norwegian operators to reap the benefits of slim hole drilling. The analysis concluded that the current economic climate may not be conducing to drilling these types of wells thanks to the excessively high drilling rig certification and on boarding costs in Norway, combined with the current OCTG market. It was shown that through cross-border standardisation of regulations and risk, introduction of performance incentive programs and implementation of digital well planning, these challenges could be overcome.

# Recommended Future Work

#### Use of Proprietary Data

It is recommended to perform a full techo-economic analysis of the concepts outlined in this body of work to analyse or else trial slim well designs for given operating company using their wellbore and drill cost data. Some potential future projects may include (but are not limited to):

• Comparison of conventional wells drilled versus what might have been possible with slim well design for one or more operators;

- Analysis of proprietary well cost data to ascertain the limits on the claim that rig crew performance is the driving factor in slim well economic viability;
- Trialling the results of this body of work for a new drill in Norway.

#### Production Wells

This body of work is unique to exploration wells. It would be important to determine the merits of slim well drilling for production wells, particularly those that are highly deviated. Some potential future projects may include (but are not limited to):

- Studying the effects of deviation on the technical viability of slim well drilling;
- What role, if any, does slim well drilling play in the economic viability of a producing field?

#### Regulatory Review

One major focus are of this thesis has been the stymieing effect that Norwegian regulations have on cost effective drilling. A full review of drilling regulations in Norway with a view to improve Norway's global competitiveness and cost-effectiveness in drilling operations is recommended. Some potential future projects may include (but are not limited to):

- A critique of NORSOK D-010 from an industry perspective, as it relates to optimised drilling. To what degree do Norwegian regulations hinder cost-effective drilling?
- A critique of the psyche of the Norwegian drilling fraternity and its efficiency. What, if anything, is to be improved to make the industry more globally competitive, what can be learned from overseas successes and what is to be avoided?

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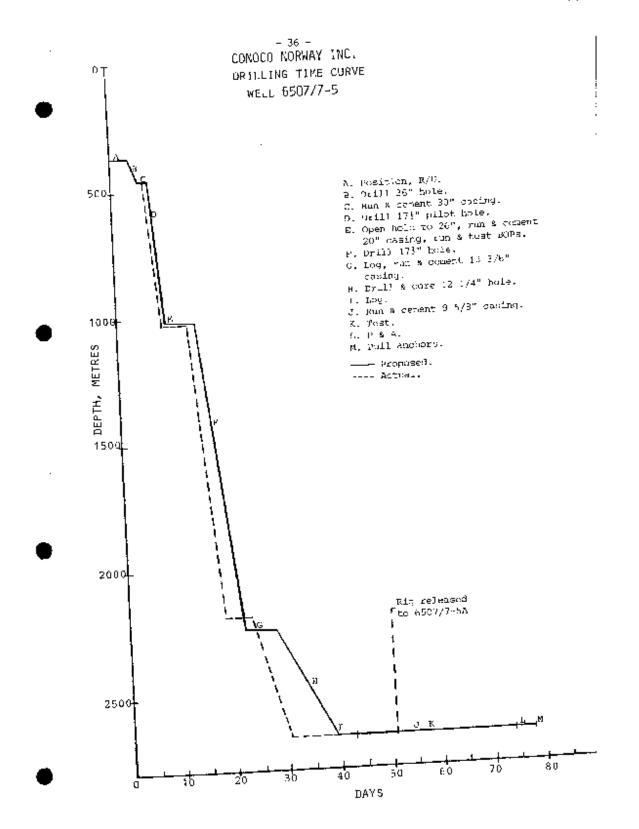
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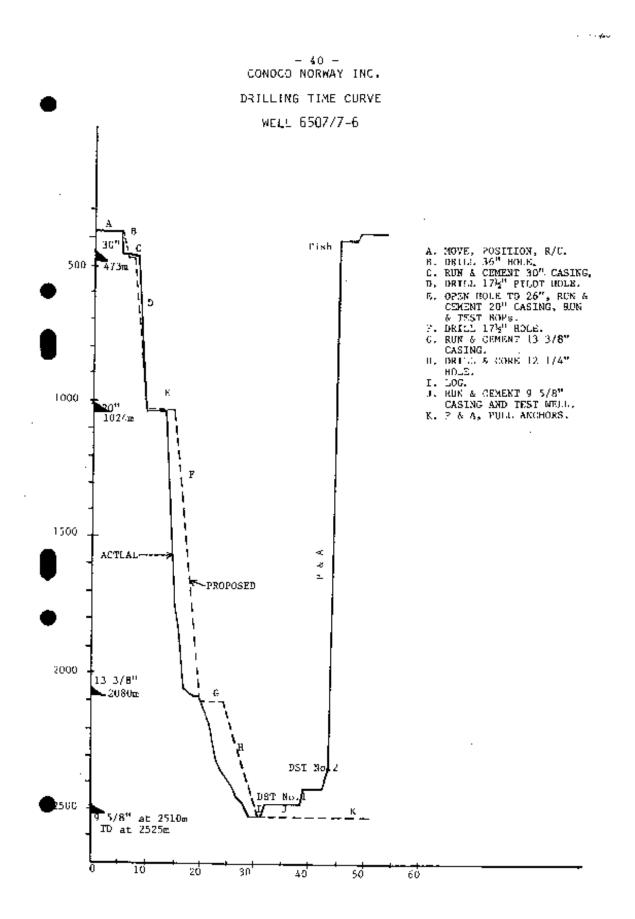
# Appendix

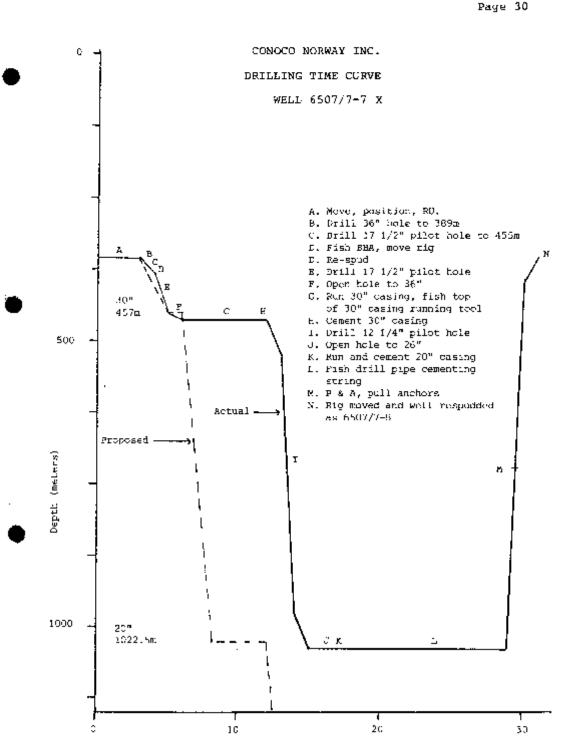
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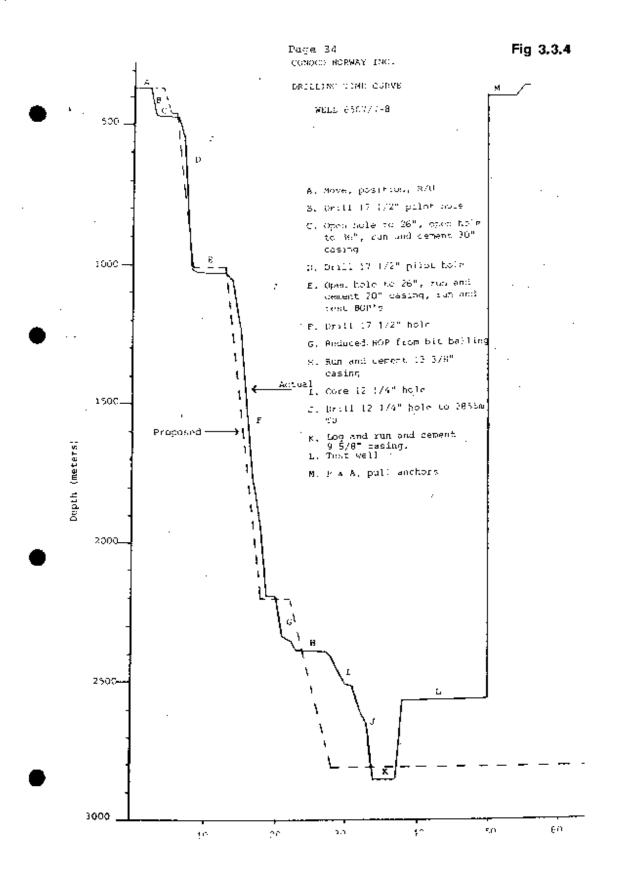
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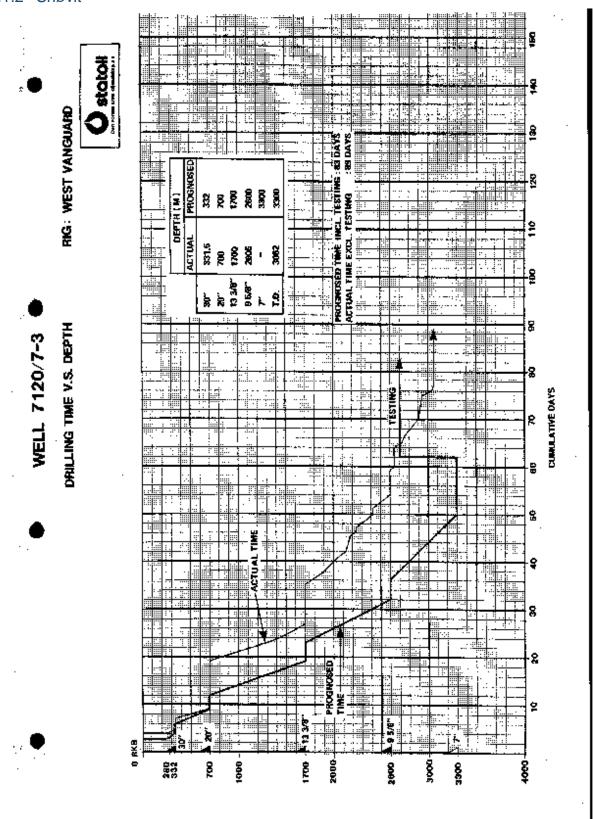






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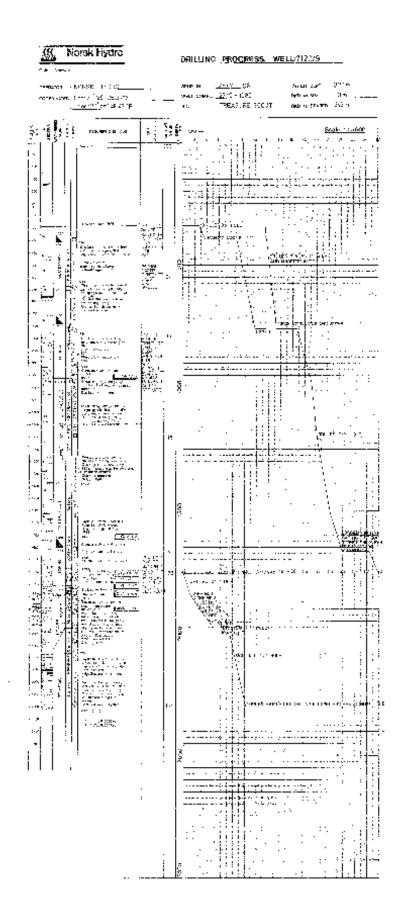


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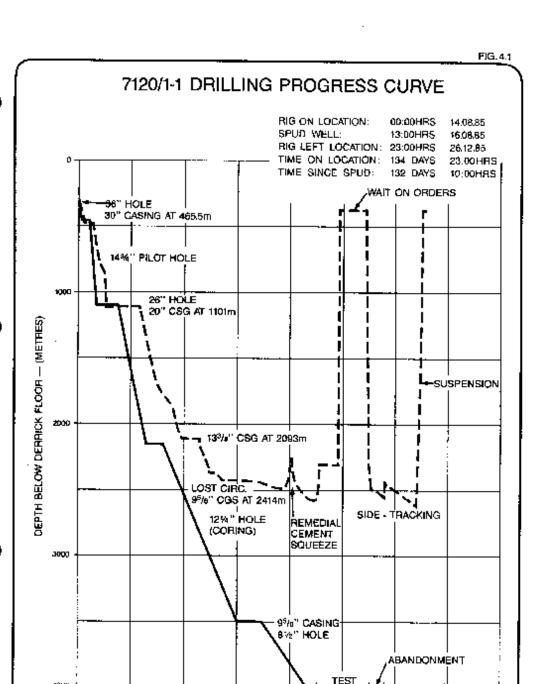


Appendix

CONTINGENCY

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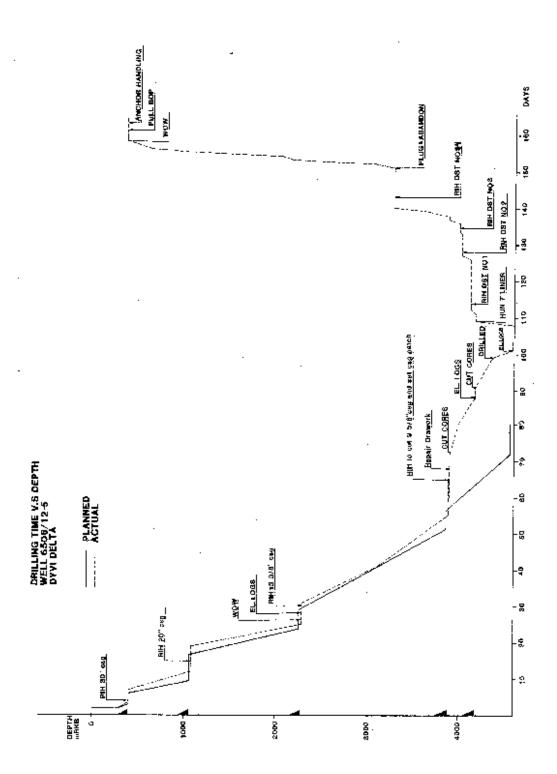
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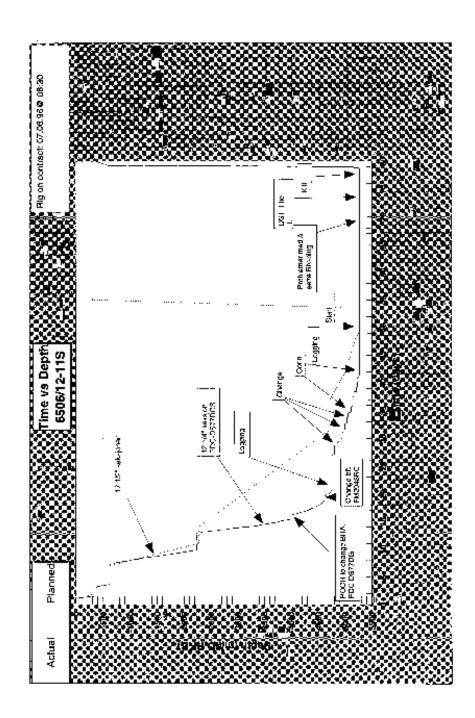
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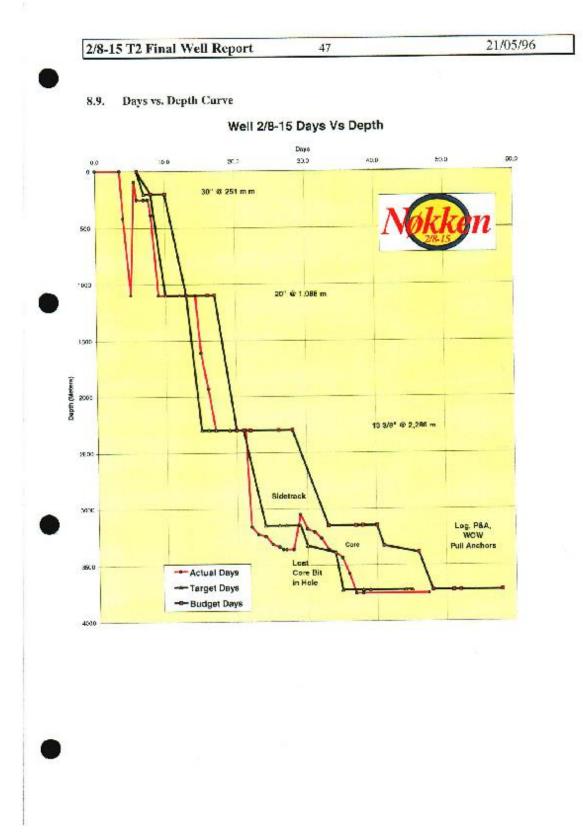
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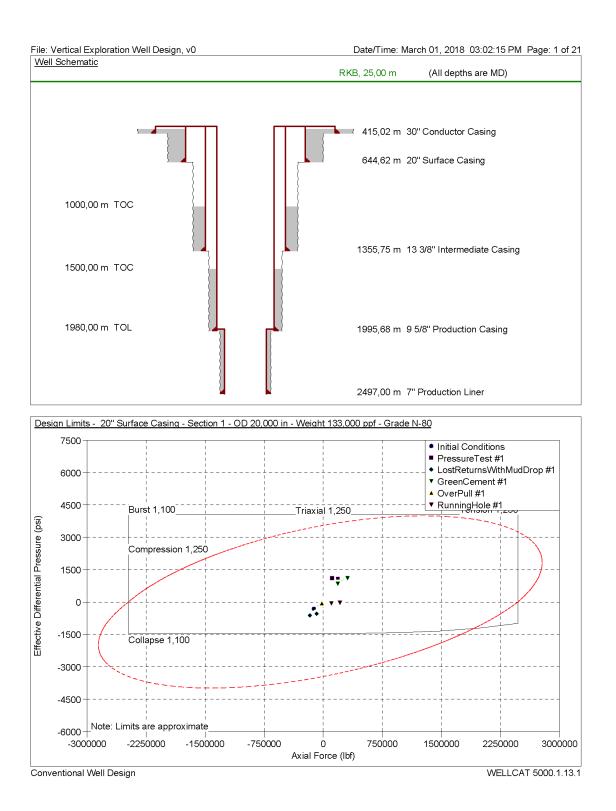


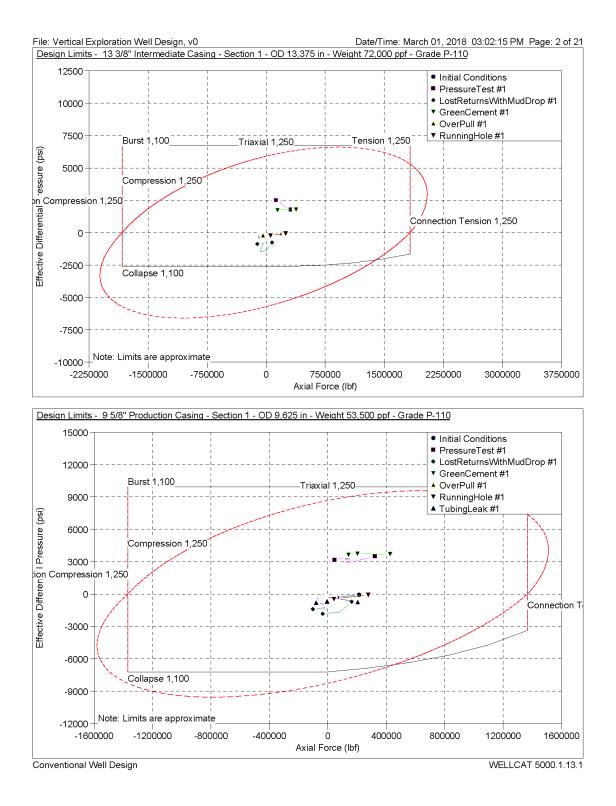


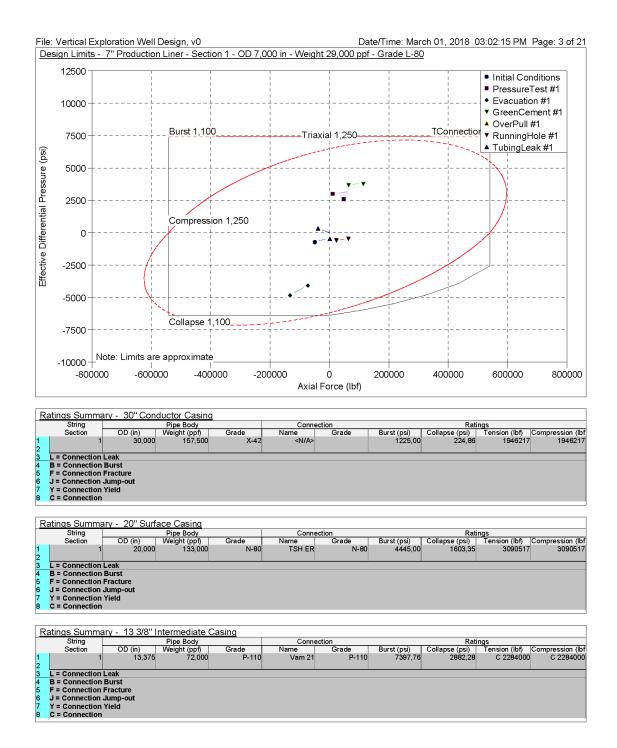
# 5.1.4 Eldfisk



- 5.2 Well Design Reports from Landmark<sup>™</sup>
- 5.2.1 Barents Sea
- 5.2.1.1 Conventional Well Design







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	1	414,99 415,05 609,60 644,59	16649 1751 12043 11288	14 36	0,00 0,00 0,00 0,00		0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0	41,65 41,65 51,18 52,90	1708,26 1708,35 1993,51 2044,80	62 58 89 94
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String Section		MD (m)	Axial Force (lbf)	Dogle (°/100f	g t)	Torque (ft-lbf)		Friction Force (lbf/ft)	Temperature (°F)	Pressure Internal	External
	1	357,04 414,99	-8369	92	0,00 0,00		0,0 0,0	0,0 0,0	42,80 41,62	0,00 0,00	54 63
	1	415,05	-10710	01	0,00		0,0	0,0	41,62	0,00	58
	1	609,60 644,59	-16502 -16877		0,00 0,00		0,0 0,0	0,0 0,0	51,20 52,92	267,50 342,04	89 94
String	Summar	MD	Cement #1 - Axial Force	20" Surfac	g .	Torque		Friction Force	Temperature	Pressure	
Section	1	(m) 357,04	(lbf) 30992	(°/100f 29	t) 0,00	(ft-lbf)	0,0	(lbf/ft) 0,0	(°F) 42,80	Internal 1647,65	External 54
	1	414,99 415,05	28463 28461		0,00		0,0	0,0	41,65 41,65	1736,55	67 67
	1	609,60	19972	20	0,00		0,0 0,0	0,0 0,0	51,18	1736,64 2035,06	115
	1	644,59	1844	51	0,00		0,0	0,0	52,90	2088,73	124
				Surface Car	sina						
asing Load	Summar	y - OverPu						Friction Force	-		( ))
String		MD	Axial Force	Dogle	g	Torque			Temperature	Pressure	
		MD (m) 357,04	Axial Force (lbf) 10726	Dogle (°/100f	g t) 0,00	Torque (ft-Ibf)	0,0	(lbf/ft) 0,0	(°F) 42,80	Internal 547,65	Éxternal 54
String		MD (m) 357,04 414,99	Axial Force (lbf) 10726 8193	Dogle (°/1001 35 75	g t) 0,00 0,00		0,0	(lbf/ft) 0,0 0,0	(°F)	Internal 547,65 636,55	Éxternal 54 63
String		MD (m) 357,04	Axial Force (lbf) 10726	Dogle (°/100f \$5 \$5 \$9 \$49 \$4	g t) 0,00			(lbf/ft) 0,0	(°F) 42,80	Internal 547,65	External 54

String	ary - reamin	g⊓ue#i-∠u	Surface Casing					
	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	357,04	212754	0,00	0,0	0,0	42,80	547,65	547
1	414,99	190899	0,00	0,0	0,0	41,65	636,55	636
1	415,05	190876	0,00	0,0	0,0	41,65	636,65	63
1	609,60	117511	0,00	0,0	0,0	51,18	935,06	93
1	644,59	104317	0,00	0,0	0,0	52,90	988,73	98
asing Load Summ								
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	357,04	164063	0,00	0,0	0,0	42,80	760,62	76
1	609,60	104401	0,00	0,0	0,0	51,18	1298,70	129
1	644,59	96135	0,00	0,0	0,0	52,93	1373,25	137
1	644,65	96121	0,00	0,0	0,0	52,93	1373,38	137
1	914,40	32401	0,00	0,0	0,0	66,22	1948,05	194
1	999,96	12187	0,00	0,0	0,0	70,40	2130,34	213
1	1000,02	12173	0,00	0,0	0,0	70,40	2130,47	213
1	1219,20	-39599	0,00	0,0	0,0	81,20	2597,40	260
1	1355,72	-71848	0,00	0,0	0,0	87,90	2888,24	297
asing Load Summ	arv - Pressu	reTest #1 - 13	3/8" Intermediate	Casing				
String	MD MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(nsi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	357,04	311836	0.00	0.0	0.0	42.80	2560,63	77
1	609,60	252174	0,00	0,0	0,0	51,18	3098,70	113
1	644,59	243908	0,00	0.0	0.0	52,93	3173,25	118
1	644.65	243894	0,00	0.0	0,0	52,93	3173,38	118
1	762.00	216174	0,00	0,0	0,0	58,70	3423,38	135
1	914,40	180174	0,02	11,6	0,0	66,22	3748,05	156
1	999,96	159960	0,20	21.8	0,0	70,40	3930,34	169
1	1000.02	196124	0,40	0.0	0.0	70,40	3930.47	148
1	1219,20	147590	0,00	0.0	0,0	81,20	4397,40	191
1	1355,72	123212	0.00	0,0	0,0	87,90	4688.24	2192
	, í		0,00	0,0	0,0	07,00	-000,24	210
Additional Pickup to	Prevent Bucklin	g = 73694 lbf						
		turnsWithMudD				Tauraanakuus	Desserves	(
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
	MD (m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-Ibf)	Friction Force (lbf/ft)	(°F) —	Internal	External
String	MD (m) 357,04	Axial Force (lbf) 73669	Dogleg (°/100ft) 0,00	Torque (ft-lbf) 0,0	Friction Force (lbf/ft) 0,0	(°F) 42,80	Internal 0,00	External 76
String	MD (m) 357,04 609,60	Axial Force (lbf) 73669 14007	Dogleg (°/100ft) 0,00 0,00	Torque (ft-lbf) 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0	(°F) 42,80 51,20	Internal 0,00 0,00	Éxternal 76 129
String	MD (m) 357,04 609,60 644,59	Axial Force (lbf) 73669 14007 5742	Dogleg (°/100ft) 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0	(°F) 42,80 51,20 52,92	Internal 0,00 0,00 20,21	Éxternal 76 129 137
String	MD (m) 357,04 609,60 644,59 644,65	Axial Force (lbf) 73669 14007 5742 5727	Dogleg (°/100ft) 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 52,92	Internal 0,00 0,00 20,21 20,26	External 76 129 137 137
String	MD (m) 357,04 609,60 644,59 644,65 914,40	Axial Force (lbf) 73669 14007 5742 5727 -57993	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 52,92 66,19	Internal 0,00 0,00 20,21 20,26 522,25	External 76 129 137 137 137 137
String	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96	Axial Force (lbf) 14007 5742 5727 -57993 -78206	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40	Internal 0,00 0,00 20,21 20,26 522,25 697,26	Éxternal 76 129 137 137 137 194 213
String	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96 1000,02	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40 70,40	Internal 0,00 20,21 20,25 522,25 697,26 697,39	Éxternal 76 129 137 137 194 213 148
String	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96	Axial Force (lbf) 14007 5742 5727 -57993 -78206	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40	Internal 0,00 0,00 20,21 20,26 522,25 697,26	Éxternal 76 129 137 137 194 213 148 191
String Section 1 1 1 1 1 1 1 1 1 1	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96 1000,02 1219,20 1365,72	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256	Dogleg (*/100ħ) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40 70,40 81,19	Internal 0,00 0,00 20,21 20,26 522,25 697,26 697,39 1145,62	Éxternal 76 129 137 137 194 213 148 191
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 3 3 3 3 3 3 3	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96 1000,02 1219,20 1355,72 ary - GreenO	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 Cement #1 - 13	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lb/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 66,19 70,40 81,19 87,91	Internal 0,00 20,21 20,26 622,25 697,26 697,39 1145,62 1424,84	External 760 1290 137 137 1944 2130 148 191 219
String Section 1 1 1 1 1 1 1 1 1 3 1 3 1 1 3 1 3 5 tring	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96 1000,02 1219,02 1255,72 ary - Green( MD	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 Cement #1 - 13 Axial Force	Dogleg (*/100h) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (/bf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(°F) 42,80 51,20 52,92 66,19 70,40 81,19 87,91	Internal 0,00 20,21 20,26 652,255 697,26 697,39 1145,62 1424,84	External 760 1299 1373 1373 1944 2133 1483 1911 2192 (psi)
String Section 1 1 1 1 1 1 1 1 1 1 1 2 3 3 3 3 3 3 3 3	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96 1000,02 1219,20 1355,72 ary - Green( MD (m)	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 Cement #1 - 13 Axial Force (lbf)	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40 70,40 81,19 87,91	Internal 0,00 20,21 20,26 697,39 1145,62 1424,84 Pressure Internal	External 760 129 137 137 194 213 148 191 219 (psi) External
String Section         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           2         5           String         5	MD (m) 357,04 609,60 644,65 944,65 914,40 999,96 1000,02 1219,20 1255,72 ary - GreenC MD (m) (m) 357,04	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 Cement #1 - 13 Axial Force (lbf) 379582	Dogleg (*/100ħ) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(°F) 42,80 51,20 52,92 66,19 70,40 70,40 81,19 87,91 Temperature (°F) 42,80	Internal 0,00 20,21 20,26 622,25 687,26 687,26 687,39 1145,62 1424,84 Pressure Internal 2560,62	External 766 129 137 137 194 213 148 191 219 (psi) External 76
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 1 3 5 1 5 5 5 5	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96 1000,02 1219,20 1355,72 ary - Green( MD (m) 357,04 609,60	Axial Force (lbf) 73669 14007 5742 5742 5727 -57993 -78206 -36157 -85938 -111256 Cement #1 - 13 Axial Force (lbf) 379582 319820	Dogleg (*/100th) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force ((bf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(°F) 42,80 51,20 52,92 66,19 70,40 70,40 81,19 87,91 Temperature (°F) 42,80 51,18	Internal 0,00 20,21 20,26 652,25 697,39 1145,62 1424,84 Pressure Internal 2560,62 3098,70	External 766 129 137 137 194 213 148 191 219 (psi) External 766 129
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 1 3 5 1 5 5 5 5	MD (m) 357,04 609,60 644,65 644,65 644,65 999,96 1000,02 1219,20 1355,72 ary - GreenC MD (m) 357,04 609,60 644,459	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 2000 -111256 2000 -111256 2000 -111256 2000 -111256 2000 -111554	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (R-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lb/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 42,80 51,20 52,92 66,19 70,40 81,19 87,91 Temperature (°F) 42,80 51,18 52,93	Internal 0,00 0,00 20,21 20,26 697,26 697,26 697,39 1145,62 1424,84 Pressure Internal 2560,62 3098,70 3173,25	External 76 129 137 137 194 213 213 148 191 219 (psi) External 76 129 137
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 1 3 5 1 5 5 5 5	MD (m) 357,04 609,60 644,59 644,65 914,40 999,96 1000,02 1219,02 1219,02 1355,72 ary - GreenC MD (m) 557,04 609,60 644,59 644,65	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -86938 -111256 Cement #1 - 13 Axial Force (lbf) 379582 31920 311654 311640	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40 70,40 70,40 81,19 87,91 Temperature (°F) 42,80 51,18 52,93	Internal 0,00 20,21 20,26 697,26 697,39 1145,62 1424,84 Pressure Internal 2560,62 3099,70 3173,25	External 76 129 137 137 194 213 148 191 219 (psi) External 76 76 129 129 137 137
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 1 3 5 1 5 5 5 5	MD (m) 357,04 609,60 644,59 644,65 99,96 1000,02 1219,20 1365,72 ary - Green( MD (m) (m) (m) 357,04 609,60 644,59 644,65 814,40	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 Cement #1 - 13 Axial Force (lbf) 379582 319520 311654 311644 311644	Dogleg (*/100th) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force ((bf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40 70,40 81,19 87,91 Temperature (°F) 42,80 51,18 52,93 52,93 52,93 66,22	Internal 0,00 0,00 20,21 20,26 697,39 1145,62 1424,84 1444,84 1444	External 760 (129) 137 137 194 213 148 191 219 (psi) External 76 129 137 137 137
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 1 3 5 1 5 5 5 5	MD (m) 357,04 609,60 644,65 914,40 999,96 1000,02 1219,20 1255,72 ary - GreenC MD (m) 357,04 609,60 644,59 644,65 914,40 999,96	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 2000 -36157 -85938 -111256 2000 -36157 -85938 -111256 2000 379582 319520 311654 311654 311654 311654 247920	Dogleg (*/100h) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(°F) 42,80 51,20 52,92 66,19 70,40 81,19 87,91 Temperature (°F) (°F) (°F) 52,93 66,22 70,40	Internal 0,00 0,00 20,21 20,26 697,26 697,26 697,39 1145,62 1424,84 Pressure Internal 2560,62 3098,70 3173,25 3173,38 3748,05 3330,34	External 7 fo 129 137 137 194 213 148 148 191 219 (psi) External 7 fo 7 fo 129 137 137 137 194 213
String Section 1 1 1 1 1 1 1 1 1 3 1 3 1 1 3 1 3 5 tring	MD (m) 357,04 609,60 644,59 644,65 99,96 1000,02 1219,20 1365,72 ary - Green( MD (m) (m) (m) 357,04 609,60 644,59 644,65 814,40	Axial Force (lbf) 73669 14007 5742 5727 -57993 -78206 -36157 -85938 -111256 Cement #1 - 13 Axial Force (lbf) 379582 319520 311654 311644 311644	Dogleg (*/100th) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force ((bf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(°F) 42,80 51,20 52,92 52,92 66,19 70,40 70,40 81,19 87,91 Temperature (°F) 42,80 51,18 52,93 52,93 52,93 66,22	Internal 0,00 0,00 20,21 20,26 697,39 1145,62 1424,84 1444,84 1444	External 766 1299 1373 1373 1944 2133 1482 1911 2192 (psi)

## Date/Time: March 01, 2018 03:02:15 PM Page: 5 of 21

Conventional Well Design

Cas	ing Load Sum	mary - OverP	ull #1 - 13 3/8"	Intermediate Ca	asina				
/43	String	MD MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	357,04	195918	0,00	0,0	0,0	42,80	760,63	760
-	1	609,60	136256	0,00	0,0	0,0	51,18	1298,70	1298
	1	644,59	127990 127976	0,00 0,00	0,0 0,0	0,0 0,0	52,93	1373,25	1373 1373
	1	644,65 914,40	64256	0,00	0,0	0,0	52,93 66,22	1373,38 1948,05	1948
	1	999,96	44042	0,00	0,0	0,0	70,40	2130,34	2130
	1	1000,02	44028	0,00	0,0	0,0	70,40	2130,47	2130
	1	1219,20	-7744	0,00	0,0	0,0	81,20	2597,40	2597
	1	1355,72	-39993	0,00	0,0	0,0	87,90	2888,24	2888
as	Ing Load Sum String	mary - Runnir MD	n <u>gHole #1 - 13 :</u> Axial Force	3/8" Intermediat Dogleg	te Casing Torque	Friction Force	Temperature	Pressure	(psi)
_	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	357,04	247804	0,00	0,0	0,0	42,80	760,63	760
	1	609,60 644,59	199316 192599	0,00 0,00	0,0 0,0	0,0 0,0	51,18 52,93	1298,70 1373,25	1298 1373
	1	644,65	192587	0,00	0,0	0,0	52,93	1373,38	1373
	1	914,40	140802	0,00	0,0	0,0	66,22	1948,05	1948
	1	999,96	124374	0,00	0,0	0,0	70,40	2130,34	2130
	1	1000,02	124363	0,00	0,0	0,0	70,40	2130,47	2130
	1	1219,20	82287	0,00	0,0	0,0	81,20	2597,40	2597
	1	1355,72	56079	0,00	0,0	0,0	87,90	2888,24	288
as	ing Load Sum	mary - Initial (	Conditions - 95	/8" Production (	Casing				
43	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
	1	357,04	214949	0,00	0,0	0,0	42,80	730,20	730
	1	609,60	170617	0,00	0,0	0,0	51,18	1246,75	1246
	1	914,40	117117	0,00	0,0	0,0	66,22	1870,13	1870
-	1	1219,20 1355,72	63617	0,00	0,0	0,0	81,20	2493,50	2493
		1355,72	39654 39644	0,00 0,00	0,0 0,0	0,0 0,0	87,89 87,89	2772,71 2772,84	2772 2772
	1	1499,98	14335	0,00	0,0	0,0	95,00	3067,74	3067
	i	1500,04	14324	0,00	0,0	0,0	95,00	3067,86	3067
	4						96,20	3116,88	3118
	1	1524,00	10117	0,00	0,0	0,0		5110,00	
	1	1828,80	-43383	0,00	0,0	0,0	111,24	3740,26	3768
	1 1 1								3768
26	1	1828,80 1981,20 1995,65	-43383 -70133 -72675	0,00 0,00 0,00	0,0 0,0 0,0	0,0 0,0	111,24 118,66	3740,26 4051,95	3768
as	ing Load Sum String	<u>1828,80</u> 1981,20 1995,65 <u>marγ - Pressu</u> MD	-43383 -70133 -72675 IreTest #1 - 9 5 Axial Force	0,00 0,00 0,00 /8" Production ( Dogleg	0,0 0,0 0,0 0,0 Torque	0,0 0,0 0,0 Friction Force	111,24 118,66 119,40 Temperature	3740,26 4051,95 4081,50 Pressure	3768 4169 4208 (psi)
as	i ing Load Sum	1828,80 1981,20 1995,65 <u>MD</u> (m)	-43383 -70133 -72675 IreTest #1 - 95 Axial Force (lbf)	0,00 0,00 0,00 0,00 0,00 /8" Production ( Dogleg (°/100t)	0,0 0,0 0,0 0,0 <u>Casing</u> Torque (ft-lbf)	0,0 0,0 0,0 Friction Force (lbf/ft)	111,24 118,66 119,40 Temperature (°F)	3740,26 4051,95 4081,50 Pressure Internal	3768 4169 4208 (psi) External
as	ing Load Sum String	<u>1828,80</u> 1981,20 1995,65 <u>marγ - Pressu</u> MD	-43383 -70133 -72675 IreTest #1 - 9 5 Axial Force	0,00 0,00 0,00 /8" Production ( Dogleg	0,0 0,0 0,0 0,0 Torque	0,0 0,0 0,0 Friction Force	111,24 118,66 119,40 Temperature	3740,26 4051,95 4081,50 Pressure	3766 4165 4208 (psi) External 730
as	ing Load Sum String	1828.80 1981,20 1995,65 <u>MD</u> (m) 557,04 609,60 914,40	-43983 -70133 -72675 IreTest #1 - 9 5 Axial Force (bf) 323493 279160 225660	0,00 0,00 /8" Production ( Dogleg (°/100ft) 0,00 0,00	0,0 0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	111,24 119,66 119,40 Temperature (°F) 42,80 51,18 66,22	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26	3766 4165 4208 (psi) External 730 1246 1877
as	ing Load Sum String	1828 80 1981,20 1995,65 <u>MD</u> (m) 357,04 609,60 914,40 1219,20	-43983 -70133 -72675 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160	0,00 0,00 0,00 /8" Production ( Dogleg (°/100ft) 0,00 0,00 0,00	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0	111,24 118,66 119,40 (°F) (°F) (°F) 51,18 66,22 81,20	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01	376i 416i 420i External 73i 124i 187i 249i
<u>as</u>	ing Load Sum String	1828.80 1981.20 1995,65 MD (m) 357,04 609,60 914,40 1219,20 1355,72	-43983 -70133 -72675 ireTest #1 - 9 5 Axial Force (lbf) 323493 279160 225660 172160 148198	0,00 0,00 0,00 /8" Production ( Dogleg (*/100R) 0,00 0,00 0,00 0,00	0.0 0,0 0,0 7 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89	3740,26 4061,95 4081,50 Pressure Internal 4223,31 5040,26 5487,01 5687,11	3766 4165 4208 (psi) External 730 1244 1870 2499 2772
<u>as</u>	ing Load Sum String	1828,80 1991,20 1995,65 MD (m) 357,04 609,60 914,40 1219,20 1355,78	-43983 -70133 -72675 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 148187 148187	0,00 0,00 0,00 /8" Production ( Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ħ) 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 87,89	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,20	376 416 420 (psi) External 734 124 187 249 277 277
as	ing Load Sum String	1828.80 1981.20 1995.65 MD (m) 357,04 609.60 914.40 1219.20 1355.72 1355.72 1355.73	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 12878 148198 148198	0,00 0,00 0,00 / <u>8" Production (</u> Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 87,89 87,89 95,00	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,11 5687,20 5888,54	3766 4166 4206 (psi) External 730 1244 1870 2499 2777 2777 3066
as	ing Load Sum String	1828.80 1981,20 1995,65 MD (m) 357,04 809,60 914,40 1219,20 1355,72 1355,78 1499,98 1500,04	-43983 -70133 -72675 IreTest #1 - 9 5 Axial Force (lbf) 225660 172160 225660 172160 148198 148198 148198 136684	0,00 0,00 0,00 /8" Production ( Dogleg ("/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00	3740,26 4061,95 4081,50 Pressure Internal 4223,31 5040,26 5487,01 5687,20 5689,54 5898,63	376i 416i 420i External 73i 124i 187i 249i 277i 277i 306i 249i
<u>as</u>	ing Load Sum String	1828.80 1981.20 1995.65 MD (m) 357,04 609.60 914.40 1219.20 1355.72 1355.72 1355.73	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 12878 148198 148198	0,00 0,00 0,00 / <u>8" Production (</u> Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 87,89 87,89 95,00	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,11 5687,20 5888,54	376i 416i 420i 500 500 500 73i 73i 73i 73i 73i 73i 73i 73i 73i 73i
<u>as</u>	ing Load Sum String	1828.80 1991.20 1995,65 MD (m) 357,04 609,60 914,40 1219,20 1355,78 1499,98 1500,04 1524,00 1828,80 1828,80 1828,80	-43983 -70133 -72675 Axial Force (lbf) 225660 172160 148187 12878 136694 132078 73396 47352	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 96,20 111,24 1118,66	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,20 5689,54 5898,54 5898,63 5833,76 6380,52 66380,52	(psi) (psi) External 73 1244 187 249 2777 306 249 249 2773 306 249 348 348
35	ing Load Sum String	1828.80 1981.20 1995.65 MD (m) 357.04 609.60 914.40 1219.20 1355.72 1355.72 1355.72 1355.72 1355.72 1355.72 1352.80 1524.00 1828.80	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 148198 148198 148197 12878 136694 132078 73366	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 87,89 87,89 95,00 95,00 96,20 111,24	3740,26 4061,95 4081,50 Pressure Internal 4223,31 5040,26 5487,01 5687,11 5687,20 5898,63 5993,76 6380,52	(psi) (psi) External 73 124 187 249 277 306 249 2254 316 348
	1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) 357,04 609,60 914,40 1219,20 1355,72 13	-43983 -70133 -72675 Axial Force (lbf) 323493 279160 225660 172160 12878 148198 148198 148198 148198 148198 136694 132078 73396 47352 44919	0,00 0,00 0,00 / <u>8" Production (</u> Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	0,0 0,0 0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 96,20 111,24 1118,66	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,20 5689,54 5898,54 5898,63 5833,76 6380,52 66380,52	(psi) (psi) External 733 1244 1877 2493 2777; 3066 2499 2544 3168 3484 3484
	ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) 357.04 609,60 914,40 1219,20 1355.72 1355.78 1499,98 1500,00 1828.80 1995,65	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 1225660 172160 148197 148197 148197 12878 136684 136684 136684 132078 73396 47352 44919 eturnsWithMudC Axial Force	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00 95,00 95,00 95,00 111,24 118,66 119,40	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,10 5687,20 5898,54 5898,63 5983,76 6380,52 6603,89 6625,07	(psi) (psi) External 733 1244 1877 2439 2777 2777 2777 306 2439 2544 316 3484 3484 3451
	ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995.65 MD (m) 357,04 609.60 914.40 1219.20 1355.72 1355.78 1499.98 1500.04 1524.00 1828.80 1981.20 1995.65 MD (m)	-43983 -70133 -72675 Axial Force (lbf) 323493 279160 225660 172160 1225660 172160 1225660 172160 1225660 172160 122878 136694 132078 73396 47352 44919	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0 0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 87,89 87,89 95,00 95,00 95,00 96,20 111,24 118,66 119,40	3740,26 4061,95 4081,50 Pressure Internal 4223,31 5040,26 5487,01 5687,11 5687,20 5898,63 5933,76 6380,52 6603,89 6625,07 Pressure	376f 418i 420f (psi) External 73i 1244 187i 249i 249i 254i 3514 3514 (psi) External
	ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) 557.04 609,60 914,40 1219,20 1355,72 1355,78 1499,98 1500,04 1524,00 1828,80 1995,65 mary - LostRee MD (m) 357,04	-43983 -70133 -72675 Axial Force (bf) 323493 279160 1225660 172160 148198 148197 122878 136694 132078 73396 47352 47352 44919 25UrnsWithMudE Axial Force (bf) 163809	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00 95,00 96,20 111,24 118,66 119,40	3740,26           4051,95           4081,50           Pressure           Internal           4223,31           4593,51           5040,26           547,01           5687,20           5898,63           5933,76           6380,52           6603,89           6625,07           Pressure           Internal           0,00	3766 4188 4208 (psi) External 7733 1244 1877 2498 2777 2077 2077 3006 2544 3166 348& 3514 (psi) External 733
	ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) 357,04 609,60 914,40 1219,20 1355,78 1499,98 1500,04 1524,00 1828,80 1985,65 MD (m) (m) (m) 357,04 609,60 914,40	-43983 -70133 -72675 Axial Force (lbf) 323493 279160 125660 172160 148187 132078 73396 44919 	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 96,20 111,24 118,66 119,40 Temperature (°F) Temperature (°F) 42,80 51,20 86,19	3740,26           4051,95           4081,50           Pressure           Internal           4223,31           4593,51           5040,26           5487,01           5687,11           5687,20           5898,54           5898,63           5933,76           6380,52           6603,89           6625,07           Pressure           Internal           0,00           0,00           0,00           0,00           11,63	(psi) (psi) External 1244 1877 2437 2544 316 348 3514 (psi) External 737 124 124 1877
	ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) 357,04 609,60 914,40 1219,20 1355,72 1355,78 1499,98 1500,04 1524,00 1828,80 1981,20 1995,65 MD (m) 357,04 609,60 914,40 1219,20	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 1225660 172160 122878 148197 122878 136694 148197 122878 136694 47352 44919 <u>eturnsWithMudC</u> Axial Force (lbf) 163809 119477 65977 12477	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,000 95,0000 95,0000 95,0000 95,0000 95,0000 95,00000 95,0000000000000000000000000000000	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,11 5687,20 5898,63 5933,76 6380,52 6603,89 6625,07 Pressure Internal 0,00 0,00 181,63 805,01	(psi) External 773 1244 1877 2499 2544 3168 3489 3511 External 733 1244 1877 259 2544 3168 3489 3511 2544 1877 2777 2777 2777 2499 2544 2544 3168 2545 2545 2545 2545 2545 2545 2545 254
	ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995.65 MD (m) 357,04 609.60 914.40 1219.20 1355.72 1355.72 1355.72 1355.72 1355.72 1355.72 1355.72 1355.72 1355.72 1995.65 MD (m) 357.04 0192.00 1995.65 MD (m) 357.04 0192.00 1355.72 1995.65 MD (m) 1995.65 MD (m) 1995.65 1995.72 1995.75	-43983 -70133 -72675 Axial Force (lbf) 225660 172160 148187 12878 136694 132078 13478 136694 132078 44919 	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 87,89 95,00 96,00 96,00 111,24 118,66 119,40 Temperature (°F) 42,80 51,20 66,19 81,19 87,91	3740,26           4061,95           4081,50           Pressure           Internal           4223,31           5040,26           5487,011           5687,111           5687,11           5687,60           5898,63           5933,76           6380,52           6603,89           6625,07           Pressure           Internal           0,00           181,63           805,01	3766 4161 4200 External 733 1244 1244 2493 2493 2493 2493 2544 3166 348& 3514 733 1244 1877 733 1244 1877 2493 2493 2493 2493 2493 2493 2493 2493
	1 ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) 357.04 609,60 914.40 1219,20 1355.78 155.78 155.78 155.78 155.78 155.78 155.78 155.78 152.00 1995,65 MD (m) 357.04 609,60 914.40 1219,20 1355.78	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 12878 148197 12878 136684 148197 12878 136684 132078 73396 47352 44919 -112877 124777 124777 -11486 -11496	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 7 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 119,40 7 emperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00 95,00 95,00 96,20 111,24 118,66 119,40 7 Emperature (°F) 42,80 51,20 66,19 81,19 87,91	3740,26 4051,95 4061,95 4081,50 Pressure 1nternal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,20 5898,54 5898,63 5933,76 6380,52 6603,89 6625,07 Pressure Internal 0,00 0,00 181,63 895,01 1084,22 1084,35	3766 4168 4200 External 733 1244 1877 2493 2777 2493 2540 3166 348& 3514 5514 (psi) External 730 1244 1877 2493 2493 2493 2493 2777 2493 2493 2493 2493 2493 2493 2493 2493
	1 ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995.65 MD (m) 357,04 609,60 914,40 1219.20 1365,72 1365,78 1499,98 1500,04 1524,00 1828.80 1995.65 MD (m) 357,04 609,60 914,40 1219,20 1355,72 1355,75	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 12878 148197 12878 136684 148197 12878 136684 132078 73396 47352 44919 -112877 124777 124777 -11486 -11496	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00 95,00 95,00 95,00 95,00 95,00 95,00 95,00 111,24 119,40 Temperature (°F) 42,80 51,120 66,19 81,19 87,91 87,91 87,91 87,91 95,00	3740,26 4051,95 4081,50 Pressure Internal 4223,31 4593,51 5040,26 5487,01 5687,11 5687,11 5687,20 5898,63 5983,76 6380,52 6603,89 6625,07 Pressure Internal 0,00 181,63 805,01 1084,22 1084,35	3766 4188 4200 External 733 1244 1877 2499 2544 3166 3166 3166 3166 3167 3167 3167 3167
	1 ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) \$57.04 609.60 914.40 1219.20 1355.72 1355.78 1499.98 1500.04 1524.00 1828.80 1995,65 MD (m) (m) \$57.04 609.60 914.40 1219.20 1355.72 1355.78 1499.98 1500.04	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 12878 148197 12878 136684 148197 12878 136684 132078 73396 47352 44919 -112877 124777 124777 -11486 -11496	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 7,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00 96,20 111,24 118,66 119,40 Temperature (°F) 42,80 51,20 66,19 81,19 87,91 87,91 87,91 95,00 95,00	3740,26           4051,95           4081,50           -           Internal           4223,31           4593,51           5040,26           5487,01           5687,11           5687,20           5896,54           5898,63           5933,76           6380,52           6603,89           6625,07           -	(psi) (psi) External 733 1244 1870 2493 2544 3166 3484 3514 (psi) External 733 1244 1877 2777 2777 3066 2499 2499 2777 2777 2066 2499
	1 ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995.65 MD (m) 357.04 609.60 914.40 129.20 1355.72 1355.78 1499.98 1500.04 1524.00 1828.80 1995.65 MD (m) 357.04 609.60 914.40 1995.65 MD (m) 357.04 609.60 914.20 1995.65 MD (m) 1995.72 1955.78 1499.98 1500.04 1524.00 1524	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 1225660 172160 122878 138684 148197 122878 138684 138684 132078 73396 47352 44919 -1122878 163809 119477 65977 12477 -11496	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00 95,00 95,00 95,00 95,00 95,00 95,00 95,00 51,20 66,19 87,91 87,91 87,91 87,91 87,91 95,00 95,00 95,00 95,00 95,00 95,00	3740,26 4061,95 4081,50 9 9 100000000000000000000000000000000	3766 4180 4206 (psi) External 7530 1246 1877 2490 2777 2777 2777 3067 2490 2544 3188 3488 3488 3488 3514
	1 ing Load Sum String Section 1 1 1 1 1 1 1 1 1 1 1 1 1	1828.80 1981.20 1995,65 MD (m) \$57.04 609.60 914.40 1219.20 1355.72 1355.78 1499.98 1500.04 1524.00 1828.80 1995,65 MD (m) (m) \$57.04 609.60 914.40 1219.20 1355.72 1355.78 1499.98 1500.04	-43983 -70133 -72675 -72675 Axial Force (lbf) 323493 279160 225660 172160 12878 148197 12878 136684 148197 12878 136684 132078 73396 47352 44919 -112877 124777 124777 -11486 -11496	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 7,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	111,24 118,66 119,40 Temperature (°F) 42,80 51,18 66,22 81,20 87,89 95,00 95,00 96,20 111,24 118,66 119,40 Temperature (°F) 42,80 51,20 66,19 81,19 87,91 87,91 87,91 95,00 95,00	3740,26           4051,95           4081,50           -           Internal           4223,31           4593,51           5040,26           5487,01           5687,11           5687,20           5896,54           5898,63           5933,76           6380,52           6603,89           6625,07           -	(psi) External 277 277 277 207 244 255 311 344 355 External 77 124 255 244 255 244 255 244 255 244 255 244 277 7277 300 244 255

		MD MD	Cement #1 - 95 Axial Force		Jasing Torque		Existion Esses	Tanananakuna	Durana	(1)
	String Section	(m)	(lbf)	Dogleg (°/100ft)	(ft-lbf)		Friction Force (lbf/ft)	Temperature (°F)	Pressure Internal	External
	1	357,04	426638	0,00		0,0	0,0	42,80	4430,20	73
	1	609,60	382306	0,00		0,0	0,0	51,18	4946,75	124
	1	914,40	328806	0,00		0,0	0,0	66,22	5570,13	187
	1	1219,20	275306	0,00		0,0	0,0	81,20	6193,50	249
	1	1355,72 1355,78	251343 251333	0,00 0,00		0,0 0,0	0,0 0,0	87,89 87,89	6472,71 6472,84	277 277
	4	1499,98	226024	0,00		0,0	0,0	95,00	6767,74	306
	1	1500,04	226013	0,00		0.0	0,0	95,00	6767,86	306
	1	1524,00	221806	0,00		0,0	0,0	96,20	6816,88	311
	1	1828,80	168306	0,00		0,0	0,0	111,24	7440,26	376
	1	1981,20	141556	0,00		0,0	0,0	118,66	7751,95	416
	1	1995,65	139014	0,00		0,0	0,0	119,40	7781,50	420
asin	a Load Sumr	nary - OverPi	ıll #1 - 9 5/8'' Pr	oduction Casin	n					
aom	String	MD MD	Axial Force	Dogleg	Torque		Friction Force	Temperature	Pressure	(nsi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F)	Internal	External
	1	357,04	274162	0,00		0,0	0,0	42,80	730,20	73
	1	609,60	229830	0,00		0,0	0,0	51,18	1246,76	124
	1	914,40	176330	0,00		0,0	0,0	66,22	1870,13	187
	1	1219,20	122830	0,00		0,0	0,0	81,20	2493,51	249
	1	1355,72	98867	0,00		0,0	0,0	87,89	2772,72	277
	1	1355,78 1499,98	98856 73548	0,00 0,00		0,0 0,0	0,0 0,0	87,89 95,00	2772,84 3067,73	277 306
	1	1500,04	73537	0,00		0,0	0,0	95,00	3067,85	306
	1	1524,00	69330	0,00		0,0	0,0	96,20	3116,87	311
	1	1828,80	15830	0,00		0,0	0,0	111,24	3740,25	374
	1	1981,20	-10920	0,00		0,0	0,0	118,66	4051,94	405
	1	1995,65	-13462	0,00		0,0	0,0	119,40	4081,50	408
asin	<u>g Load Sumr</u> String	narγ - Runnin MD	<u>gHole #1 - 95/</u> Axial Force	<u>B" Production C</u> Dogleg	asing Torque		Friction Force	Temperature	Pressure	(nsi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F)	Internal	External
	1	357,04	277498	0,00		0,0	0,0	42,80	730,20	73
	1	609,60	241196	0,00		0,0	0,0	51,18	1246,76	124
	1	914,40	197387	0,00		0,0	0,0	66,22	1870,13	187
	1	1219,20	153579	0,00		0,0	0,0	81,20	2493,51	249
	1	1355,72	133957	0,00		0,0	0,0	87,89	2772,72	277
	1	1355,78 1499,98	133948 113224	0,00 0,00		0,0	0,0 0,0	87,89 95,00	2772,84 3067,73	277
	4	1500,04	113215	0.00		0.0	0,0	95,00	3067,85	306 306
	i	1524,00	109770	0.00		0.0	0,0	96,20	3116,87	311
	i	1828,80	65961	0.00		0.0	0,0	111,24	3740,25	374
	1	1981,20	44057	0,00		0,0	0,0	118,66	4051,94	405
	1	1995,65	41980	0,00		0,0	0,0	119,40	4081,50	408
		nany Tubina	Look #1 0 5/9	Draduation Co	oin a					
asin	<u>g Load Sumr</u> String Section	MD (m)	Leak #1 - 9 5/8 Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)		Friction Force (lbf/ft)	Temperature (°F)	Pressure	(psi) External
	1	357,04	204808	0.00		0,0	(101/11)	42,80	0,06	External 74
	1	609,60	160476	0,00		0,0	0,0	51,18	516,62	110
	1	914,40	106976	0,00		0,0	0,0	66,22	1139,99	153
	1	1219,20	53476	0,00		0,0	0,0	81,20	1763,37	196
	1	1355,72	29513	0,00		0,0	0,0	87,89	2042,58	216
	1	1355,78	29502	0,00		0,0	0,0	87,89	2042,70	216
	- 1	1499,98	4194	0,00		0,0	0,0	95,00	2337,60	236
		1500,04	-10738	0,00		0,0	0,0	95,00	2337,73	306
	1			0,00		0,0	0,0 0,0	96,20 111,24	2386,75 3010,12	310
	1	1524,00	-14202	0.00		0,0	0,0	111,24	3321,80	353 375
	1 1 1	1524,00 1828,80	-58226	0,00						
	1 1 1 1	1524,00		0,00 0,00 0,00		0,0	0,0	119,40	3351,36	377
	1 1 1 1	1524,00 1828,80 1981,20	-58226 -76941	0,00						377
asin		1524,00 1828,80 1981,20 1995,65 narγ - Initial C	-58226 -76941 -78679 Conditions - 7'' F	0,00 0,00 Production Liner			0,0	119,40	3351,36	
asin	String	1524,00 1828,80 1981,20 1995,65 <u>narγ - Initial C</u> MD	-58226 -76941 -78679 Conditions - 7" F Axial Force	0,00 0,00 Production Liner Dogleg	Torque		0,0 Friction Force	119,40 Temperature	3351,36 Pressure	(psi)
asin		1524,00 1828,80 1981,20 1995,65 <u>nary - Initial C</u> <u>MD</u> (m)	-58226 -76941 -78679 20nditions - 7" F Axial Force (lbf)	0,00 0,00 Production Liner Dogleg (°/100ft)	Torque (ft-lbf)	0,0	0,0 Friction Force (lbf/ft)	119,40 Temperature(°F)	3351,36 Pressure Internal	(psi) External
asin	String Section 1	1524.00 1828,80 1981,20 1995,65 mary - Initial C MD (m) 1980,04	-58226 -76941 -78679 Conditions - 7" F Axial Force (lbf) 1093	0,00 0,00 Production Liner Dogleg (°/100ft) 0,00	Torque (ft-lbf)	0,0	0,0 Friction Force (lbf/ft) 0,0	119,40 Temperature	3351,36 Pressure Internal 4049,55	(psi) External 404
asin	String Section 1 1	1524,00 1828,80 1981,20 1995,65 <u>mary - Initial C</u> <u>MD</u> (m) 1980,04 1981,20	-58226 -76941 -78679 Conditions - 7" F Axial Force (lbf) 1093 978	0,00 0,00 Production Liner Dogleg (*/100ft) 0,00 0,00	Torque (ft-Ibf)	0,0	0,0 Friction Force (lbf/ft) 0,0	119,40 Temperature	3351,36 Pressure Internal 4049,55 4051,95	External 404 405
asin	String Section 1 1 1	1524,00 1828,80 1981,20 1995,65 <u>mary - Initial C</u> <u>MD</u> (m) 1980,04 1981,20 1995,65	-58226 -76941 -78679 Conditions - 7" F Axial Force (lbf) 1993 978 -399	0,00 0,00 Production Liner Dogleg (*/100tt) 0,00 0,00 0,00	Torque (ft-lbf)	0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0	119,40 Temperature	3351,36 Pressure Internal 4049,55 4051,95 4081,50	(psi) External 404 405 408
asin	String Section 1 1	1524,00 1828,80 1981,20 1995,65 <u>mary - Initial C</u> <u>MD</u> (m) 1980,04 1981,20	-58226 -76941 -78679 Conditions - 7" F Axial Force (lbf) 1093 978	0,00 0,00 Production Liner Dogleg (*/100ft) 0,00 0,00	Torque (ft-lbf)	0,0	0,0 Friction Force (lbf/ft) 0,0	119,40 Temperature	3351,36 Pressure Internal 4049,55 4051,95	(psi) External 404 405

: Vertical E	Current -			Production Liner			1arch 01, 2018		
sing Load String	Summa	MD MD	relest#1 - /'' + Axial Force	Production Liner Dogleg	Torque	Friction Force	Temperature	D	(nei)
Section		(m)	Axiai Force (lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Pressure Internal	(psi) External
Gection	1	1980.04	47094	0.00	0.0	0.0	118,60	6602.18	404
	1	1981,20	46987	0,00	0,0	0,0	118,66	6603,89	405
	1	1995,65	45695	0,00	0,0	0,0	119,38	6625,07	407
	1	1995,71	58560	0,00	0,0	0,0	119,39	6625,16	351
	1	2133,60	44508	0,00	0,0	0,0	126,18	6827,27	378
	1	2438,40 2496,98	16016 11070	0,00 0,00	0,0 0,0	0,0 0,0	141,22 144,10	7274,02 7359,87	432 443
		2430,30	11070	0,00	0,0	0,0	14,10	7555,07	
sing Load String	Summa	ny - Evacua	tion #1 - 7" Pro Axial Force	oduction Liner Dogleg	Torque	Friction Force	Temperature	Pressure	(nsi)
Section		(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	1980,04	-71851	0,00	0,0	0,0	118,62	3,37	404
	1	1981,20	-71988	0,00	0,0	0,0	118,67	3,38	405
	1	1995,65	-73640	0,00	0,0	0,0	119,38	3,40	407
	1	1995,71	-73641	0,00	0,0	0,0	119,39	3,40	407
	1	2133,60	-89555	0,00	0,0	0,0	126,17	3,64	426
	1	2438,40 2496,98	-123520 -129536	0,00 0,00	0,0 0,0	0,0 0,0	141,17 144,05	4,16 4,27	470 478
sing Load	Summa	irv - Green	ement #1 - 7"	Production Liner					
String Load	Summe	MD MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
Section		(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°E) —	Internal	External
	1	1980,04	112222	0,00	0,0	0,0	118,60	7749,55	404
	1	1981,20	112108	0,00	0,0	0,0	118,66	7751,95	40
	1	1995,65	110730	0,00	0,0	0,0	119,38	7781,50	408
	1	1995,71	110730	0,00	0,0	0,0	119,39	7781,62	408
	1	2133,60	97608	0,00	0,0	0,0	126,18	8063,63	43
sing Load String	1 1 Summa	2438,40 2496,98	68608 63033 Ill #1 - 7'' Produ Axial Force	0,00 0,00 uction Liner Dogleg	0,0 0,0	0,0 0,0 Friction Force	141,22 144,10	8687,00 8806,80 Pressure	52:
sing Load String Section	1 1 Summa 1 1 1 1 1 1 1	2496,98 ary - OverPu	63033 III #1 - 7'' Produ	0,00	0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/lt) 0,0 0,0 0,0 0,0 0,0 0,0	144,10 Temperature(°F) 118,60 118,60 119,38 119,39 126,18 141,22	Pressure Internal 4049,55 4051,95 4081,62 4363,63 4987,01	(psi) External 404 400 400 400 400 400 400 400 400 40
String Section	1 1 1 1 1 1	2496,98 ITY - OVERPL MD (m) 1980,04 1986,25 1995,65 1995,71 2133,60 2438,40 2438,40 2438,40 2438,40 2438,40 2438,40 1995,65 1995,65	63033 III #1 - 7" Produ Axial Force (lbf) 56035 55921 54543 54543 54543 41421 12421 6846 gHole #1 - 7" F Axial Force (lbf) 63067 62976 61850 61846	0,00 uction Liner Dogleg ('/100ft) 0,00 0,0	0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 Friction Force ((bf/ft)) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	144,10 Temperature(°F) 118,60 118,60 119,38 119,39 126,18 141,22 144,10 Temperature(°F) 118,60 118,66 119,38 119,39	8806,80           Pressure           Internal           4049,55           4081,62           4363,63           4987,01           5106,80           Pressure           Internal           4049,55           4051,95           4051,95           4049,55           4081,62	(psi) External 400 400 401 401 401 511 (psi) External 400 400 401 401 401
String Section sing Load String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 MD (m) 1980,04 1981,20 1995,65 1995,65 1995,71 2133,60 2438,40 2496,98 MD (m) 1980,04 1995,65 1995,71 2133,60 2438,40 2496,98	63033 Axial Force (bf) 56035 55921 54543 54564 54564 54568 5456	0,00 uction Liner Dogleg ('/100R) 0,00	0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	144,10 Temperature (°F) 118,60 118,60 119,38 119,38 126,18 141,22 144,10 Temperature (°F) (°F) 118,60 118,60 118,60 118,60 118,60	Pressure Internal 4049,55 4051,95 4081,50 4081,52 4363,63 4987,01 5106,80 Pressure Internal 4049,55 4051,95 4051,95	(psi) External 400 400 400 400 400 510 (psi) External 400 400 400 400 400 400 400 400 400 40
String Section String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 ITY - OVERPL MD (m) 1980,04 1981,20 1995,65 1995,71 2133,60 2438,40 2496,98 ITY - Runnin MD (m) 1980,04 1980,04 1980,04 1980,04 1985,571 2133,60 2438,40 1980,57 1	63033 Axial Force (lbf) 56035 55921 54543 54543 54543 41421 12421 6846 9 gHole #1 - 7" FF Axial Force (lbf) 63067 62976 61850 61846 51109 27376 22816 Leak #1 - 7" Prr Axial Force	0,00 uction Liner Dogleg ('/100ft) 0,00 0,0	0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	144,10 Temperature (°F) 118,60 118,60 119,38 119,39 126,18 141,22 144,10 Temperature (°F) 118,60 118,60 118,66 119,39 126,18 144,10 Temperature (°F) 118,60 118,60 118,60 118,60 118,60 118,60 118,60 118,60 114,10 144,10 Temperature (°F) 118,60 118,60 119,38 119,38 119,38 119,38 118,60 119,38 119,38 119,38 119,38 114,10 144,10 Temperature (°F) 118,60 118,60 119,38 119,38 119,38 119,38 119,38 119,38 119,38 119,38 119,38 119,38 119,38 119,38 119,38 119,38 118,60 118,60 118,60 118,60 119,38 119,38 119,38 119,38 119,38 119,38 118,60 118,56 119,38 119,39 126,18 144,10 126,18 144,10 126,18 144,10 126,18 144,10 126,18 144,10 144,	8806,80 Pressure Internal 4049,55 4061,95 4081,62 4081,62 4081,62 4081,62 4081,50 4081,50 4081,50 4049,55 4051,95 4	(psi) External 400 400 400 400 400 400 510 (psi) 510 400 400 400 400 400 400 400 400 400 4
String Section String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 MD (m) 1980,04 1981,20 1995,65 1995,71 2133,60 2438,40 2496,98 MTY - Runnin MD (m) 1995,65 1995,71 2133,60 2438,40 2496,98 MD (m) 1995,65 1995,71 2133,60 2438,40 2496,98 MD (m) MD (m)	63033 Axial Force (lbf) 56035 55921 54543 54543 41421 6846 <u>gHole #1 - 7" F</u> Axial Force (lbf) 61950 61946 51109 27376 22816 Leak #1 - 7" Pr.	0,00 iction Liner Dogleg ('/100#) 0,00	0,0 Torque ((t-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Temperature (°F) (°F) 118,66 118,66 119,38 119,39 126,18 141,22 144,10 Temperature (°F) 118,66 119,38 119,39 126,18 141,22 144,10	9806,80           Pressure           Internal           4049,55           4051,95           4081,50           4081,50           4081,50           4081,63           4987,01           5106,80           9           Pressure           Internal           4049,55           4051,95           4051,95           4051,95           4051,95           4081,62           4081,62           4383,63           4987,01           5106,80           Pressure           Pressure	(psi) External 400 400 400 400 401 510 (psi) External (psi) (psi) External
String Section String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 ry - OverPu MD (m) 1980,04 1981,20 1995,61 1995,71 2133,60 2438,40 2438,60 2438,60 1980,04	63033 Axial Force (lbf) 56035 55921 54543 5454 5454 5454 5454 5456 5456 5456 5457 5477 62976 61850 61850 61850 61846 51109 27376 22816 Leak #1 - 7" Pr Axial Force (lbf) 63067 61946 51109 27376 22816 100 100 100 100 100 100 100 1	0,00 uction Liner Dogleg ('/100t) 0,00	0,0           Torque (ft-lbf)           0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	144,10 Temperature (°F) 118,60 118,60 119,38 119,39 126,18 144,10 Temperature (°F) 118,60 119,68 119,38 126,18 119,39 126,18 144,10 Temperature (°F) 118,60 119,38 144,10 Temperature (°F) 118,61 119,38 144,10 118,60 118,50 119,38 119,39 126,18 144,10	8806,80           Pressure           Internal           4049,55           4051,95           4081,52           4363,63           4987,01           5106,80           Pressure           Internal           4049,55           4051,95           4081,62           4081,62           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,80           987,01           5106,80	(psi) External 400 400 400 401 403 403 409 401 401 401 401 401 401 401 401
String Section String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 MD (m) 1980,04 1981,20 1995,65 1995,65 1995,76 2438,40 2496,98 MTY - Runnin MD (m) 1980,04 1995,65 1995,71 2133,60 2438,40 2496,98 MD (m) 1980,04 1995,65 1995,71 2133,60 2438,40 2496,98 MD (m) 1980,04 1981,20 MD	63033 Axial Force (lbf) 56035 55921 54543 54564 5109 27376 22816 51109 27376 22816 972 4000 972 972	0,00 action Liner Dogleg ('/100R) 0,00	0.0           Torque (ft-lbf)           0.0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Temperature (°F) (°F) (°F) (°F) (°F) (°F) (°F) (°F)	9806,80           Pressure           Internal           4049,55           4051,95           4081,50           4081,50           4081,50           4081,62           4363,63           4987,01           5106,80           1           4049,55           4081,62           4081,62           4081,50           4081,50           4081,50           4081,50           4081,50           4081,62           4083,63           4987,01           5106,80           Pressure           Internal           4049,55           4051,95           4081,62           4383,63           4987,01           5106,80	(psi) External 400 400 400 401 403 403 409 401 401 401 401 401 401 401 401
String Section String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 TY - OVerPL MD (m) 1980,04 1981,20 1995,65 1995,71 2133,60 2438,40 2496,98 TY - Runnin MD (m) 1980,04 1995,65 1995,71 2133,60 2438,40 2496,98 TY - Tubingl MD (m) 1980,04	63033 Axial Force (lbf) 56035 55921 54543 5454 5454 5454 5454 5456 5456 5456 5457 5477 62976 61850 61850 61850 61846 51109 27376 22816 Leak #1 - 7" Pr Axial Force (lbf) 63067 61946 51109 27376 22816 100 100 100 100 100 100 100 1	0,00 uction Liner Dogleg ('/100t) 0,00	0,0           Torque (ft-lbf)           0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	144,10 Temperature (°F) 118,60 118,60 119,38 119,39 126,18 144,10 Temperature (°F) 118,60 119,68 119,38 126,18 119,39 126,18 144,10 Temperature (°F) 118,60 119,38 144,10 Temperature (°F) 118,61 119,38 144,10 118,60 118,50 119,38 119,39 126,18 144,10	8806,80           Pressure           Internal           4049,55           4051,95           4081,52           4363,63           4987,01           5106,80           Pressure           Internal           4049,55           4051,95           4081,62           4081,62           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,52           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,80           987,01           5106,80	(psi) External 400 400 400 400 400 400 400 400 400 40
String Section String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 MD (m) 1980,04 1981,20 1995,65 1995,71 2133,60 2438,40 2496,98 MD (m) 1980,04 1980,04 1985,65 1995,71 2133,60 2438,40 2496,98 MD (m) (m) (m) 1980,04 1985,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,65 1995,71 2133,60 2438,40 2438,58 (m) (m) (m) (m) (m) (m) (m) (m)	63033 Axial Force (lbf) 56035 55921 54543 41421 6846 <u>GHole #1 - 7" F</u> Axial Force (lbf) 61950	0,00 iction Liner Dogleg ('/100ft) 0,00 0,0	(ft-lbf) (ft	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	144,10 Temperature (°F) (°F) 118,60 118,60 119,38 119,39 126,18 141,22 144,10 Temperature (°F) (°F) 118,66 119,38 119,39 126,18 141,22 144,10 Temperature (°F) (°F) 118,67 119,38 119,39 126,17	9806,80           Pressure           Internal           4049,55           4051,95           4081,50           4081,50           4081,50           4081,62           4081,63           4987,01           5106,80           9806,80           4081,50           4081,50           4081,50           4081,50           4081,50           4081,50           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62           4081,62	(psi) External 400 400 400 400 400 400 400 40
String Section String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2496,98 MD (m) 1980,04 1980,04 1981,20 1995,65 1995,71 2133,60 2438,40 2496,98 rry - Runnin MD (m) 1980,04 1985,71 2133,60 2438,40 2496,98 my (m) 1985,67 1995,65 1995,71 2133,60 2438,40 2496,98 my (m) 1980,04 1980,04 1985,71 2133,60 2438,40 2496,98 (m) 1985,71 2133,60 2438,40 2496,98 (m) 1985,71 2133,60 2438,40 2496,98 (m) 1985,71 2133,60 2438,40 2496,98 (m) 1985,71 2133,60 2438,40 2496,98 (m) 1985,71 2133,60 2438,40 2496,98 (m) 1985,71 2133,60 2438,40 2496,98 (m) 1985,71 2133,80 2438,40 2496,98 (m) 1985,71 1995,65 1995,71 1995,65 1995,71 2133,80 2438,40 2496,98 (m) 1995,71 2133,80 2438,40 2496,98 (m) 1995,71 2133,80 2438,40 2496,98 (m) 1995,71 2133,80 2438,40 2496,98 (m) 1995,71 2133,80 2438,40 2496,98 (m) 1995,71 2133,60 2438,40 2496,98 (m) 1995,71 2133,60 2133,80 2135,70	63033 Axial Force (lbf) 56035 55921 54543 54543 54543 41421 12421 6846 9 gHole #1 - 7" FF Axial Force (lbf) 63067 62976 61850 61846 51109 27376 22816 22816 Leak #1 - 7" Pr Axial Force (lbf) 1065 972 -149 -148	0,00 uction Liner Dogleg ('/100ft) 0,00 0,0	0,0           Torque (ft-lbf)           0,0	0,0 Friction Force ((bf/ft)) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	144,10 Temperature (°F) 118,60 118,60 118,63 119,38 119,39 126,18 141,22 144,10 Temperature (°F) 118,60 118,60 118,60 118,61 119,39 126,18 144,10 Temperature (°F) 118,60 118,60 118,60 118,60 118,60 118,60 119,39 126,18 144,10 144,10 144,10 144,10 144,10 144,10 144,10 148,60 119,39 126,18 144,10 144,1	8806,80           Pressure           Internal           4049,55           4051,95           4081,62           4363,63           4987,01           5106,80           Pressure           Internal           4049,55           4051,95           4051,95           4051,95           4051,95           4061,50           4081,62           4383,63           4987,01           5106,80           Pressure           Internal           4049,55           4051,95           4051,95           4051,94           4049,55           4051,94           4051,94           4081,62	External 400 400 401 401 401 403 510 (psi) External 400 400 400 400 401 510

afety Eact	for Summ	harv - Initial	Conditions - 20	)" Surface Casir	na				
Strin		MD	Yield Strength	VME Stress	19	Absolu	te Safety Factors		
Sectio		(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	357,04	80000,0	800,0	D 100+	N/A	100+	46.082	M 10
	i	414,99	80000,0	800,0	100+	N/A	100+	21,374	10
	1	415,05	80000,0	800,0	100+	N/A	100+	21,362	10
	4	447,39	80000,0	929,4	86.074	N/A	100+	16,447	CM 94.8
		609,60	80000,0	3461,7		N/A	100+	5,836	
					23,110				CM 29,8
	1	644,59	80000,0	4112,6	19,452	N/A	100+	5,031	CM 26,0
Burst and	Avial Flam								
Triaxial Fla Default = Ir Envelope F	Tension, M ags nner Wall a Flags			•	safety factor, N =	· Negative Bending			
afety Fact	tor Summ	nary - Press	ureTest #1 - 20	)" Surface Casir	ng				
Strin	g	MD	Yield Strength	VME Stress			ute Safety Factors		
Strin Sectio	g	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	g	(m) 357,04	(psi) 80000,0	(psi) 17606,9	4,544	Envelope N/A	Burst 4,132	Collapse 100+	16,7
	g	(m) 357,04 414,99	(psi) 80000,0 80000,0	(psi) 17606,9 17736,0	4,544 4,511	Envelope N/A N/A	Burst 4,132 4,122	Collapse 100+ 100+	16, 18,
	g	(m) 357,04 414,99 415,05	(psi) 80000,0 80000,0 80000,0	(psi) 17606,9 17736,0 18496,6	4,544 4,511 4,325	Envelope N/A N/A N/A	Burst 4,132 4,122 3,954	Collapse 100+ 100+ 100+	16,3 18,5 17,6
	g	(m) 357,04 414,99 415,05 609,60	(psi) 80000,0 80000,0 80000,0 80000,0	(psi) 17606,9 17736,0 18496,6 18386,9	4,544 4,511 4,325 4,351	Envelope N/A N/A N/A N/A	Burst 4,132 4,122 3,954 4,033	Collapse 100+ 100+ 100+ 100+ 100+	16,1 18,5 17,6 25,6
	g	(m) 357,04 414,99 415,05	(psi) 80000,0 80000,0 80000,0	(psi) 17606,9 17736,0 18496,6	4,544 4,511 4,325	Envelope N/A N/A N/A	Burst 4,132 4,122 3,954	Collapse 100+ 100+ 100+	16,1 18,5 17,6 25,6
Sectio	g 5n 1 1 1 1 1	(m) 357,04 414,99 415,05 609,60 644,59	(psi) 80000,0 80000,0 80000,0 80000,0	(psi) 17606,9 17736,0 18496,6 18386,9	4,544 4,511 4,325 4,351	Envelope N/A N/A N/A N/A	Burst 4,132 4,122 3,954 4,033	Collapse 100+ 100+ 100+ 100+ 100+	16,7 18,5 17,6 25,6
Section Burst and Default = P	g on 1 1 1 1 1 Axial Flags Pipe Body,	(m) 357,04 414,99 415,05 609,60 644,59	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0	(psi) 17606,9 17736,0 18496,6 18386,9 18429,5	4,544 4,511 4,325 4,351 4,341	Envelope N/A N/A N/A N/A	Burst 4,132 4,122 3,954 4,033 4,033	Collapse 100+ 100+ 100+ 100+ 100+ 100+	16,7 18,5 17,6 25,6 27,3
Section Burst and Default = P Axial Flags Default = T Triaxial Fla Default = II Envelope F	g 1 1 1 Axial Flags Pipe Body, s Fension, M Ags nner Wall a Flags	(m) 357.04 414.98 415.05 609.60 644.59 L = Connection = Compression and Positive Be	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0 9 Leak, B = Connec	(psi) 17606,9 17736,0 18496,6 18386,9 18429,5 tion Burst, F = Con	4,544 4,511 4,325 4,351 4,341	Envelope N/A N/A N/A N/A N/A	Burst 4,132 4,122 3,954 4,033 4,033	Collapse 100+ 100+ 100+ 100+ 100+ 100+	16, 18, 17, 25, 27,
Sectic Burst and Default = P Axial Flags Default = T Triaxial Fla Default = I Envelope F EB = Envel	g 1 1 1 Axial Flags Pipe Body, s rension, M ags nner Wall a Flags top Eurst, tor Summ	(m) 357,04 414,99 415,05 609,60 644,59 <b>L</b> = Connection = Compression and Positive Be EC = Envelope hary - LostR	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0 9 Leak, B = Connec 9 nding OR No Benc 9 Collapse, N/A = n eturnsWithMud	(psi) 17606,9 17736,0 18496,6 18386,9 18429,5 tion Burst, F = Con ling, D = Outer wall to ISO Connection Drop #1 - 20" S	4, 544 4, 511 4, 325 4, 351 4, 341	Envelope N/A N/A N/A N/A J = Connection Ju	Burst 4,132 4,122 3,954 4,033 4,033 mp-out, Y = Con	Collapse 100+ 100+ 100+ 100+ 100+ 100+	16,7 18,5 17,6 25,6 27,3
Section Burst and J Default = P Axial Flagg Default = T Triaxia Flag Default = It Envelope P EB = Envel Bafety Fact String	g 1 1 1 Axial Flagg Pipe Body, s rension, M ags nner Wall a Flags lope Burst, tor Summ g	(m) 357,04 414,99 415,05 609,60 609,60 644,59 5 L = Connection and Positive Be are Enveloped C = Enveloped mary - LostR MD	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0 1 Leak, B = Connec 1 Leak, B = Connec 1 Leak, N = n eturnsWithMud Yield Strength	(psi)	4, 544 4, 511 4, 325 4, 351 4, 341 anection Fracture safety factor, N =	Envelope N/A N/A N/A N/A J = Connection Ju	Burst 4,132 4,132 3,954 4,033 4,033 mp-out, Y = Con	Collapse 100+ 10	16, 18, 17, 25, 27, connection
Sectic Burst and Default = P Axial Flags Default = T Triaxial Fla Default = I Envelope F EB = Envel	g 1 1 1 Axial Flagg Pipe Body, s rension, M ags nner Wall a Flags lope Burst, tor Summ g	(m) 357,04 414,99 415,05 6 L = Connection Compression ary - LostR MD (m)	(psi) 80000,0 8000,0 8000,	(psi)	4, 544 4, 511 4, 325 4, 351 4, 341 anection Fracture safety factor, N = <u>Surface Casinc</u> Triaxia	Envelope N/A N/A N/A A J = Connection Ju : Negative Bending	Burst 4,132 4,132 3,954 4,033 4,033 mp-out, Y = Con	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	16, 18, 17, 7, 25, 27, 32, 27, 32, 20, 20, 20, 20, 20, 20, 20, 20, 20, 2
Section Burst and J Default = P Axial Flagg Default = T Triaxia Flag Default = It Envelope P EB = Envel Bafety Fact String	g 1 1 1 Axial Flagg Pipe Body, s rension, M ags nner Wall a Flags lope Burst, tor Summ g	(m) 357,04 414,99 415,05 609,60 609,60 644,59 3 L = Connection = Compression and Positive Be EC = Envelope ND MD (m) 357,04	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0 1 Leak, B = Connec 1 1 Leak, B = Connec 2 Collapse, N/A = n eturnsWithMud Yield Strength (psi) 80000,0	(psi)	4, 544 4, 511 4, 325 4, 351 4, 341 anection Fracture safety factor, N = <u>Surface Casinc</u> Triaxial 8, 651	Envelope N/A N/A N/A N/A J = Connection Ju	Burst 4,132 4,132 3,954 4,033 4,033 mp-out, Y = Con mp-out, Y = Con	Collapse 100+ 10	16, 18, 17, 25, 27, connection
Section Burst and J Default = P Axial Flagg Default = T Triaxia Flag Default = It Envelope P EB = Envel Bafety Fact String	g 1 1 1 Axial Flagg Pipe Body, s rension, M ags nner Wall a Flags lope Burst, tor Summ g	(m) 357,04 414,99 415,05 <b>L</b> = Connection <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Com</b>	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0 1 Leak, B = Connect 1 1 Leak, B = Connect 2 Collapse, N/A = n eturnsWithMud Yield Strength (psi) 80000,0 80000,0	(psi) ( 17606,9 17736,0 18496,6 18429,5 18429,5 tion Burst, F = Con ling, D = Outer wall to ISO Connection Drop #1 - 20" S VME Stress (psi) (psi)	4, 544 4, 511 4, 325 4, 351 4, 341 Innection Fracture safety factor, N = <u>Surface Casinc</u> Triaxial 8, 651 7, 548	Envelope N/A N/A N/A N/A J = Connection Ju Support State N/A N/A	Burst 4,132 4,122 3,954 4,033 4,033 mp-out, Y = Con ute Safety Factors Burst 100+ 100+	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ Collapse 2,928 2,519	16, 18, 17,7, 25, 27, 27, connection
Section Burst and J Default = P Axial Flagg Default = T Triaxia Flag Default = It Envelope P EB = Envel Bafety Fact String	g 1 1 1 Axial Flagg Pipe Body, s rension, M ags nner Wall a Flags lope Burst, tor Summ g	(m) 357,04 414,98 415,05 609,60 604,59 <b>3</b> <b>L</b> = Connection <b>= Compression</b> <b>= Com</b>	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0 9 Leak, B = Connec 9 1 Leak, B = Conn	(psi)	4, 544 4, 511 4, 325 4, 351 4, 341 anection Fracture safety factor, N = Surface Casino Triaxial 8, 651 7, 548 8, 222	Envelope N/A N/A N/A N/A N/A S F Connection Ju Envelope N/A N/A N/A	Burst   4,132 3,954 4,033 4,033 mp-out, Y = Con mp-out, Y = Con Burst   100+ 100+ 100+	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+ Collapse 2,928 2,519 2,744	16, 18, 17, 25, 27, 3 connection Axial CM 36, CM 26, CM 26, CM 26,
Section Burst and J Default = P Axial Flagg Default = T Triaxia Flag Default = It Envelope P EB = Envel Bafety Fact String	g 1 1 1 Axial Flagg Pipe Body, s rension, M ags nner Wall a Flags lope Burst, tor Summ g	(m) 357,04 414,99 415,05 <b>L</b> = Connection <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Compression</b> <b>Com</b>	(psi) 80000,0 80000,0 80000,0 80000,0 1 Leak, B = Connec 1 Leak, B = Connec 1 Leak, B = Connec 2 Collapse, N/A = n 2 Collapse,	(psi)	4, 544 4, 511 4, 325 4, 351 4, 341 anection Fracture safety factor, N = <u>Surface Casinc</u> Triaxial 8, 651 7, 548 8, 822 6, 922	Envelope N/A N/A N/A N/A A N/A S Pervelope N/A N/A N/A N/A N/A N/A	Burst 4,132 4,132 3,954 4,033 4,033 mp-out, Y = Con ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ Collapse 2,928 2,519 2,744 2,280	Axial CM 36, CM 26, CM 26, 27, Connection
Section Burst and J Default = P Axial Flagg Default = T Triaxia Flag Default = It Envelope P EB = Envel Bafety Fact String	g 1 1 1 Axial Flagg Pipe Body, s rension, M ags nner Wall a Flags lope Burst, tor Summ g	(m) 357,04 414,98 415,05 609,60 604,59 <b>3</b> <b>L</b> = Connection <b>= Compression</b> <b>= Com</b>	(psi) 80000,0 80000,0 80000,0 80000,0 80000,0 9 Leak, B = Connec 9 1 Leak, B = Conn	(psi)	4, 544 4, 511 4, 325 4, 351 4, 341 anection Fracture safety factor, N = Surface Casino Triaxial 8, 651 7, 548 8, 222	Envelope N/A N/A N/A N/A N/A S F Connection Ju Envelope N/A N/A N/A	Burst   4,132 3,954 4,033 4,033 mp-out, Y = Con mp-out, Y = Con Burst   100+ 100+ 100+	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+ Collapse 2,928 2,519 2,744	Axial CM 36, CM 28, CM 26, 27, Connection

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 1
 644,59
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 8
 Burst and Axial Flags

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 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jun

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 Axial Flags

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 Default = Tension, M = Compression

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 14
 Triaxial Flags

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 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 16
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 17
 Envelope Flags

 18
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

	Axial	•			ng	0" Surface Cas				Se
1       357,04       60000,0       17642,0       4,535       N/A       4,041       100-         1       414,99       80000,0       17097,1       4,679       N/A       4,172       100+         1       414,99       80000,0       17097,1       4,679       N/A       4,172       100+         1       416,95       80000,0       17096,5       4,679       N/A       4,172       100+         1       609,60       80000,0       14216,5       5,627       N/A       5,025       100+         1       644,59       80000,0       13565,5       N 5,897       N/A       5,266       100+         Burst and Axial Flags       Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C =         0       Axial Flags       1       Default = Tension, M = Compression       1       1       100+         2       Triaxial Flags       1       Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending       6         6       Envelope Flags       7       EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         Safety Factor Summary - OverPull #1 - 20" Surface Casing	Axial									
1         414.69         80000.0         17097.1         4.679         N/A         4.172         100+           1         415.05         80000.0         17096.5         4.679         N/A         4.172         100+           1         415.05         80000.0         17096.5         4.679         N/A         4.172         100+           1         605.00         80000.0         14216.5         5.627         N/A         4.025         100+           Burst and Axial Flags         80000.0         13565.5         N 5.897         N/A         5.266         100+           Burst and Axial Flags         1         644.59         80000.0         13565.5         N 5.897         N/A         5.266         100+           Burst and Axial Flags         1         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C =         0           0         Axial Flags         1         1         141.00         1         100+           1         Default = Tension, M = Compression         1         1         1         1         100+           2         Traxial Flags         1         1         2         1         1         1         1 </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Section</td> <td></td>									Section	
1       415,05       80000,0       17096,5       4,679       N/A       4,172       100+         1       609,60       80000,0       14216,5       5,627       N/A       5,025       100+         1       644,59       80000,0       13566,5       N 5,897       N/A       5,025       100+         Burst and Axial Flags       Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C =         0       Axial Flags       1       Default = Tension, M = Compression       2         3       Triaxial Flags       2       2       1       1       1         4       Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending       5       5         6       Envelope Flags       7       EB = Envelope Collapse, N/A = no ISO Connection         7       EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection       5         Safety Factor Summary - OverPull #1 - 20" Surface Casing       5	9,97								1	
1       609.60       80000.0       14216.5       5.627       N/A       5.025       100+         Burst and Axial Flags       80000.0       13565.5       N 5.897       N/A       5.266       100+         Burst and Axial Flags       Default Flags       100+       5.266       100+       5.266       100+         Burst and Axial Flags       Triaxial Flags       100+       5.266       100+       5.266       100+         Default = Tension, M = Compression       Triaxial Flags       100+       10+       10+       10+       10+         1       Default = Tension, M = Compression       10+       10+       10+       10+       10+         1       Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending       10+       10+         2       Envelope Flags       E       Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection       10+       10+         3       Safety Factor Summary - OverPull #1 - 20'' Surface Casing       10+       10+       10+       10+	10,85								1	
1       644,59       80000,0       13565,5       N 5,897       N/A       5,266       100+         Burst and Axial Flags       Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C =         Axial Flags       Default = Tension, M = Compression         Triaxial Flags       Envelope Flags         Envelope Flags       Envelope Collapse, N/A = no ISO Connection         Safety Factor Summary - OverPull #1 - 20" Surface Casing	10,85								1	
Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Axial Flags Default = Tension, M = Compression Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending Envelope Flags Envelope Flags T B = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection Safety Factor Summary - OverPull #1 - 20" Surface Casing	15,47				5,627				1	
Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C =         Axial Flags         Traixial Flags         Traixial Flags         Traixial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending         Envelope Flags         Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         Safety Factor Summary - OverPull #1 - 20" Surface Casing	16,75	100+	5,266	N/A	N 5,897	13565,5	80000,0	644,59	1	
Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C =         Axial Flags         Traixial Flags         Traixial Flags         Traixial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending         Envelope Flags         Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         Safety Factor Summary - OverPull #1 - 20" Surface Casing										
Default = Tension, M = Compression         Triaxial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending         Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         Safety Factor Summary - OverPull #1 - 20" Surface Casing	micedon		mp out, i – com	o - oonneedon ou	incettori i ractare,		r Lean, D - Connee	iy, E - Connection	Derudit - Tipe Bou	-
	Junection	nection neiu, c - c	inp-out, r = com	J - Connection Ju	nection Fracture,	alon Buist, F - Col	Leak, D = Connec	iy, L = Connection	Delault - Pipe Dou	
									Avial Flags	h .
2 3 Triaxial Flags 4 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 5 6 Envelope Flags 7 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection 5 5 5 5 5 5 5 5 5 5 5 5 5							h	M = Compression		
3 Triaxial Flags         4 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending         5         6 Envelope Flags         7 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         Safety Factor Summary - OverPull #1 - 20" Surface Casing								m - eempreedin	bordant - ronoron,	
Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending     6     Envelope Flags     7 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection     Safety Factor Summary - OverPull #1 - 20" Surface Casing									Triavial Flags	
5 6 Envelope Flags 7 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection Safety Factor Summary - OverPull #1 - 20" Surface Casing				Negative Rending	safety factor N =	ling D = Outer wall	nding OP No Bend	II and Positive Re		
6 Envelope Flags 7 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection Safety Factor Summary - OverPull #1 - 20" Surface Casing				Tregative Berlang	ourory rubtor, re-	ang, b - euter mai	anding entite Bona		Bordan - miler Pra	
7 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection Safety Factor Summary - OverPull #1 - 20" Surface Casing										
Safety Factor Summary - OverPull #1 - 20" Surface Casing										
						ISO Connection	e Collance N/A = n	ret EC = Envelop		
						lo ISO Connection	e Collapse, N/A = n	rst, EC = Envelop		
						o ISO Connection	e Collapse, N/A = n	rst, EC = Envelop		
						o ISO Connection	e Collapse, N/A = n	rst, EC = Envelop		
									EB = Envelope Bur	7
	_		ite Safety Factors	Absol		rface Casing		nmary - OverF	EB = Envelope Bur	7
	Axial		ute Safety Factors		Triaxial	rface Casing VME Stress	Pull #1 - 20'' Su Yield Strength	mmary - OverF MD	EB = Envelope Bur afety Factor Sun String	7
	Axial 28.8	Collapse	Burst	Envelope	Triaxial D 24.066	rface Casing VME Stress (psi)	Pull #1 - 20'' Su Yield Strength (psi)	mmary - OverF MD (m)	EB = Envelope Bur	7
	28,8	Collapse 46,105	Burst 100+	Envelope N/A	D 24,066	rface Casing VME Stress (psi) 3324,2	Pull #1 - 20'' Su Yield Strength (psi) 80000,0	<u>nmarγ - Over</u> F MD (m) 357,04	EB = Envelope Bur afety Factor Sun String	7
1 609.60 80000.0 858.8 D 93.148 N/A 100+ 27.003	28,8 37,70	Collapse 46,105 39,666	Burst 100+ 100+	Envelope N/A N/A	D 24,066 D 29,001	rface Casing VME Stress (psi) 3324,2 2758,5	2ull #1 - 20" Su Yield Strength (psi) 80000,0 80000,0	<u>mmarγ - Over</u> F MD (m) 357,04 414,99	EB = Envelope Bur afety Factor Sun String	7
	28,8	Collapse 46,105 39,666 39,660	Burst 100+ 100+ 100+ 100+	Envelope N/A N/A N/A	D 24,066 D 29,001 D 29,007	rface Casing VME Stress (psi) 3324,2 2758,5 2757,9	Pull #1 - 20'' Su Yield Strength (psi) 80000,0 80000,0 80000,0	mmary - OverF MD (m) 357,04 414,99 415,05	EB = Envelope Bur afety Factor Sun String	7

 
 3
 1
 415,05

 4
 1
 609,60

 5
 1
 644,59

 6
 1
 644,59

 7
 Burst and Axial Flags

 8
 Default = Pipe Body, L = Connection I

 9
 10
 Axial Flags

 11
 Default = Tension, M = Compression

 12
 Triaxial Flags

 14
 Default = Inner Wall and Positive Bend

 15
 16

 16
 Envelope Flags

 17
 EB = Envelope Burst, EC = Envelope
 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	ety Factor Summa String	MD	Yield Strength	VME Stress		Abso	lute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	357,04	80000,0	6054,9	D 13,213	N/A	100+	46,104	14,526
2	1	414,99	80000,0	5578,0	D 14,342	N/A	100+	39,666	16,189
3	1	415,05	80000,0	5577,5	D 14,343	N/A	100+	39,660	16,191
4	1	609,60	80000,0	3976,9	D 20,116	N/A	100+	27,003	26,300
5	1	644,59	80000,0	3689,0	D 21,686	N/A	100+	25,537	29,626
6								· · · · · · · · · · · · · · · · · · ·	
7 BI	urst and Axial Flags								
8 De	efault = Pipe Body, L	= Connection	Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection Ju	ump-out, Y = Con	nection Yield, C =	Connection
9									
10 A>	kial Flags								
11 De	efault = Tension, M =	Compression	า						
12		-							
13 Tr	iaxial Flags								
14 De	efault = Inner Wall ar	d Positive Be	nding OR No Bend	ing, D = Outer wall	safety factor, N	= Negative Bending	1		
15			0	0,	• •	0	•		

16 Envelope Flags 17 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Conventional Well Design

afety Factor Sumr	nary - Initial	Conditions - 13	3/8" Intermedia	ate Casing				
String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	357,04	110000,0	8660,5	D 12,701	N/A	100+	49,189	C 13,
1	609,60	110000,0	6325,7	D 17,389	N/A	100+	28,843	C 21,
1	644,59	110000,0	6002,2	D 18,326	N/A	100+	27,281	C 23,
i	644,65	110000,0	6001,7	D 18.328	N/A	100+	27,279	C 23,
i	914,40	110000,0	3508,1	D 31,356	N/A	100+	19,246	C 70,
i i	999,96	109920,6	2717,2	D 40,454	N/A	100+	17,602	M 1
1	1000,02	109920,5	2716,6	D 40,463	N/A	100+	17,600	M 1
					N/A			
1	1138,49	109694,6	1436,5	D 76,360		100+	15,461	CM 1
1	1219,20	109563,2	1095,6	100+	N/A	100+	13,909	CM 57
1	1355,72	109341,3	1126,6	97,058	N/A	100+	9,407	CM 31
_ /								
Burst and Axial Flag					1 - <b>O</b>			
Default = Pipe Body,	L = Connection	i Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	imp-out, Y = Con	hection field, $C = 0$	Connection
Avial Flama								
Axial Flags								
Default = Tension, №	= Compression	ו						
Triaxial Flags								
Default = Inner Wall	and Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N =	Negative Bending	I		
Envelope Flags								
EB = Envelope Burs	, EC = Envelop	e Collapse, N/A = n	o ISO Connection					
fety Factor Sumr				ate Casing				
String	MD	Yield Strength	VME Stress			ute Safety Factors		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	357,04	110000,0	24061,3	4,572	N/A	4,151	100+	C 7
1	609,60	110000.0	26141.2	4,208	N/A	3,771	100+	C 9
i	644,59	110000,0	26474,7	4,155	N/A	3,724	100+	C 9
1	644,65	110000,0	26475,3	4,155	N/A	3,724	100+	Č 9
1	762,00	110000,0	27667,4	N 3,976	N/A	3,574	100+	C 10
1		110000,0			N/A		100+	
	914,40		29463,0	N 3,734		3,396		C 11
1	999,96	109920,6	30575,1	N 3,595	N/A	3,301	100+	C 12
1	1000,02	109920,5	33076,0	3,323	N/A	3,020	100+	C 11
1	1219,20	109563,2	33895,0	3,232	N/A	2,972	100+	C 15
1	1355,72	109341,3	34343,1	3,184	N/A	2,947	100+	C 18
Burst and Axial Flag	s							
Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	Imp-out, Y = Coni	nection Yield, C = (	Connection
• •						• •	·	
Axial Flags								
Default = Tension, M	= Compression	1						
	Compression							
Triaxial Flags								
Default = Inner Wall	and Positive Be	nding OR No Bend	ing D = Outer wall	safety factor N =	Negative Rending			
- miler wan	and i oblive be	inaling on no benu	ing, D - Outer Wall	staty ructor, N -	nogative bending			
Envelope Flags								
		Collance N/A	o ISO Correction					
EB = Envelope Burs	., EC = Envelope	e Conapse, N/A = n	o iso connection					
			Due #4 40.00	011.1	- 0			
fety Factor Sumr				8 intermediat				
String	MD	Yield Strength	VME Stress			ute Safety Factors		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	357,04	110000,0	13822,8	7,958	N/A	100+	3,787	C 31
	609,60	110000,0	20328,3	5,411	N/A	100+	2,219	M 1
1	644,59	110000,0	20968,6	5,246	N/A	100+	2,128	M ·
1					N/A	100+	2,128	M ·
1								
1	644,65	110000,0	20969,4	5,246				
1 1 1 1 1	644,65 762,00	110000,0	21326,8	5,158	N/A	100+	2,017	CM ·
1 1 1 1 1 1	644,65 762,00 914,40	110000,0 110000,0	21326,8 20895,8	5,158 5,264	N/A N/A	100+ 100+	2,017 1,966	CM 1 CM 39
1 1 1 1 1 1 1	644,65 762,00 914,40 999,96	110000,0 110000,0 109920,5	21326,8 20895,8 20687,5	5,158 5,264 5,313	N/A N/A N/A	100+ 100+ 100+	2,017 1,966 1,939	CM 1 CM 39 CM 29
1 1 1 1 1 1 1	644,65 762,00 914,40	110000,0 110000,0	21326,8 20895,8	5,158 5,264	N/A N/A	100+ 100+	2,017 1,966	CM 1
	644,65 762,00 914,40 999,96	110000,0 110000,0 109920,5	21326,8 20895,8 20687,5	5,158 5,264 5,313	N/A N/A N/A	100+ 100+ 100+	2,017 1,966 1,939	CM <sup>-</sup> CM 39 CM 29

 9
 1
 1219.20
 109583,5
 10706,3
 10.234
 N/A
 100+
 3,350
 CM 28,4

 10
 1
 1355,72
 109341,1
 10419,8
 10,494
 N/A
 100+
 3,355
 CM 28,4

 11
 Burst and Axial Flags
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 10,494
 N/A
 100+
 3,285
 CM 20,3

 12
 Burst and Axial Flags
 10
 10,494
 N/A
 100+
 3,285
 CM 20,3

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 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection
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 Axial Flags
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Conventional Well Design

### File: Vertical Exploration Well Design, v0

Date/Time: March 01, 2018 03:02:16 PM Page: 12 of 21

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	357,04	110000,0	24983,2	4,403	N/A	4,110	100+	6,02
	1	609,60	110000,0	24433,0	4,502	N/A	4,110	100+	C 7,14
	1	644,59	110000,0	24373,4	4,513	N/A	4,110	100+	C 7,33
	1	644,65	110000,0	24373,3	4,513	N/A	4,110	100+	C 7,33
	1	914,40	110000,0	24055,7	4,573	N/A	4,110	100+	C 9,2
	1	999,96	109920,6	24008,2	4,578	N/A	4,107	100+	C 10,02
	1	1000,02	109920,5	24008,2	4,578	N/A	4,107	100+	C 10,03
	1	1205,76	109584,0	24000,6	4,566	N/A	4,094	100+	C 12,7
	1	1219,20	109563.2	23902,3	4,584	N/A	4,111	100+	C 12,9
D	1	1355,72	109341,3	22916,9	N 4,771	N/A	4,286	100+	C 15,8
1	1 t and Axial Flags	1355,72	109341,3	22916,9	N 4,771	N/A	4,286	100+	C 15,8
Burs Defa	ult = Pipe Body, I	1355,72		22916,9 tion Burst, F = Con	,		,		· · ·
3 Defai 4 5 Axial		1355,72 . = Connection	Leak, B = Connec		,		,		,
Burst Burst	ult = Pipe Body, I Flags ult = Tension, M :	1355,72 . = Connection	Leak, B = Connec		,		,		C 15,81
Burst Burst	ult = Pipe Body, I Flags ult = Tension, M : ial Flags	1355,72 . = Connection = Compression	Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Coni		,
1 Burst 2 Burst 3 Defau 4 Defau 5 Axial 6 Defau 7 8 Triax	ult = Pipe Body, I Flags ult = Tension, M : ial Flags	1355,72 . = Connection = Compression	Leak, B = Connec		nection Fracture,	J = Connection Ju	mp-out, Y = Coni		,
Burst Burst Defai Axial Defai Triax Defai	ult = Pipe Body, I Flags ult = Tension, M : ial Flags	1355,72 . = Connection = Compression	Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Coni		,
2 Burst 3 Defai 4 Defai 5 Axial 6 Defai 3 Triax 9 Defai 9 Defai	ult = Pipe Body, I Flags ult = Tension, M = ial Flags ult = Inner Wall a lope Flags	1355,72 . = Connection = Compression nd Positive Ben	Leak, B = Connec	tion Burst, F = Con ing, D = Outer wall	nection Fracture,	J = Connection Ju	mp-out, Y = Coni		,
Burst Burst Burst Anial Axial Content Burst Axial Defat Defat Defat Defat	ult = Pipe Body, I Flags ult = Tension, M = ial Flags ult = Inner Wall a lope Flags	1355,72 . = Connection = Compression nd Positive Ben	Leak, B = Connect	tion Burst, F = Con ing, D = Outer wall	nection Fracture,	J = Connection Ju	mp-out, Y = Coni		,

	String	MD	Yield Strength	VME Stress		Abs	olute Safety Factor	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	357,04	110000,0	10194,3	D 10,790	N/A	100+	49,149	C 11,665
2	1	609,60	110000,0	7859,6	D 13,996	N/A	100+	28,826	C 16,773
3	1	644,59	110000,0	7536,1	D 14,596	N/A	100+	27,266	C 17,856
4	1	644,65	110000,0	7535,6	D 14,597	N/A	100+	27,263	C 17,858
5	1	914,40	110000,0	5042,0	D 21,817	N/A	100+	19,240	C 35,567
6	1	999,96	109920,6	4251,0	D 25,857	N/A	100+	17,597	C 51,853
7	1	1000,02	109920,5	4250,5	D 25,861	N/A	100+	17,596	C 51,870
8	1	1219,20	109563,2	2224,5	D 49,253	N/A	100+	14,436	100+
9	1	1355,72	109341,3	1093,4	D 100+	N/A	100+	12,982	CM 56,702
10									
11	Burst and Axial Flags	s							
12	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Co	nnection Fracture	e, J = Connection J	lump-out, Y = Coi	nnection Yield, C =	Connection
13									
14	Axial Flags								
15	Default = Tension, M	= Compression	า						
16									
17	Triaxial Flags								

Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 18

19 20 21

Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

String MD Yield Strength VME Stress Absolute Safety Factors Burst String Section Collapse 49,071 28,783 27,225 27,223 19,216 17,576 17,575 14,423 12,974 d Strength (psi) 110000,0 110000,0 110000,0 110000,0 109920,6 109920,5 109563,2 109341,3 (m) Triaxial Envelope (psi) si) 12692,7 10896,0 10647,1 10646,7 8727,8 8119,1 8118,7 6559,6 5588,5 axial D 8,666 D 10,095 D 10,331 D 10,332 D 12,603 D 13,539 D 13,539 D 16,703 D 19,566 Axial xial C 9,223 C 11,466 C 11,866 C 11,867 C 16,231 C 18,362 C 18,363 C 27,663 C 40,509 357,04 609,60 644,59 644,65 914,40 999,96 1000,02 1219,20 1355,72 N/A N/A N/A N/A N/A N/A N/A  $\begin{array}{c} 2\\ 3\\ 4\\ 5\\ 6\\ 7\\ 8\\ 9\\ 10\\ 11\\ 12\\ 13\\ 14\\ 15\\ 16\\ 17\\ 18\\ 9\\ 21\\ \end{array}$ Burst and Axial Flags
Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection Axial Flags Default = Tension, M = Compression Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

ou	fety Factor Summ String	MD	Yield Strength	VME Stress	Casing	Abso	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	, Collapse	Axial
	1	357,04	110000,0	14556,3	D 7,557	N/A	100+	92,647	7,9
	1	609,60	110000,0	12221,3	D 9,001	N/A	100+	54,734	10,0
	1	914,40	110000,0	9403,4	D 11,698	N/A	100+	36,848	14,6
	1	1219,20	109563,2	6585,5	D 16,637	N/A	100+	27,828	C 26,7
	1	1355,72	109341,7	5323,3	D 20,540	N/A	100+	25,096	C 42,8
	1	1355,78	109341,6	5322,8	D 20,542	N/A	100+	25,095	C 42,9
	1	1499,98	109106,3	3989,8	D 27,347	N/A	100+	22,747	C 10
	1	1500,04	109106,2	3989,2	D 27,350	N/A	100+	22,746	C 10
	1	1524,00	109066,5	3778,5	28,865	N/A	100+	22,269	M 10
0	1	1676,40	108817,6	2442,3	44,554	N/A	100+	19,610	CM 10
1	1	1828,80	108568,7	1128,3	96,225	N/A	100+	17,493	CM 38,9
2	1	1845,69	108542,5	1085,4	100+	N/A	100+	17,286	CM 36,4
3	1	1981,20	108323,0	1090,2	99,364	N/A	100+	13,697	CM 24,0
4	1	1995,65	108298,6	1166,6	92,832	N/A	100+	13,400	CM 23,1
5									

18 9 Axial Flags 20 Default = Tension, M = Compression 21 21 Triaxial Flags 23 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 24 25 Envelope Flags 26 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	;	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	357,04	110000,0	32768,3	3,357	N/A	3,120	100+	5,290
	1	609,60	110000,0	31143,4	3,532	N/A	3,257	100+	6,130
	1	914,40	110000,0	29277,1	3,757	N/A	3,438	100+	7,58
	1	1219,20	109563,2	27534,0	3,979	N/A	3,627	100+	9,90
	1	1355,72	109341,7	26799,6	4,080	N/A	3,718	100+	11,473
	1	1355,78	109341,6	26799,3	4,080	N/A	3,718	100+	11,478
	1	1499,98	109106,3	26058,7	4,187	N/A	3,819	100+	13,81
	1	1500,04	109106,2	31520,4	3,461	N/A	3,172	100+	12,410
	1	1524,00	109066,5	31409,5	3,472	N/A	3,185	100+	12,84
0	1	1828,80	108568,7	30114,9	3,605	N/A	3,351	100+	C 23,00
1	1	1981,20	108323,0	29502,4	3,672	N/A	3,441	100+	C 35,58
2	1	1995,65	108298,6	29445,8	N 3,678	N/A	3,450	100+	C 37,50
3									
	Burst and Axial Flags								
5 [	Default = Pipe Body, L	. = Connectior	i Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Coni	nection Yield, C = 0	Connection
6	Axial Flags								
6 7									
6 7 / 8 [	Default = Tension, M =	Compression	ı						
6 7 / 8   9	Default = Tension, M =	Compression	1						
6 7 / 8   9	Default = Tension, M = Friaxial Flags								
6 7 / 8   9	Default = Tension, M =			ling, D = Outer wall	safety factor, N =	Negative Bending			

Conventional Well Design

WELLCAT 5000.1.13.1

#### File: Vertical Exploration Well Design, v0 Date/Time: March 01, 2018 03:02:16 PM Page: 14 of 21 Safety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8" Production Casing String MD Yield Strength VME Stress Section (m) (psi) (psi) Triaxial Enve d Strength (psi) 110000,0 110000,0 110000,0 109563,5 109341,0 109341,0 109341,3 109106,2 109106,1 10967,1 108570,7 108322,5 108229,0 Absolute Safety Factors Burst Collapse 10,597 6,257 4,634 4,634 4,451 4,377 4,368 4,293 6,248 6,217 5,850 5,681 (m) 357,04 (psi) 15900,4 Axial 10,446 14,322 C 22,498 C 22,934 M 100+ 100+ CM 100+ CM 46,111 CM 91,978 CM 75,303 CM 22,481 M 17,170 M 16,792 Envelope Axial 6,918 6,001 5,275 5,365 5,833 6,040 6,040 6,064 6,251 9,170 9,247 10,095 10,314 10,329 N/A 100+ 609,60 857,01 914,40 1219,20 1355,72 1355,78 1371,60 1499,98 1500,04 1524,00 1828,80 1981,20 1995,65 18331,1 20852,5 20502,1 18783,4 18103,1 18102,8 18028,1 17454,8 11897,5 11795,0 10754,6 10502,8 10485,1 N/A N/A N/A N/A N/A N/A N/A N/A N/A 5,681 5,666 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

Axial Flags Default = Tension, M = Compression

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Safety Factor Summary - GreenCement #1 - 9 5/8" Production Casing

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	357,04	110000,0	36153,6	3,043	N/A	2,946	100+	4,01
:	1	609,60	110000,0	35431,9	3,105	N/A	2,946	100+	4,47
6	1	914,40	110000,0	34750,5	3,165	N/A	2,946	100+	5,20
	1	1219,20	109563,2	34287,8	3,195	N/A	2,934	100+	6,19
	1	1355,72	109341,7	34154,0	3,201	N/A	2,928	100+	6,76
i -	1	1355,78	109341,6	34153,9	3,201	N/A	2,928	100+	6,76
	1	1499,98	109106,3	34062,9	3,203	N/A	2,922	100+	7,50
	1	1500,04	109106,2	34062,8	3,203	N/A	2,922	100+	7,50
	1	1524,00	109066,5	34034,4	3,205	N/A	2,923	100+	7,64
0	1	1828,80	108568,7	33786,9	3,213	N/A	2,930	100+	10,03
1	1	1981,20		33015,3	3,281	N/A	2,996	100+	11,90
2	1	1995,65	108298,6	32935,1	3,288	N/A	3,003	100+	12,11
3									
4	Burst and Axial Flags								
5	Default = Pipe Body, L	= Connection	n Leak, B = Connec	tion Burst, F = Co	nnection Fracture	, J = Connection Ju	ımp-out, Y = Con	nection Yield, C = 0	Connection
6									
7	Axial Flags								
18	Default = Tension, M =	Compression	า						
9									
20	Triaxial Flags								
1	Default = Inner Wall ar	nd Positive Be	nding OR No Bend	ling, D = Outer wal	l safety factor, N =	Negative Bending	I		
22									
23	Envelope Flags								
vi –	ED = Envolono Burot	EC = Envolon	o Collonoo N(A = n	a ISO Connection					

EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

### File: Vertical Exploration Well Design, v0

Date/Time: March 01, 2018 03:02:16 PM Page: 15 of 21

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors	5	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	357,04	110000,0	18365,0	D 5,990	N/A	100+	91,496	6,241
2	1	609,60	110000,0	16030,0	D 6,862	N/A	100+	54,097	7,44
3	1	914,40	110000,0	13212,1	D 8,326	N/A	100+	36,450	9,704
4	1	1219,20		10394,2	D 10,541	N/A	100+	27,548	13,870
5	1	1355,72	109341,7	9132,1	D 11,973	N/A	100+	24,851	17,204
3	1	1355,78	109341,6	9131,5	D 11,974	N/A	100+	24,850	17,200
7	1	1499,98	109106,3	7798,5	D 13,991	N/A	100+	22,532	C 23,07
3	1	1500,04	109106,2	7797,9	D 13,992	N/A	100+	22,531	C 23,079
Э	1	1524,00	109066,5	7576,3	D 14,396	N/A	100+	22,188	C 24,470
10	1	1828,80	108568,7	4758,4	D 22,816	N/A	100+	18,605	C 100
11	1	1981,20	108323,0	3349,5	D 32,340	N/A	100+	17,196	100-
12	1	1995,65	108298,6	3215,5	D 33,680	N/A	100+	17,069	100-
13									
	Burst and Axial Flag								
	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection Ju	ımp-out, Y = Con	nection Yield, C = 0	Connection
16									
	Axial Flags								
	Default = Tension, M	= Compression	ı						
19									
	Triaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N	= Negative Bending			
22									
	Envelope Flags								
	EB = Envelope Burst								

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	357,04	110000,0	18579,6	D 5,920	N/A	100+	91,429	6,16
	1	609,60	110000,0	16761,1	D 6,563	N/A	100+	53,969	7,09
	1	914,40	110000,0	14566,6	D 7,552	N/A	100+	36,301	8,6
	1	1219,20	109563,2	12372,1	D 8,856	N/A	100+	27,394	11,0
	1	1355,72	109341,7	11389,1	D 9,601	N/A	100+	24,697	12,69
	1	1355,78	109341,6	11388,7	D 9,601	N/A	100+	24,695	12,69
	1	1499,98	109106,3	10350,6	D 10,541	N/A	100+	22,378	14,99
	1	1500,04	109106,2	10350,1	D 10,542	N/A	100+	22,377	14,99
	1	1524,00	109066,5	10177,5	D 10,716	N/A	100+	22,035	15,45
0	1	1828,80	108568,7	7983,0	D 13,600	N/A	100+	18,455	C 25,60
1	1	1981,20	108323,0	6885,8	D 15,731	N/A	100+	17,077	C 38,24
2	1	1995,65	108298,6	6781,7	D 15,969	N/A	100+	16,957	C 40,12
3									
4	Burst and Axial Flags	;							
5 [	Default = Pipe Body,	L = Connectior	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
6									
7 /	Axial Flags								
	Default = Tension, M	= Compressior	า						
9									
0	Triaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N =	Negative Bending			
2									
ŝ	Envelope Flags								

### File: Vertical Exploration Well Design, v0

Date/Time: March 01, 2018 03:02:17 PM Page: 16 of 21

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors	\$	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	357,04	110000,0	18454,3	5,961	N/A	100+	10,294	8,35
	1	609,60	110000,0	14969,0	7,349	N/A	100+	11,981	10,66
	1	914,40	110000,0	10767,4	10,216	N/A	100+	14,856	15,99
	1	1066,80	109810,0	8670,3	12,665	N/A	100+	16,829	C 21,29
	1	1219,20	109563,2	6579,1	16,653	N/A	100+	19,379	C 31,86
	1	1355,72	109341,7	4717,0	23,180	N/A	100+	22,397	C 57,62
	1	1355,78	109341,6	4716,2	23,184	N/A	100+	22,398	C 57,65
	1	1499,98	109106,3	2785,6	39,168	N/A	100+	26,776	M 100
	1	1500,04	109106,2	8693,5	12,550	N/A	100+	7,961	100
0	1	1524,00	109066,5	8426,8	12,943	N/A	100+	8,035	CM 100
1	1	1828,80	108568,7	5240,0	20,719	N/A	100+	9,129	CM 29,00
2	1	1981,20	108323,0	3999,5	27,084	N/A	100+	9,798	CM 21,89
3 4	1	1995,65	108298,6	3898, 1	27,783	N/A	100+	9,866	CM 21,41
6 <b>C</b> 7 <b>A</b> 9 <b>C</b> 0	Axial Flags Default = Tension, N	L = Connection		tion Burst, F = Con	nection Fracture,	, J = Connection Ju	ımp-out, Y = Coni	nection Yield, C = C	Connection
	riaxial Flags )efault = Inner Wall Envelope Flags	and Positive Be	nding OR No Bend	ding, D = Outer wall	safety factor, N =	• Negative Bending			

String	MD	Yield Strength	VME Stress		Abso	ute Safety Factor	s	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1980,04	78781,8	4178,8	D 18,853	N/A	100+	14,730	M 100
1	1981,20	78780,4	4168,2	D 18,900	N/A	100+	14,719	M 100
1	1995,65	78763,0	4041,1	19,491	N/A	100+	14,580	100
1	1995,71	78762,9	4041,2	19,490	N/A	100+	14,579	100
1	2133,60	78599,4	2833,3	27,741	N/A	100+	13,314	M 49,14
1	2438,40	78237,3	912,8	85,713	N/A	100+	10,308	M 15,55
1	2496,98	78168,0	1151,4	67,890	N/A	100+	9,564	M 13,74
Burst and Axial Fla Default = Pipe Body Axial Flags		·	tion Burst, F = Con	nection Fracture	, J = Connection Ju	imp-out, Y = Con	nection Yield, C = C	Connection
Default = Pipe Body Axial Flags Default = Tension, I Triaxial Flags Default = Inner Wall	A = Compression	1	·				nection Yield, C = C	Connection
Default = Pipe Body Axial Flags Default = Tension, I Triaxial Flags	A = Compression	n ending OR No Bend	ling, D = Outer wall				nection Yield, C = C	Connection
Default = Pipe Body Axial Flags Default = Tension, I Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs	/ = Compression and Positive Be it, EC = Envelop	n ending OR No Bend e Collapse, N/A = n	ling, D = Outer wall to ISO Connection	safety factor, N =			nection Yield, C = C	Connection
Default = Pipe Body Axial Flags Default = Tension, I Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs Safety Factor Sum	A = Compression and Positive Be at, EC = Envelop mary - Press	n ending OR No Bend e Collapse, N/A = n ureTest #1 - 7''	ling, D = Outer wall to ISO Connection Production Line	safety factor, N =	- = Negative Bending			Connection
Default = Pipe Body Axial Flags Default = Tension, I Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs Safety Factor Sum String	A = Compression and Positive Be at, EC = Envelop mary - Press MD	n e Collapse, N/A = n ureTest #1 - 7''' Yield Strength	ing, D = Outer wall to ISO Connection Production Line VME Stress	safety factor, N = 21	- = Negative Bending Abso	ute Safety Factor	s	
Default = Pipe Body Axial Flags Default = Tension, I Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs Safety Factor Sum	A = Compression and Positive Be at, EC = Envelop mary - Press	n ending OR No Bend e Collapse, N/A = n ureTest #1 - 7''	ling, D = Outer wall to ISO Connection Production Line	safety factor, N =	- = Negative Bending			Axial

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 5
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 78599,4
 27444,8
 2,864
 N/A
 2,636
 100+
 14,9

 6
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 2438,40
 78237,3
 27049,2
 2,992
 N/A
 2,708
 100+
 41,3

 7
 1
 2496,98
 78168,0
 26986,1
 N 2,997
 N/A
 2,722
 100+
 59,6

 9
 Burst and Axial Flags
 Default = Pipe Body, L = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 12
 Axial Flags
 Default = Tension, M = Compression

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 < 14,175 14,573 11,371 14,930 41,301 59,690

Conventional Well Design

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	1980,04	78781,4	38264,3	2,059	N/A	100+	1,719	M 9,270
	1	1981,20	78780,0	38275,9	2,058	N/A	100+	1,719	M 9,252
	1	1995,65	78762,9	38420,5	2,050	N/A	100+	1,710	M 9,04
	1	1995,71	78762,9	38421,4	2,050	N/A	100+	1,710	M 9,04:
	1	2133,60	78599,5	39823,2	1,974	N/A	100+	1,629	M 7,420
	4	2438.40	78238.5	43107.0	1,815	N/A	100+	1,475	M 5,35
5		2436,40	/0230,5	43107,0		IN/A			IVI 0,000
,	1	2496,98	78169,1	43770,0	1,786	N/A	100+	1,448	M 5,102
)  0  1	1 Burst and Axial Flags Default = Pipe Body,	2496,98	78169,1	43770,0	1,786	N/A	100+	1,448	M 5,10
0 10 11 12 13		2496,98 S L = Connectior	78169,1	43770,0	1,786	N/A	100+	1,448	M 5,10
)  0  1  2  3  4	Default = Pipe Body, Axial Flags Default = Tension, M	2496,98 S L = Connectior	78169,1	43770,0	1,786	N/A	100+	1,448	M 5,102
10 11 12 13 14 15	Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags	2496,98 L = Connectior = Compression	78169,1 n Leak, B = Connec	43770,0 tion Burst, F = Con	1,786 nection Fracture	N/A J = Connection Ju	100+ mp-out, Y = Coni	1,448	M 5,102
10 11 12 13 14 15	Default = Pipe Body, Axial Flags Default = Tension, M	2496,98 L = Connectior = Compression	78169,1 n Leak, B = Connec	43770,0 tion Burst, F = Con	1,786 nection Fracture	N/A J = Connection Ju	100+ mp-out, Y = Coni	1,448	M 5,102
9 10 11 12 13 14 15 16 17	Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags	2496,98 L = Connectior = Compression	78169,1 n Leak, B = Connec	43770,0 tion Burst, F = Con	1,786 nection Fracture	N/A J = Connection Ju	100+ mp-out, Y = Coni	1,448	M 5,102
9 10 11 12 13 14 15 16 17 18	Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a	2496,98 S L = Connectior = Compression and Positive Be	78169,1 D Leak, B = Connec D nding OR No Bend	43770,0 tion Burst, F = Con ling, D = Outer wall	1,786 nection Fracture	N/A J = Connection Ju	100+ mp-out, Y = Coni	1,448	M 5,102

	 String	MD	Yield Strength	VME Stress		Ab	solute Safety Facto	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	1980,04	78781,8	33158,2	2,376	N/A	2,172	100+	5,935
2	1	1981,20	78780,4	33156,7	2,376	N/A	2,172	100+	5,941
3	1	1995,65	78763,0	33138,6	2,377	N/A	2,172	100+	6,014
4	1	1995,71	78762,9	33138,5	2,377	N/A	2,172	100+	6,014
5	1	2133,60	78599,4	32990,4	2,382	N/A	2,174	100+	6,808
6	1	2438,40	78237,3	32345,4	2,419	N/A	2,211	100+	9,641
7	1	2496,98	78168,0	32028,3	2,441	N/A	2,232	100+	10,484
8									

 9
 Burst and Axial Flags

 10
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 11
 Item 1

 12
 Axial Flags

 13
 Default = Tension, M = Compression

 14
 Item 2

 15
 Triaxial Flags

 16
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 17
 Item 2

 18
 Envelope Flags

 19
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Sa	afety Factor Sum	mary - OverF	Pull #1 - 7'' Pro	duction Liner					
	String	MD	Yield Strength	VME Stress		Ab	solute Safety Facto	ors	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	1980,04	78781,8	10681,3	D 7,376	N/A	100+	14,293	11,886
2	1	1981,20	78780,4	10670,2	D 7,383	N/A	100+	14,286	11,910
3	1	1995,65	78763,0	10536,7	D 7,475	N/A	100+	14,191	12,209
4	1	1995,71	78762,9	10536,8	D 7,475	N/A	100+	14,191	12,209
5	1	2133,60	78599,4	9265,8	D 8,483	N/A	100+	13,357	16,043
6	1	2438,40	78237,3	6457,0	D 12,117	N/A	100+	11,837	53,252
7	1	2496,98	78168,0	5916,9	D 13,211	N/A	100+	11,586	96,538
9									

 9
 Burst and Axial Flags

 9
 Burst and Axial Flags

 10
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 12
 Axial Flags

 13
 Default = Tension, M = Compression

 14
 14

 15
 Triaxial Flags

 16
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 17
 18

 18
 Envelope Flags

 19
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

## File: Vertical Exploration Well Design, v0

	Vertical Explora		0,			Date/Time: Mar	ch 01, 2018 C	03:02:17 PM Pa	age: 18 of 21
Sa	fety Factor Sumn	hary - Runni			[				
	String	MD	Yield Strength	VME Stress			ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	1980,04	78781,8	11513,5	D 6,843	N/A	100+	14,232	10,561
2	1	1981,20	78780,4	11505,1	D 6,847	N/A	100+	14,225	10,576
3	1	1995,65	78763,0	11401,5	D 6,908	N/A	100+	14,129	10,766
4	1	1995,71	78762,9	11401,0	D 6,908	N/A	100+	14,129	10,767
5	1	2133,60	78599,4	10412,4	D 7,549	N/A	100+	13,281	13,002
6	1	2438,40	78237,3	8227,0	D 9,510	N/A	100+	11,742	24,162
7	1	2496,98	78168,0	7807,0	D 10,013	N/A	100+	11,488	28,965
8									
	Burst and Axial Flags								
	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Conr	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
11									
12 /	Axial Flags								
	Default = Tension, M	= Compression	า						
14									
	friaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ling, D = Outer wall s	safety factor, N =	Negative Bending			
17									
	Invelope Flags								
19	EB = Envelope Burst	EC = Envelop	e Collapse, N/A = n	o ISO Connection					

String	MD	Yield Strength	VME Stress		Absolu	te Safety Factors	;	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1980,04	78781,4	4175,5	D 18,868	N/A	100+	14,731	M 100
1	1981,20	78780,0	4163,1	D 18,924	N/A	100+	14,745	M 100
1	1995,65	78762,9	4014,2	19,621	N/A	100+	14,928	100
1	1995,71	78762,9	4014,3	19,621	N/A	100+	14,928	100
1	2133,60	78599,5	2707,5	29,030	N/A	83,450	16,836	M 60,50
1	2438,40	78238,5	2610,7	29,969	N/A	27,833	23,506	M 19,61
1	2496,98	78169,1	3064,7	N 25,506	N/A	24,658	25,451	M 17,58
Burst and Axial Flags Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst	L = Connection = Compression and Positive Be	nding OR No Bend	ing, D = Outer wall			np-out, Y = Coni	nection Yield, C =	Connection
MD (	, m)	Hooke's	Buckling				Total	Buckled
				Balloo (m)	n Therr (m			Buckled Length (m)
MD (	, m)	Hooke's	Buckling (m)		(m			
Top	m) Base γ - Pressure	Hooke's Law (m)	Buckling (m) No length chan	(m) ges - Pipe is fully ce	(m	)	(m)	Length (m)
Top	m) Base γ - Pressure	Hooke's	Buckling (m) No length chan	(m) ges - Pipe is fully ce	(m	) nal	(m) Total	

- L-	viovement Summa							
	MD	(m)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
	Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1								
2								
3				No length changes -	Pipe is fully cemented	1		
1								
F								
P								

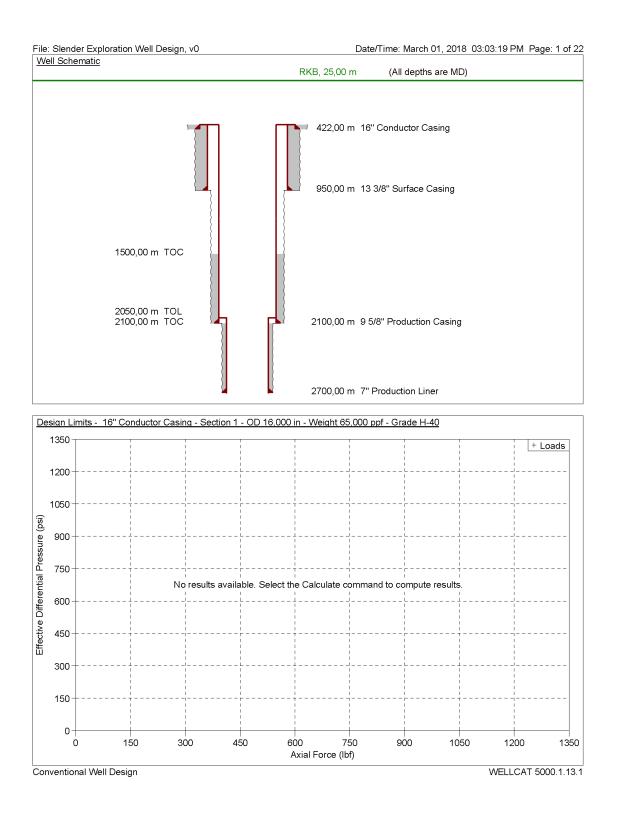
Conventional Well Design

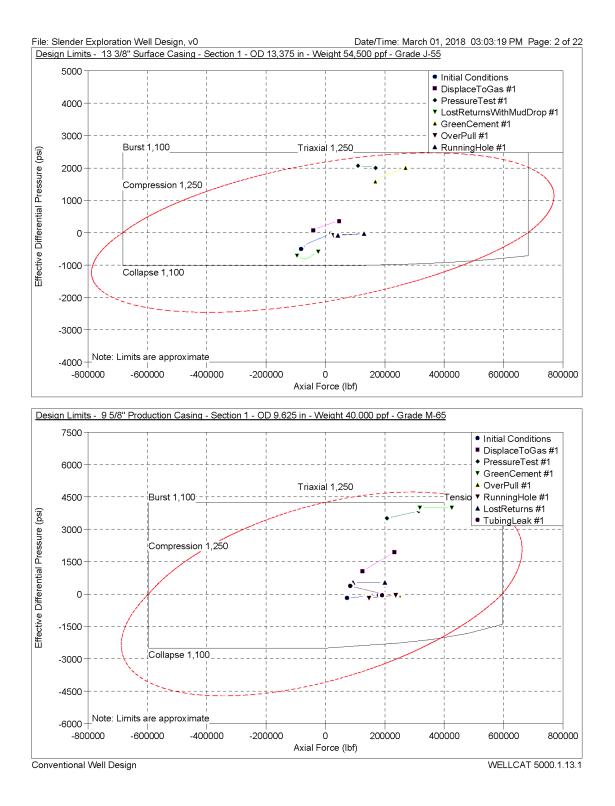
e: Vertical E lovement S		GreenCement	#1 - 20" Surfac					
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1			No	o length changes - Pipe	e is fully cemented			
ovement S	ummary -	OverPull #1 -	20" Surface Cas	sing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
			No	o length changes - Pipe	e is fully cemented			
				5 5 1	,			
ovement S	ummarv -	RunninaHole #	#1 - 20" Surface	e Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
				longth changes Dis	a is fully comented			
			INC	o length changes - Pipe	e is fully cemented			
ovement C	ummany	Initial Condition	ne - 13 3/8" Int	ermediate Casing				
overnent S	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
				Ducking				
Ton		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
Тор	357,04	Base 1000,00	Law (m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	Length (m)
Тор		Base 1000,00	Law (m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	Length (m)
Тор		Base 1000,00	Law (m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	Length (m)
	357,04	1000,00	0,000	0,000	(m) 0,000	(m) 0,000	(m) 0,000	Length (m)
	357,04 ummary -	1000,00	0,000 #1 - 13 3/8'' Inte	0,000 ermediate Casing	0,000	0,000	0,000	
ovement S	357,04	1000,00 PressureTest #	0,000 <u>#1 - 13 3/8'' Inte</u> Hooke's	0,000 ermediate Casing Buckling	0,000 Balloon	0,000 Thermal	0,000 Total	Buckled
	357,04 ummary - <u>MD (m)</u>	1000,00 PressureTest # Base	0,000 #1 - 13 3/8'' Inte Hooke's Law (m)	0,000 ermediate Casing Buckling (m)	0,000 Balloon (m)	0,000 Thermal	0,000	Buckled Length (m)
ovement S	357,04 ummary -	1000,00 PressureTest #	0,000 <u>#1 - 13 3/8'' Inte</u> Hooke's	0,000 ermediate Casing Buckling	0,000 Balloon	0,000 Thermal	0,000 Total	Buckled Length (m)
ovement S	357,04 ummary - <u>MD (m)</u>	1000,00 PressureTest # Base	0,000 #1 - 13 3/8'' Inte Hooke's Law (m)	0,000 ermediate Casing Buckling (m)	0,000 Balloon (m)	0,000 Thermal	0,000	Buckled Length (m)
ovement S	357,04 ummary - MD (m) 357,04	1000,00 PressureTest # Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152	0,000 ermediate Casing Buckling (m) -0,001	0,000 Balloon (m) -0,152	0,000 Thermal	0,000	Buckled Length (m)
ovement S	357,04 ummary - MD (m) 357,04 ummary -	1000,00 PressureTest # Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152	0,000 ermediate Casing Buckling (m) -0,001	0,000 Balloon (m) -0,152 diate Casing	0,000 Thermal (m) 0,000	0,000 Total (m) 0,000	Buckled Length (m) 25
ovement S	357,04 ummary - MD (m) 357,04	1000,00 PressureTest # Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 0,152 0,152 0,000	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Interme Buckling	0,000 Balloon (m) -0,152 diate Casing Balloon	0,000 Thermal (m) 0,000	0,000 Total (m) 0,000	Buckled Length (m) 25 Buckled
ovement S	357,04 ummary - MD (m) 357,04 ummary -	1000,00 PressureTest # Base 1000,00 LostReturnsW Base	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermed Buckling (m)	0,000 Balloon (m) -0,152 diate Casing Balloon (m)	0,000 Thermal (m) 0,000	0,000 Total (m) 0,000	Buckled Length (m) 25 Buckled Length (m)
ovement S	357,04 <u>MD (m)</u> 357,04 <u>ummary -</u> <u>MD (m)</u>	1000,00 PressureTest # Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m)	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Interme Buckling	0,000 Balloon (m) -0,152 diate Casing Balloon	0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m)	Buckled Length (m) 25 Buckled Length (m)
ovement S	357,04 <u>MD (m)</u> 357,04 <u>ummary -</u> <u>MD (m)</u>	1000,00 PressureTest # Base 1000,00 LostReturnsW Base	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m)	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermed Buckling (m)	0,000 Balloon (m) -0,152 diate Casing Balloon (m)	0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m)	Buckled Length (m) 25 Buckled Length (m)
ovement S	357,04 ummary - MD (m) 357,04 ummary - MD (m) 357,04	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 0,152 0,152 0,152 0,053 thMudDrop #1 - Hooke's Law (m) -0,093	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermer Buckling (m) 0,000	0,000 Balloon (m) -0,152 diate Casing Balloon (m) 0,093	0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m)	Buckled Length (m) 25 Buckled Length (m)
ovement S	357,04 <u>MD (m)</u> 357,04 <u>MD (m)</u> 357,04 <u>MD (m)</u> 357,04 <u>ummary -</u>	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Int	0,000 ermediate Casing (m) -0,001 - 13 3/8" Intermer Buckling (m) 0,000 ermediate Casing	0,000 Balloon (m) -0,152 diate Casing Balloon (m) 0,093	0,000 Thermal (m) 0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m) 0,000	Buckled Length (m) 25 Buckled Length (m)
ovement S Top ovement S ovement S ovement S	357,04 ummary - MD (m) 357,04 ummary - MD (m) 357,04	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) 0,052 -0,093 #1 - 13 3/8" Int Hooke's	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermed Buckling (m) 0,000 ermediate Casing Buckling	0,000 Balloon (m) -0,152 diate Casing Balloon (m) 0,093 Balloon	0,000 Thermal (m) 0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m) 0,000 Total	Buckled Length (m) 25 Buckled Length (m) Buckled
ovement S Top ovement S Top	357,04 ummary - MD (m) 357,04 ummary - MD (m) 357,04 ummary - MD (m)	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) #1 - 13 3/8" Int Hooke's Law (m)	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermer Buckling (m) 0,000 termediate Casing Buckling (m)	0,000 Balloon (m) -0,152 Gliate Casing Balloon (m) 0,093 Balloon	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m)	0,000 Total (m) 0,000 Total (m) 0,000 Total (m)	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m)
ovement S Top ovement S ovement S ovement S	357,04 <u>MD (m)</u> 357,04 <u>MD (m)</u> 357,04 <u>MD (m)</u> 357,04 <u>ummary -</u>	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) 0,052 -0,093 #1 - 13 3/8" Inte Hooke's	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermed Buckling (m) 0,000 ermediate Casing Buckling	0,000 Balloon (m) -0,152 diate Casing Balloon (m) 0,093 Balloon	0,000 Thermal (m) 0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m) 0,000 Total	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m)
ovement S Top ovement S ovement S ovement S	357,04 ummary - MD (m) 357,04 ummary - MD (m) 357,04 ummary - MD (m)	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) #1 - 13 3/8" Int Hooke's Law (m)	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermer Buckling (m) 0,000 termediate Casing Buckling (m)	0,000 Balloon (m) -0,152 Gliate Casing Balloon (m) 0,093 Balloon	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m)	0,000 Total (m) 0,000 Total (m) 0,000 Total (m)	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m)
ovement S Top ovement S ovement S Top	357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Int Hooke's Law (m) 0,089	0,000 ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermediate Buckling (m) 0,000	0,000 Balloon (m) -0,152 Gliate Casing Balloon (m) 0,093 Balloon	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m)	0,000 Total (m) 0,000 Total (m) 0,000 Total (m)	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m)
ovement S Top ovement S ovement S Top	357,04 ummary - MD (m) 357,04 ummary - MD (m) 357,04 ummary - MD (m) 357,04 ummary -	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Interme	ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermet Buckling (m) 0,000 termediate Casing (m) 0,000	0,000 Balloon (m) -0,152 Gliate Casing Balloon (m) 0,093 Balloon (m) 0,000	0,000 Thermal (m) 0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m) 0,000 Total (m) 0,089	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m)
ovement S Top ovement S Top lovement S Top	357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00 OverPull #1 -	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Interme Hooke's Law (m) 0,089 13 3/8" Interme Hooke's	ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermediate Casing (m) 0,000 termediate Casing (m) 0,000 diate Casing Buckling	0,000 Balloon (m) -0,152 Balloon (m) 0,000 Balloon (m) 0,000 Balloon	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	0,000 Total (m) 0,000 Total (m) 0,000	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m) Buckled
ovement S 	357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00 OverPull #1 - Base	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Interme Hooke's Law (m)	ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermediate Buckling (m) 0,000 termediate Casing Buckling (m) 0,000	0,000 Balloon (m) -0,152 diate Casing Balloon (m) 0,093 Balloon (m) 0,000 Balloon (m) 0,000	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	0,000 Total (m) 0,000 Total (m) 0,000 Total (m) 0,089 Total (m) 0,089	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m) Buckled
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ovement S Top ovement S ovement S Top ovement S Top	357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m)	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00 OverPull #1 - Base 1000,00 UserPull #1 -	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Interme Hooke's Law (m) 0,089 13 3/8" Interme Hooke's Law (m) 0,089 13 3/8" Interme Hooke's Law (m) 0,032 r slackoff (-)	ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermet Buckling (m) 0,000 termediate Casing Buckling (m) 0,000 diate Casing Buckling (m) 0,000	0,000 Balloon (m) -0,152 Balloon (m) 0,093 Balloon (m) 0,000 Balloon (m) 0,000	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	0,000 Total (m) 0,000 Total (m) 0,000 Total (m) 0,089 Total (m) 0,089	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m)
ovement S Top ovement S Top ovement S Top ovement S Top * Surface dis ovement S	357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m)	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00 OverPull #1 - Base 1000,00 Iue to pickup (+) or RunningHole #	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Intermee Hooke's Law (m) 0,089 13 3/8" Intermee Hooke's Law (m) 0,032 r slackoff (-) #1 - 13 3/8" Intermee Hooke's	ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermer Buckling (m) 0,000 termediate Casing Buckling (m) 0,000 diate Casing Buckling (m) 0,000	0,000 Balloon (m) -0,152 Balloon (m) 0,000 Balloon (m) 0,000 Balloon	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	0,000 Total (m) 0,000 Total (m) 0,000 Total (m) 0,089 Total (m) 0,032*	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m) Buckled Buckled
ovement S Top ovement S Top ovement S Top ovement S Top * Surface dis ovement S	357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m)	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00 OverPull #1 - Base 1000,00 Iue to pickup (+) or RunningHole #	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Intermee Hooke's Law (m) 0,089 13 3/8" Intermee Hooke's Law (m) 0,032 r slackoff (-) #1 - 13 3/8" Intermee Hooke's	ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermediate Casing (m) 0,000 termediate Casing Buckling (m) 0,000 diate Casing Buckling (m) 0,000	0,000 Balloon (m) -0,152 diate Casing Balloon (m) 0,000 Balloon (m) 0,000 Balloon (m) 0,000 Balloon (m) 0,000	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	0,000 Total (m) 0,000 Total (m) 0,000 Total (m) 0,089 Total (m) 0,032*	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m) Buckled Length (m)
ovement S Top ovement S ovement S Top ovement S Top * Surface dis ovement S	357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m) 357,04 Ummary - MD (m)	1000,00 PressureTest # Base 1000,00 LostReturnsW Base 1000,00 GreenCement Base 1000,00 OverPull #1 - Base 1000,00 Iue to pickup (+) or RunningHole #	0,000 #1 - 13 3/8" Inte Hooke's Law (m) 0,152 ithMudDrop #1 - Hooke's Law (m) -0,093 #1 - 13 3/8" Intermee Hooke's Law (m) 0,089 13 3/8" Intermee Hooke's Law (m) 0,032 r slackoff (-) #1 - 13 3/8" Intermee Hooke's	ermediate Casing Buckling (m) -0,001 - 13 3/8" Intermer Buckling (m) 0,000 termediate Casing Buckling (m) 0,000 diate Casing Buckling (m) 0,000	0,000 Balloon (m) -0,152 diate Casing Balloon (m) 0,000 Balloon (m) 0,000 Balloon (m) 0,000 Balloon (m) 0,000	0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	0,000 Total (m) 0,000 Total (m) 0,000 Total (m) 0,089 Total (m) 0,032*	Buckled Length (m) 25 Buckled Length (m) Buckled Length (m) Buckled Length (m)

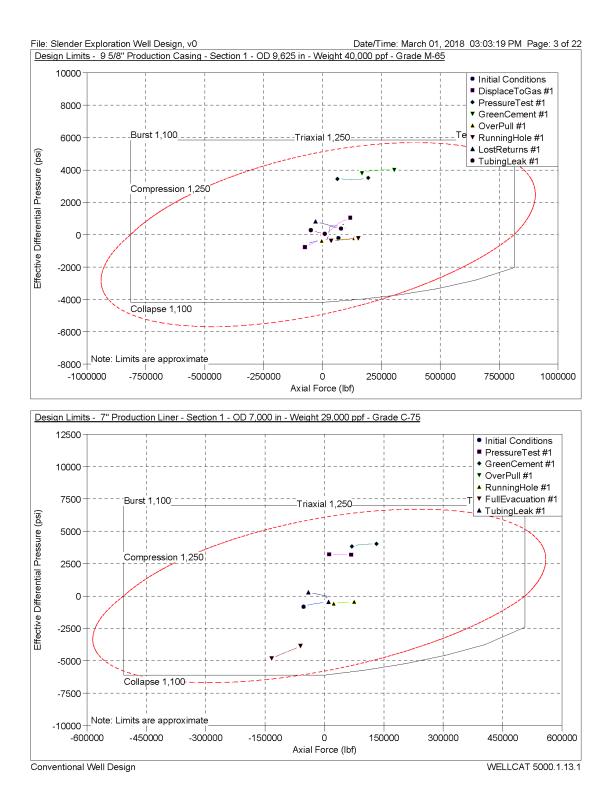
		0 	unting Conting	Daterrin	e: March 01, 2018	05.02.17 FIV	Fage. 20 01
	miliar Condition	ns - 95/8" Prod Hooke's	Buckling	Balloon	Thermal	Total	Buckled
MD (m) Top	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
357,04	1500,00	0,000	0,000	0,000	0,000	0,000	0,
Novement Summary -	PressureTest #				_		
MD (m)	Dere	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top 357.04	Base 1500,00	Law (m) 0,266	(m) 0,000	(m) -0,266	(m) 0,000	(m) 0.000	Length (m) 0.
001,01	1000,00	0,200	0,000	0,200	5,000	0,000	J
Aovement Summary -	LostReturnsWi	ithMudDrop #1 -	9 5/8" Productic	on Casing			
MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
357,04	1500,00	-0,125	0,000	0,125	0,000	0,000	<b>0</b>
/ovement Summary -	GreenComent	#1 0.5/8" Prov	duction Cosing				
MD (m)	Greencement	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
357,04	1500,00	0,208	0,000	0,000	0,000	0,208	0
Novement Summary -	OverPull #1 - !		n Casing				
MD (m)	Bees	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top 357,04	Base 1500,00	Law (m) 0,176	(m) 0,000	(m) 0,000	(m) 0,000	(m) 0,176*	Length (m) 0
007,04	1000,00	0,170	0,000	0,000	0,000	0,170	0
* Surface displacement	due to pickup (+) or	slackoff (-)					
lovement Summarγ -	RunningHole #						
MD (m)	Base	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
			No results available fo	or this load case			
1	T 1: 1 1 ///	0.5/01 D					
Novement Summary -	TubingLeak #1			Pallaan	Thormal	Tatal	Puelded
MD (m)		Hooke's	Buckling	Balloon (m)	Thermal (m)	Total (m)	Buckled
	TubingLeak #1 Base 1500,00			Balloon (m) 0,061	Thermal (m) 0,000	Total (m) 0,000	Buckled Length (m) 0
MD (m) Top 357,04	Base 1500,00	Hooke's Law (m) -0,061	Buckling (m) 0,000	(m)	(m)	(m)	Length (m)
MD (m) Top 357,04	Base 1500,00	Hooke's Law (m) -0,061	Buckling (m) 0,000	(m)	(m)	(m)	Length (m)
MD (m) Top 357,04	Base 1500,00	Hooke's Law (m) -0,061 ns - 7'' Productio	Buckling (m) 0,000 on Liner	(m) 0,061	(m) 0,000	(m) 0,000	Length (m) 0
MD (m) Top 357,04 Aovement Summary - MD (m)	Base 1500,00	Hooke's Law (m) -0,061 ms - 7" Productio Hooke's Law (m)	Buckling (m) 0,000 on Liner Buckling (m)	(m) 0,061 Balloon (m)	(m) 0,000	(m) 0,000  	Length (m) C Buckled
MD (m) Top 357,04 Aovement Summary - MD (m)	Base 1500,00	Hooke's Law (m) -0,061 ms - 7" Productio Hooke's Law (m)	Buckling (m) 0,000 on Liner Buckling	(m) 0,061 Balloon (m)	(m) 0,000	(m) 0,000  	Length (m) 0 Buckled
MD (m) Top 357,04 Aovement Summary - MD (m)	Base 1500,00	Hooke's Law (m) -0,061 ms - 7" Productio Hooke's Law (m)	Buckling (m) 0,000 on Liner Buckling (m)	(m) 0,061 Balloon (m)	(m) 0,000	(m) 0,000  	Length (m) 0 Buckled
MD (m) Top 357,04 Aovement Summary - MD (m) Top	Base 1500,00 Initial Condition Base	Hooke's Law (m) -0,061 ms - 7" <u>Productio</u> Hooke's Law (m) No	Buckling (m) 0,000 on Liner Buckling (m) Iength changes - Pipe	(m) 0,061 Balloon (m)	(m) 0,000	(m) 0,000  	Length (m) 0 Buckled
MD (m) Top 357,04 Aovement Summary - MD (m) Top Movement Summary -	Base 1500,00 Initial Condition Base	Hooke's Law (m) -0,061 ns - 7" Productic Hooke's Law (m) No ≭1 - 7" Productic	Buckling (m) 0,000 on Liner Buckling (m) Ilength changes - Pipe	(m) 0,061 Balloon (m) e is fully cemented	(m) 0,000 Thermal (m)	(m) 0,000  Total (m)	Length (m) 0 Buckled Length (m)
MD (m) Top 357,04 Movement Summary - MD (m) Top Movement Summary - MD (m)	Base 1500,00 Initial Condition Base PressureTest #	Hooke's Law (m) -0,061 ns - 7" Productic Hooke's Law (m) No #1 - 7" Productic Hooke's	Buckling (m) 0,000 on Liner Buckling (m) I length changes - Pipe on Liner Buckling	(m) 0,061 Balloon (m) e is fully cemented Balloon	(m) 0,000 Thermal (m) Thermal	(m) 0,000 Total (m) Total	Length (m) 0 Buckled Length (m) Buckled
MD (m) Top 357,04 Aovement Summary - MD (m) Top Movement Summary -	Base 1500,00 Initial Condition Base	Hooke's Law (m) -0,061 ns - 7" Productic Hooke's Law (m) No ≭1 - 7" Productic	Buckling (m) 0,000 on Liner Buckling (m) Ilength changes - Pipe	(m) 0,061 Balloon (m) e is fully cemented	(m) 0,000 Thermal (m)	(m) 0,000  Total (m)	Length (m) 0 Buckled Length (m)
MD (m) Top 357,04 Movement Summary - MD (m) Top Movement Summary - MD (m)	Base 1500,00 Initial Condition Base PressureTest #	Hooke's Law (m) -0,061 -0,061 Hooke's Law (m) No #1 - 7" Productio Hooke's Law (m)	Buckling (m) 0,000 0 Buckling (m) ength changes - Pipe (m) <u>on Liner</u> Buckling (m)	(m) 0,061 Balloon (m) e is fully cemented Balloon (m)	(m) 0,000 Thermal (m) Thermal	(m) 0,000 Total (m) Total	Length (m) 0 Buckled Length (m) Buckled
MD (m) Top 357,04 Movement Summary - MD (m) Top Movement Summary - MD (m)	Base 1500,00 Initial Condition Base PressureTest #	Hooke's Law (m) -0,061 -0,061 Hooke's Law (m) No	Buckling (m) 0,000 on Liner Buckling (m) I length changes - Pipe on Liner Buckling	(m) 0,061 Balloon (m) e is fully cemented Balloon (m)	(m) 0,000 Thermal (m) Thermal	(m) 0,000 Total (m) Total	Length (m) 0 Buckled Length (m) Buckled
MD (m) Top 357,04 Movement Summary - MD (m) Top Movement Summary - MD (m)	Base 1500,00 Initial Condition Base PressureTest #	Hooke's Law (m) -0,061 -0,061 Hooke's Law (m) No	Buckling (m) 0,000 0 Buckling (m) ength changes - Pipe (m) <u>on Liner</u> Buckling (m)	(m) 0,061 Balloon (m) e is fully cemented Balloon (m)	(m) 0,000 Thermal (m) Thermal	(m) 0,000 Total (m) Total	Length (m) 0 Buckled Length (m) Buckled

File: Vertical Exploration Well Design, v0		Date/Tim	e: March 01, 20	018 03:02:17 P	M Page: 21 of 2
Movement Summary - Evacuation #1 - 7	7" Production Liner				
	Hooke's Buckling	Balloon	Thermal	Total	Buckled
	_aw (m) (m)	(m)	(m)	(m)	Length (m)
1	(,	()	(,	,	g, (,
2					
3	No length changes	- Pipe is fully cemented			
4	ite lengar enanger				
5					
Movement Summary - GreenCement #1	- 7" Production Liner				
	Hooke's Buckling	Balloon	Thermal	Total	Buckled
Top Base L	_aw (m) (m)	(m)	(m)	(m)	Length (m)
2					
3	No length changes	a - Pipe is fully cemented			
4					
5					
Movement Summary - OverPull #1 - 7" F	Production Liner				
		Balloon	Thermal	Tatal	Buckled
MD (m)				Total	
Top Base L	_aw (m) (m)	(m)	(m)	(m)	Length (m)
1					
2					
3	No length changes	- Pipe is fully cemented			
4					
5					
Movement Summary - RunningHole #1 -	7" Production Liner				
	Hooke's Buckling	Balloon	Thermal	Total	Buckled
	_aw (m) (m)	(m)	(m)	(m)	Length (m)
	aw (11) (11)	(11)	(11)	(11)	Lengur (m)
	<b>N N N N</b>				
3	No length changes	- Pipe is fully cemented			
•					
5					
Movement Summary - TubingLeak #1 -	7" Production Liner				
	Hooke's Buckling	Balloon	Thermal	Total	Buckled
			(m)		
iup Dase I	_aw (m) (m)	(m)	(11)	(m)	Length (m)
3	No length changes	a - Pipe is fully cemented			
<u> </u>					

## 5.2.1.2 Slender Well Design







Caungs Ournine	<u>i i o o o o o o o o o o o o o o o o o o</u>	luctor Casing								
String		Pipe Body		Connectio				Ratings		
Section 1	OD (in) 16,000	Weight (ppf) 65,000	Grade H-40	Name BTC	Grade H-40	Burst (psi) 1640,	Collapse (p 63	si) Tensio 4,03	on (lbf) Cor 736311	mpression 7363
L = Connection B = Connection	Burst									
F = Connection J = Connection Y = Connection	Jump-out									
C = Connection										
Ratings Summa	ary - 13 3/8" S							<b>D</b>		
String Section	OD (in) 13,375	Pipe Body Weight (ppf) 54,500	Grade J-55	Connectio Name BTC	n Grade J-55	Burst (psi) 2734,	Collapse (p 58 113	Ratings si) Tensio 0,82	on (lbf) Cor 853242	mpression 8533
L = Connection B = Connection F = Connection	Burst		I	I						
J = Connection Y = Connection C = Connection	Jump-out Yield									
Ratings Summa	arv - 95/8" Pro	oduction Casing								
String Section	OD (in)	Pipe Body Weight (ppf)	Grade	Connectio Name	n Grade	Burst (psi)	Collapse (p		on (lbf) Cor	mpression
1	9,625 9,625	40,000 47,000	M-65 C-75	BTC BTC	M-65 C-75	4668,	18 276	5,20	744495 1017927	744 1017
L = Connection B = Connection F = Connection	Burst Fracture									
J = Connection Y = Connection	Yield									
C = Connection										
	ary - 7" Produc			Connectio	<b>n</b>			Patings		
Ratings Summa String Section 1	od (in) 7,000	Pipe Body	Grade C-75	Connectio Name BTC	n Grade C-75	Burst (psi) 7650,		Ratings si) Tensio 3,05	on (lbf) Cor 633707	
String Section 1 L = Connection	OD (in) 7,000 Leak	Pipe Body Weight (ppf)		Name	Grade			si) Tensio		
String Section 1 L = Connection B = Connection F = Connection	OD (in) 7,000 Leak Burst Fracture	Pipe Body Weight (ppf)		Name	Grade			si) Tensio		
String Section 1 L = Connection B = Connection J = Connection Y = Connection	OD (in) 7,000 Leak Burst Fracture Jump-out Yield	Pipe Body Weight (ppf)		Name	Grade			si) Tensio		
Section L = Connection B = Connection F = Connection J = Connection	OD (in) 7,000 Leak Burst Fracture Jump-out Yield	Pipe Body Weight (ppf)		Name	Grade			si) Tensio		
String Section 1 L = Connection B = Connection J = Connection V = Connection C = Connection	OD (in) 7,000 Leak Burst Fracture Jump-out Yield	Pipe Body Weight (ppf)	C-75 6" Conducte Dogleg	Name BTC	Grade C-75			si) Tensio		633
String Section I L = Connection F = Connection J = Connection C = Connection C = Connection	OD (in) 7,000 Leak Burst Fracture Jump-out Yield ummary - Initia	Pipe Body Weight (ppf) 29,000 29,000 al Conditions - 1 Axial Force (bf)	6" Conduct Dogleg (*/100th	Name BTC Dr Casing	Grade C-75	7650,	00 672 Temperature (°F)	si) Tensio	633707 Pressure (p	633 si) External
String Section 1 L = Connection B = Connection F = Connection Y = Connection C = Connection Casing Load SU String	OD (in) 7,000 Leak Burst Fracture Jump-out Yield ummary - Initia MD (m)	Pipe Body Weight (ppf) 29,000 al Conditions - 1 Axial Force (lbf) 04 -7503	C-75 6" Conducto Dogleg (*/100ft)	Name BTC Dr Casing Torque (ft-lbf)	Grade C-75	7650, tion Force (lbfft)	00 672	si) Tensio 9,05	633707 Pressure (pr al	633 si) External 55
String Section 1 L = Connection B = Connection J = Connection Y = Connection C = Connection C = Connection C = String Section	OD (in) 7,000 Leak Burst Fracture Jump-out Yield ummary - Initia MD (m) 1 382, 1 421,	Pipe Body Weight (ppf) 29,000 al Conditions - 1 Axial Force (lbf) 04 -7503	C-75 6" Conducto Dogleg (*/100ft) 3	Name BTC Dr Casing Torque (ft-lbf) 0,00	Grade C-75 Frid	7650, tion Force (lbf/ft) 0,0	00 672 Temperature (°F) 35,0	si) Tensio 9,05	633707 Pressure (p: al 586,00	633 si) External 55
String Section 1 L = Connection B = Connection J = Connection Y = Connection C = Connection C = Connection C = String Section	OD (in) 7,000 Leak Burst Fracture Jump-out Yield Ummary - Initia MD (m) 1 382, 1 421, 1 421, Ummary - Pres MD (m)	Pipe Body Weight (ppf) 29,000 29,000 29,000 29,000 al Conditions - 1 Axial Force (lbf) 04 -750 97 -16019 ssureTest #1 - 1 Axial Force (lbf)	6" Conducte Dogleg (*/100ft) 6" Conducte Dogleg (*/100ft)	Name BTC Dr Casing Torque (ft-lbf) 0,00 Dr Casing Torque (ft-lbf)	Grade C-75 C-75 Frict 0,1 0,0 Frict	T650, tion Force (lbf/tt) 0,0 0,0 tion Force (lbf/tt)	Temperature (°F) 35,0 36,4 Temperature (°F)	6,05 0,05 0,05 0,05 0 0 0 1nterm	633707 Pressure (p: al 566,00 647,25 Pressure (p: al	si) External 55 66 si) External
String Section 1 L = Connection F = Connection Y = Connection Y = Connection Casing Load St String Section	OD (in) 7,000 Leak Burst Fracture Jump-out Yield ummary - Initia MD (m) 1 382, 1 421, 1 421, 1 421,	Pipe Body Weight (ppf) 29,000 al Conditions - 1 Axial Force (lbf) 04 -750 97 -16019 ssureTest #1 - 1 Axial Force (lbf) 04 5226	C-75 6" Conduct Dogleg (*/100ft) 9 6" Conduct Dogleg (*/100ft) 7	Name BTC Torque (ft-lbf) 0,00 0,00 Dr Casing Torque	Grade C-75 C-75 Frict 0,0 Frict	tion Force (lbf/ft) 0,0 0,0	Temperature (°F) 35,0 36,4 Temperature	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	633707 Pressure (p: al 647,25 Pressure (p:	si) External 55 66 si) External 58
String Section 1 L = Connection B = Connection J = Connection Y = Connection C = Connection C = Connection Casing Load String Section Casing Load String Section	OD (in) 7,000 Leak Burst Fracture Jump-out Yield 1 382, 1 421, 1 382, 1 382, 1 382, 1 421,	Pipe Body Weight (ppf) 28,000 28,000 28,000 al Conditions - 1 Axial Force (lbf) 04 -750: 97 -16019 ssureTest #1 - 1 Axial Force (lbf) 04 5226: 97 49577	C-75 6" Conducte Dogleg (*/100ft) 3 6" Conducte Dogleg (*/100ft) 7	Name BTC           or Casing Torque (ft-lbf)           0,00           or Casing Torque (ft-lbf)           or Casing Torque (ft-lbf)           or O	Grade C-75 0,1 0,0 Frict 0,1 0,0 Frict	7650, tion Force (lbf/t) 0,0 0,0 tion Force (lbf/t) 0,0	Temperature (°F) 35,0 36,4 Temperature (°F) 35,0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	633707 el 586,00 647,25 Pressure (p: al 159,95	si) External 55 66 si) External 58
String Section 1 L = Connection B = Connection J = Connection Y = Connection C =	OD (in) 7,000 Leak Burst Fracture Jump-out Yield Ummary - Initia MD (m) 1 382, 1 421, Ummary - Pres MD (m) 1 382, 1 421, Ummary - Lost MD	Pipe Body           Weight (ppf)           28,000           28,000           Avial Force           (bf)           Axial Force           (bf)           53           7           -16013           37           -16019           64           -5226           97           4957           4957           ReturnsWithMu           Axial Force	C-75 6" Conduct Dogleg ('/100t) 3 6" Conduct Dogleg ('/100t) 7 7 dDrop #1 - Dogleg	Name BTC Dr Casing Torque (ft-lbf) 0,00 0,00 Dr Casing Torque (ft-lbf) 0,00 0,00 16" Conducto Torque	Grade C-75 C-75 C-75 Frid 0,1 0,0 Frid 0,0 Frid Frid	7650, tion Force (lbf/ft) 0,0 0,0 tion Force (lbf/ft) 0,0 0,0 tion Force	Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4 Temperature	0,05 intern 0 intern 0 1 1 1 1	633707 Pressure (p: al 566,00 647,25 Pressure (p: al 159,95 218,49 Pressure (p:	si) External 55 66 si) External 58 64 58 58 58
String Section 1 L = Connection B = Connection J = Connection Y = Connection C = Connection C = Connection C = Connection Casing Load String Section Casing Load St String Section	OD (in) 7,000 Leak Burst Fracture Jump-out Yield ummary - Initia MD (m) 1 382, 1 421, ummary - Pres MD (m) 1 382, 1 421, 1 421,	Pipe Body Weight (ppf) 28,000 28,000 28,000 28,000 28,000 4 Axial Force (lbf) 04 -750 97 -16015 04 -750 -750 97 -16015 04 -750	C-75 6" Conduct Dogleg ('/100ft) 3 9 6" Conduct Dogleg ('/100ft) 7 7 dDrop #1 - Dogleg ('/100ft)	Name BTC BTC Torque (ft-lbf) 0,00 0,00 0,00 0,00 16" Conducto Torque (ft-lbf) 0,00 0,00	Grade C-75 C-75 Frict 0,0 Frict 0,1 0,0 Frict 0,1 Frict 0,1	7650, tion Force (lbf/ft) 0,0 0,0 tion Force (lbf/ft) 0,0 0,0 tion Force (lbf/ft) 0,0	Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4	8) Tensia 0,05 0 0 0 0 0 0 1 1 0 0 1 1 0 0	633707 Pressure (p: al 586,00 647,25 218,49 Pressure (p: 159,95 218,49 Pressure (p: 149,49 Pressure	si) External 55 66 Si) External 58 64: Si) External 55
String Section 1 L = Connection B = Connection J = Connection Y = Connection C =	OD (in) 7,000 Leak Burst Fracture Jump-out Yield Ummary - Initia MD (m) 1 382, 1 421, Ummary - Press MD (m) 1 382, 1 421, Ummary - Lost MD (m) 1 382, 1 421, 1 382, 1 421, 1 382, 1 382,	Pipe Body Weight (ppf) 28,000 28,000 28,000 28,000 28,000 28,000 29,000 29,000 29,000 20,00	C-75 6" Conduct Dogleg ('/100ft) 3 9 6" Conduct Dogleg ('/100ft) 7 7 dDrop #1 - Dogleg ('/100ft)	Name BTC Dr Casing Torque (ft-lbf) 0,00 Dr Casing Torque (ft-lbf) 0,00 16" Conducto Torque (ft-lbf)	Grade C-75 C-75 Frict 0,1 0,0 Frict r Casing Frict Frict	7650,           tion Force           (lbf/ft)           0,0	Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4 Temperature (°F)	8) Tensia 0,05 0 0 0 0 0 0 1 1 0 0 1 1 0 0	633707 Pressure (p: al 566,00 647,25 Pressure (p: al 159,95 218,49 Pressure (p: al	si) External 55 66 Si) External 58 64: Si) External 55
String Section I L = Connection B = Connection J = Connection Y = Connection C =	OD (in) 7,000 Leak Burst Fracture Jump-out Yield 1 382, 1 421, 1 421, 1 382, 1 421, 1 382, 1 421, 1 382, 1 421, MD (m) 1 ) 1 382, 1 421, MD (m) (m) (m) 1 421, MD (m) (m) (m) (m) (m) (m) (m) (m) (m) (m)	Pipe Body Weight (ppf) 29,000 29,000 29,000 al Conditions - 1 Axial Force (lbf) 04 -750: 97 -1601: 3500 37 -1601: 37 -170: 37 -170:	6" Conducte Dogleg ('/100ft) 3 6" Conducte Dogleg ('/100ft) 7 7 dDrop #1 - Dogleg ('/100ft) 3 0 onductor Ca	Name BTC Dr Casing Torque (ft-lbf) 0,00 0,00 0,00 16" Conducto Torque (ft-lbf) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Grade C-75 C-75 C-75 C-75 Frict 0,1 0,0 Frict 0,1 0,0 Frict 0,1 0,0 Casing Frict 0,1 0,0 Casing Frict 0,1 0,0 Casing Ca	tion Force (lbf/ft) 0,0 0,0 tion Force (lbf/ft) 0,0 0,0 tion Force (lbf/ft) 0,0 0,0	Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4	8) Tensia 0,05 0 0 0 0 0 0 1 1 0 0 1 1 0 0	633707 Pressure (p: al 566,00 647,25 Pressure (p: al 159,95 218,49 Pressure (p: al 430,11 430,11 491,36	si) External 55 66 si) External 58 64 si) External 55 64
String Section 1 L = Connection B = Connection J = Connection Y = Connection C = Connection C = Connection Casing Load String Section Casing Load String Section Casing Load String Section	OD (in) 7,000 Leak Burst Fracture Jump-out Yield 1 382, 1 421, 1 421, 1 382, 1 421, 1 382, 1 421, 1 382, 1 421,	Pipe Body Weight (ppf) 29,000 20,000 20,00	6" Conducto Dogleg ('/100ft) 3 6" Conducto Dogleg ('/100ft) 7 7 dDrop #1 - Dogleg ('/100ft) 0 0 0 nductor Ca Dogleg ('/100ft)	Name BTC           or Casing Torque 0,00           or Casing Torque (ft-lbf) 0,00           or Casing Torque (ft-lbf)           0,00           16" Conducto Torque (ft-lbf)           0,00	Grade C-75 C-75 C-75 Frict 0,1 0,0 Frict 0,1 0,0 Frict 0,1 0,0 Frict C-75 Frict Frict C-75 Frict Fr	7650, tion Force (lbf/ft) 0,0 0,0 tion Force (lbf/ft) 0,0 0,0 tion Force (lbf/ft) 0,0	Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4 Temperature (°F) 35,0 36,4	0 Intern 0 Intern 0 Intern 0 Intern 0 Intern 0 Intern 0 Intern 0 Intern	633707 Pressure (p: al 556,00 647,25 Pressure (p: al 159,95 218,49 Pressure (p: 430,11 430,11 Pressure (p:	si) External 55 66 59 59 64 59 64 59 64 51 51 51 51 51

			ion Well Des	0,	<u> </u>			Date/Time: N	larch 01, 2018	03:03:20 PM	Page: 5 of 2
Casi	ng Load String	Summa	MD	gHole #1 - 16" Axial Force	Dogleg	Ing Torque		Friction Force	Temperature	Pressure	(nsi)
	Section		(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	сер —	Internal	External
		1	382,04 421,97	57096 49707	0,00 0,00		0,0 0,0	0,0 0,0	35,00 36,40	585,99 647,25	585,9 647,2
Casi	ng Load String	Summa	ary - Initial C	Conditions - 13 Axial Force	3/8" Surface Ca	sing Torque		Friction Force	Temperature	Pressure	(
	Section		(m)	(lbf)	Dogleg (°/100ft)	(ft-lbf)		(lbf/ft)	(°F)	Internal	External
		1	382,04	19474	0,00		0,0	0,0	35,00	586,00	586,0
		1	421,97 422,03	12333 12322	0,00 0,00		0,0 0,0	0,0 0,0	36,47 36,47	647,26 647,35	671, 671,2
		i	609,60	-21216	0,00		0,0	0,0	43,25	935,06	1070,
		1	914,40 949,97	-75716	0,00 0,00		0,0 0,0	0,0 0,0	54,23 55,50	1402,60 1457,15	1784, 1880,
		1	949,97	-82077	0,00		0,0	0,0	55,50	1457,15	1880,
Casii	ng Load	Summa	ary - Displac	eToGas#1 - 1	3 3/8" Surface (	Casing					
	String		MD	Axial Force	Dogleg	Torque		Friction Force	Temperature	Pressure	
	Section	1	(m) 382,04	(lbf) 46242	(°/100ft) 0.00	(ft-lbf)	0.0	(lbf/ft) 0.0	(°F) 35.00	Internal 942.90	External 585.
		1	421,97	39703	0,00		0,0	0,0	36,44	979,06	642,
		1	422,03	41855	0,00		0,0	0,0	36,44	979,12	617,
		1	609,60 914,40	10038 -36347	0,00 0,00		0,0 0,0	0,0 0,0	43,22 54,23	1148,96 1424,96	891,4 1337,1
		1	949,97	-40702	0,00		0,0	0,0	55,51	1457,17	1389,
Casi	ng Load String	Summa	ary - Pressu MD	reTest #1 - 13 Axial Force	3/8'' Surface Ca Dogleg	sing Torque		Friction Force	Temperature	Drassur	(
	Section		(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F)	Pressure	External
		1	382,04	169462	0,00		0,0	0,0	35,00	2585,99	585,
		1	421,97 422.03	164710 166868	0,00 0.00		0,0	0,0 0,0	36,47 36,47	2647,25 2647,35	642, 617,
		1	609,60	143892	0,00		0,0	0,0	43,25	2935,07	891,
		1	914,40	111983	0,00		0,0	0,0	54,23	3402,60	1337,
		1	949,97	109310	0,00		0,0	0,0	55,50	3457,15	1389,
Casi	ng Load	Summa	arv - LostRe	turnsWithMudD	rop #1 - 13 3/8	" Surface	Са	sina			
	String		MD	Axial Force	Dogleg	Torque		Friction Force	Temperature	Pressure	e (psi)
	Section	4	(m)	(lbf) -24471	(°/100ft) 0.00	(ft-lbf)	0.0	(lbf/ft)	(°F)	Internal	External
		1	382,04 421,97	-24471 -34102	0,00		0,0 0,0	0,0 0,0	35,00 36,44	0,00 0,00	586, 647,
		i	422,03	-31573	0,00		0,0	0,0	36,44	0,00	617,
_		1	609,60	-69489	0,00		0,0	0,0	43,22	82,43	891,
		1	914,40 949,97	-94174 -95946	0,00 0.00		0,0 0.0	0,0 0,0	54,23 55,51	653,86 720,54	1337, 1389,
			0.0,0.1				0,0	-,-,		,	,
Casi	ng Load	Summa		Cement #1 - 13						-	
	String Section		MD (m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)		Friction Force (lbf/ft)	Temperature (°F)	Pressure	e (psi) External
	00000011	1	382,04	269448	0,00	. ,	0,0	0,0	35,00	2586,00	586,
		1	421,97	262307	0,00		0,0	0,0	36,47	2647,26	671,
		1	422,03 609,60	262296 228757	0,00 0.00		0,0	0,0 0,0	36,47 43,25	2647,35 2935,06	671, 1070,
		1	914,40	174257	0,00		0,0	0,0	54,23	3402,60	1784,
		1	949,97	167897	0,00		0,0	0,0	55,50	3457,15	1880,
	ng Load String	Summa	<u>arγ-OverPu</u> MD	<u>III #1 - 13 3/8" :</u> Axial Force	Surface Casing Dogleg	Torque		Friction Force	Temperature	Pressure	(psi)
Casi			(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F) —	Internal	External
Casii	Section		382,04	128938	0,00		0,0	0,0	35,00	585,99	585,
Casii	Section	1			0,00		0.0				
	Section	1	421,97	121797	0,00		0,0	0,0	36,47 36,47	647,25 647,35	647, 647
	Section	1 1 1 1	421,97 422,03 609,60	121797 121786 88247	0,00 0,00		0,0 0,0	0,0 0,0 0,0	36,47 36,47 43,25	647,35 935,07	647, 935,
Casii	Section	1 1 1 1	421,97 422,03	121797 121786	0,00		0,0	0,0	36,47	647,35	647,

#### File: Slender Exploration Well Design, v0 Casing Load Summary - RunningHole #1 - 13 3/8'' Surface Casin

### Date/Time: March 01, 2018 03:03:20 PM Page: 6 of 22

Ca	ising Load Summa	ary - Runnii	ngHole #1 - 13 :	3/8" Surface Ca	sing				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	1	382,04	129927	0,00	0,0	0,0	35,00	585,99	585,99
2	1	421,97	123737	0,00	0,0	0,0	36,47	647,25	647,25
3	1	422,03	123727	0,00	0,0	0,0	36,47	647,35	647,35
4	1	609,60	94652	0,00	0,0	0,0	43,25	935,07	935,07
5	1	914,40	47405	0,00	0,0	0,0	54,23	1402,60	1402,60
6	1	949,97	41891	0,00	0,0	0,0	55,50	1457,15	1457,15

Ca	asing Load Summ	ary - Initial (	Conditions - 95/	8" Production	Casing				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	1	382,04	180148	0,00	0,0	0,0	35,00	716,22	716,22
2	1	609,60	150283	0,00	0,0	0,0	43,25	1142,86	1142,86
3	1	914,40	110283	0,00	0,0	0,0	54,23	1714,28	1714,28
4	1	949,97	105615	0,00	0,0	0,0	55,53	1780,97	1780,97
5	1	950,03	105607	0,00	0,0	0,0	55,53	1781,08	1781,08
6	1	1199,97	72806	0,00	0,0	0,0	64,50	2249,66	2249,66
7	2	1200,03	68031	0,00	0,0	0,0	64,50	2249,78	2249,78
8	2	1219,20	65076	0,00	0,0	0,0	65,20	2285,71	2285,71
9	2	1499,98	21781	0.00	0.0	0.0	75,30	2812.09	2812.09
10	2	1500,04	21772	0,00	0,0	0,0	75,30	2812,21	2812,22
11	2	1524,00	18076	0,00	0,0	0,0	76,18	2857,14	2863,28
12	2	1828,80	-28924	0,00	0,0	0,0	87,26	3428,57	3512,62
13	2	2099,98	-70743	0,00	0,0	0,0	97,00	3936,94	4174,68

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	382,04	231711	0,00	0,0	0,0	35,00	2657,55	716,20
2	1	609,60	201846	0,00	0,0	0,0	43,22	2732,21	1039,29
3	1	914,40	161846	0,00	0,0	0,0	54,23	2832,21	1472,01
4	1	949,97	157178	0,00	0,0	0,0	55,51	2843,88	1522,51
5	1	950,03	157170	0,00	0,0	0,0	55,51	2843,90	1522,60
3	1	1199,97	124369	0,00	0,0	0,0	64,54	2925,91	1877,44
7	2	1200,03	118162	0,00	0,0	0,0	64,54	2925,93	1877,52
8	2	1219,20	115206	0,00	0,0	0,0	65,23	2932,21	1904,74
9	2	1499,98	71912	0,00	0,0	0,0	75,37	3024,33	2303,35
10	2	1500,04	29110	0,00	0,0	0,0	75,37	3024,35	2812,19
11	2	1524,00	24879	0,00	0,0	0,0	76,24	3032,21	2846,22
12	2	1828,80	-29343	0,00	0,0	0,0	87,25	3132,21	3278,95
13	2	2099,98	-73962	0,00	0,0	0,0	97,03	3221,18	3663,93

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	382,04	314144	0,00	0,0	0,0	35,00	4559,95	716,22
2	1	609,60	284280	0,00	0,0	0,0	43,25	4893,51	1142,85
3	1	914,40	244280	0,00	0,0	0,0	54,23	5340,26	1714,28
4	1	949,97	239612	0,00	0,0	0,0	55,53	5392,40	1780,96
5	1	950,03	239604	0,00	0,0	0,0	55,53	5392,49	1781,08
6	1	1199,97	206803	0,00	0,0	0,0	64,50	5758,82	2249,65
7	2	1200,03	194594	0,00	0,0	0,0	64,50	5758,91	2249,77
8	2	1219,20	191638	0,00	0,0	0,0	65,20	5787,01	2285,70
9	2	1499,98	148343	0,15	1,3	0,0	75,30	6198,54	2812,07
10	2	1500,04	142034	0,00	0,0	0,0	75,30	6198,63	2812,19
11	2	1524,00	138733	0,00	0,0	0,0	76,18	6233,77	2846,22
12	2	1828,80	96762	0,00	0,0	0,0	87,26	6680,52	3278,95
13	2	2099,98	63100	0,00	0,0	0,0	97,00	7077,98	3663,93
14									
15 A	dditional Pickup to I	Prevent Bucklin	ng = 13956 lbf						

Conventional Well Design

	lender E>			0,				Date/Time: N	aron 01, 2010	05.05.211 101 1	ugo. 1 012
Casing		Summa		Cement #1 - 95							
	String		MD	Axial Force	Dogleg	Torque		Friction Force	Temperature	Pressure	
_	Section		(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F)	Internal	External
		1	382,04	425372	0,00		0,0	0,0	35,00	4716,22	716,2
		1	609,60	395507	0,00		0,0	0,0	43,25	5142,86	1142,8
		1	914,40	355507	0,00		0,0	0,0	54,23	5714,28	1714,2
		1	949,97	350839	0,00		0,0	0,0	55,53	5780,97	1780,9
			950,03	350831	0,00		0,0	0,0	55,53	5781,08 6249,66	1781,
		2	1199,97 1200,03	318030 304781	0,00 0,00		0,0 0,0	0,0 0,0	64,50 64,50	6249,00	2249,0 2249,1
		2	1219,20	301825	0,00		0.0	0,0	65,20	6285,71	2249,
: 		2	1499.98	258531	0,00		0.0	0,0	75,30	6812.09	2265,
0		2	1500,04	258521	0,00		0.0	0,0	75,30	6812,21	2812,
1		2 2 2 2	1524,00	254825	0,00		0,0	0,0	76,18	6857,14	2863,
2		2	1828,80	207825	0,00		0,0	0,0	87,26	7428,57	3512,
3		2	2099,98	166007	0,00		0,0	0,0	97,00	7936,94	4174,
Casing		Summa	ary - OverPu MD	III #1 - 9 5/8'' Pi Axial Force				Friction Force	Tananatan	<b>D</b>	( I)
	String Section				Dogleg (°/100ft)	Torque		(lbf/ft)	Temperature	Pressure Internal	(psi) External
	Section	1	(m) 382,04	(lbf) 247449	(*/100#) 0,00	(ft-lbf)	0,0	(lbf/ft) 0,0	(°F) 35,00	Internal 716,22	External 716,
_		1	582,04 609,60	247449	0,00		0,0	0,0	43,25	1142,86	1142,
		1	914,40	177584	0,00		0,0	0,0	43,25 54,23	1714,29	17142,
		1	949.97	172916	0,00		0.0	0,0	54,25	1714,29	1714,
		1	950,03	172908	0,00		0,0	0,0	55,53	1781,09	1781,
		i	1199,97	140108	0,00		0,0	0,0	64,50	2249,66	2249,
		2	1200,03	135333	0,00		0.0	0,0	64,50	2249,78	2249,
		2	1219,20	132377	0,00		0,0	0,0	65,20	2285,71	2285,
		2	1499,98	89082	0.00		0.0	0,0	75,30	2812.09	2812,
0		2	1500,04	89073	0,00		0,0	0,0	75,30	2812,20	2812,
			1524,00	85377	0,00		0,0	0,0	76,18	2857,14	2857,
		2									
1		2			0.00	(	0.0	0.0	87.26	3428.57	3428.3
		2 2 2 2	1828,80 2099,98	38377 -3442	0,00 0,00		0,0 0,0	0,0 0,0	87,26 97,00	3428,57 3936,94	3428,5 3936,5
1 2 3	String		1828,80 2099,98 ary - Runnin MD	38377 -3442 gHole #1 - 95/ Axial Force	0,00 8" Production C Dogleg	Casing Torque		0,0 Friction Force	97,00	3936,94 Pressure	3936,s (psi)
1 2 3			1828,80 2099,98 arγ - Runnin MD (m)	38377 -3442 gHole #1 - 95/	0,00 8'' Production C	( Casing Torque (ft-lbf)	0,0	0,0 Friction Force (lbf/ft)	97,00	3936,94 Pressure Internal	3936, (psi) External
1 2 3 Casing	String		1828,80 2099,98 ary - Runnin MD (m) 382,04	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585	0,00 <u>8" Production C</u> Dogleg (°/100ft) 0,00	Casing Torque (ft-lbf)	0,0	0,0 Friction Force (lbf/ft) 0,0	97,00 Temperature	3936,94 Pressure Internal 716,22	3936, (psi) External 716,
1 2 3	String		1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607	0,00 8" Production C Dogleg (°/100ft) 0,00 0,00	C <u>asing</u> Torque (ft-lbf) (	0,0	0,0 Friction Force (lbf/ft) 0,0 0,0	97,00 Temperature	3936,94 Pressure Internal 716,22 1142,86	3936, (psi) External 716, 1142,
1 2 3	String	Summa 1 1	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607 178152	0,00 8" Production C Dogleg (°/100ft) 0,00 0,00 0,00	Casing Torque (ft-lbf) (	0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0	97,00 Temperature (°F) 35,00 43,25 54,23	3936,94 Pressure Internal 716,22 1142,86 1714,29	3936, (psi) External 716, 1142, 1714,
Casing	String	Summa 1 1	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607	0,00 8" Production C Dogleg (°/100ft) 0,00 0,00	C <u>asing</u> Torque (ft-lbf) (	0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0	97,00 Temperature	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97	3936, (psi) External 716, 1142, 1714, 1780,
Casing	String	Summa 1 1 1 1 1	1828,80 2099,98 MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97	38377 -3442 g <u>Hole #1 - 9 5/</u> Axial Force (lbf) 236585 211607 178152 174248 174241 146807	0,00 8" Production C Dogleg ("/100ft) 0,00 0,00 0,00 0,00 0,00 0,00	Casing Torque (ft-lbf) (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 55,53 64,50	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66	(psi) External 716, 1142, 1714, 1780, 1781, 2249,
1 2 3 Casing	String	Summa 1 1 1 1 1 1 1 2	1628,80 2099,98 mp (m) 382,04 609,60 914,40 949,97 950,03	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211807 178152 1784241	0,00 8" Production C Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00	Casing Torque (ft-lbf) (	0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1780,97 1781,09	(psi) External 716, 1142, 1714, 1780, 1781, 2249,
Casing	String	Summa 1 1 1 1 1 1 2 2	1828,80 2099,98 ary - Runnin (m) 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607 178152 174248 174241 146807 152520 150052	8" Production C Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) (°F) 55,53 56,53 56,53 64,50 64,50 65,20	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2285,71	3936, (psi) External 716, 1142, 1714, 1780, 1781, 2249, 2249, 2249, 2245,
Casing	String	Summa 1 1 1 1 1 1 2 2	1828,80 2099,98 MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20 1499,98	38377 -3442 g <u>Hole #1 - 9 5/</u> Axial Force (lbf) 236595 211607 178152 174248 174248 174248 174241 146807 152520 150052 113902	0,00 8" Production C Dogleg (*/100R) 0,00 0	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 64,50 64,50 65,20 75,30	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2249,78 2285,71 2812,09	3936, (psi) External 716, 1142, 1780, 1781, 2249, 2249, 2249, 2249, 2285, 2812,
Casing	String	Summa 1 1 1 1 1 1 2 2	1828,80 2099,98 mary - Runnin (m) 382,04 609,60 914,40 949,97 1200,03 1199,97 1200,03 1219,20 1499,98 1500,04	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607 178152 1774248 174241 146807 152520 150052 113902	0,00 8" Production C Dogleg (*/1008) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature (°F) 43,25 54,23 55,53 64,50 64,50 64,50 64,50 65,20 75,30	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,66 2249,78 2285,71 2812,09 2812,20	3936, (psi) External 716, 1142, 1714, 1780, 1781, 2249, 2285, 2812, 2812,
1 2 3 Casing	String	Summa 1 1 1 1 1 1 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00	38377 -3442 gHole #1 - 9 5/ Axial Force (bf) 236585 211607 178152 174248 174241 146807 152520 150052 113894 110808	0,00 8" Production C Dogleg ("/100ft) 0,00	Casing Torque (ft-lbf)	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 66,20 75,30 75,30 76,18	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2245,71 2812,09 2812,20 2857,14	3936, (psi) External 716, 1714, 1781, 2249, 2249, 2249, 2249, 2285, 2812, 2812, 2812, 2812,
	String	Summa 1 1 1 1 1 1 2 2	1828,80 2099,98 mtp (m) 382,04 609,60 914,40 949,97 1200,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607 178152 174248 174241 146807 152520 150052 113902 113894 110808 71563	0,00 8" Production C Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 55,53 55,53 64,50 64,50 65,20 75,30 75,30 76,18 87,26	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2249,78 2249,78 2285,71 2812,20 2857,14 3428,57	(psi) External 716 1142 1714 1780 1781 2249 2285 2812 2812 2812 2817 3428
	String	Summa 1 1 1 1 1 1 1 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00	38377 -3442 gHole #1 - 9 5/ Axial Force (bf) 236585 211607 178152 174248 174241 146807 152520 150052 113894 110808	0,00 8" Production C Dogleg ("/100ft) 0,00	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 66,20 75,30 75,30 76,18	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2245,71 2812,09 2812,20 2857,14	(psi) External 716, 1142, 1714, 1780, 1781, 2249, 2285, 2812, 2812, 2857, 3428,
Casing	String Section	Bumma 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 914,40 914,97 950,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211807 178152 174241 146807 150052 113902 113092 113092 113804 71663 36649 turns #1 - 9 5/8	0,00 8" Production C Dogleg ("/100ft) 0,00	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 55,53 55,53 64,50 64,50 64,50 75,30 76,18 87,26 97,00	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2249,78 2249,78 2249,78 2249,78 2249,78 225,71 2812,09 2812,20 2857,14 3428,57 3936,94	3936, (psi) External 716, 1142, 1714, 1780, 1781, 2249, 2285, 2812, 2812, 2812, 2812, 2812, 3428, 3936,
1 2 3 Casing 0 1 2 3	String Section g Load S String	Bumma 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin (m) 382,04 609,60 914,40 949,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607 178152 1774248 174241 146807 152520 150052 113902 113902 113994 71563 36649 36649	8" Production C Dogleg ('100ft) 0,00 0	Casing Torque (R-Ibf) (C ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) (°F) 55,53 56,53 56,53 56,53 64,50 64,50 66,20 75,30 76,18 87,26 97,00 Temperature	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2285,71 2812,09 2812,20 2857,14 3428,57 3936,94 Pressure	3936, (psi) External 716, 1142, 1714, 1781, 2249, 295, 2812, 285, 3428, 3936, (psi)
Casing	String Section	Bumma 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin (m) 382,04 609,60 914,40 949,97 120,03 1199,97 120,03 1219,20 149,98 1500,04 1524,00 1828,80 2099,98	38377 -3442 -3442 	0,00 8" Production C Dogleg (*/100ft) 0,00	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature _(°F) 35,00 43,25 54,23 55,53 64,50 65,20 75,30 75,000 75,0000 75,0000 75,0000 75,0000 75,0000 75,0000 75,0000 75,0000 75,00000 75,00000 75,000000000000000000000000000000000000	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2265,71 2812,09 2812,20 2812,20 285,714 3428,57 3936,94 Pressure Pressure	3936, (psi) External 716, 1142, 1714, 1780, 1780, 1781, 2249, 2249, 2249, 2285, 2812, 2812, 2857, 3428, 3936, (psi) External
Casing	String Section g Load S String	Summa 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 750,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04	38377 -3442 3442 3442 3442 3442 3442 34585 211807 178152 174248 174248 174248 174248 174248 174248 174249 174248 174249 17449 17	0,00 8" Production C Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Casing Torque (R-Ibf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 64,50 65,20 75,30 76,30 76,18 87,26 97,00 Temperature(°F) 35,00	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2285,71 2812,20 2857,14 3428,57 3936,94 Pressure Internal 1251,29	(psi) External 716, 1142, 1714, 1780, 1780, 1781, 2249, 2249, 2285, 2812, 2812, 2857, 3428, 3936, (psi) External 716, 716, 716, 716, 716, 716, 718, 7
Casing	String Section g Load S String	Summa 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin (m) (m) 382,04 609,60 914,40 949,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 609,60	38377 -3442 -3442 	0,00  8" Production C Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 56,53 64,50 64,50 66,20 75,30 76,18 87,26 97,00 Temperature(°F) 35,00 43,25	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2295,71 2812,09 2812,20 2812,20 2812,20 2812,20 285,71 3936,94 Pressure Internal 1251,29 1677,93	3936, (psi) External 716, 1142, 1780, 1781, 2249, 2249, 2249, 2249, 2249, 2245, 2812, 2812, 2812, 2812, 2813, 3936, (psi) External Fire, 1142, 1142, 1142, 1142, 1142, 1142, 1142, 1142, 1142, 1144
Casing	String Section g Load S String	Summa 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 360,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 609,60 914,40	38377 -3442 3442 3442 3442 3442 3442 3444 345 3444 345 3444 345 345 345 345	0,00 8" Production C Dogleg (*/100R) 0,00 0	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (		0,0 Friction Force (lbf/ft) 0.0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 64,50 75,30 75,000 75,0000 75,000 75,0000 75,0000 75,0000 75,0000 75,0000000000000000	3936,94  Pressure Internal Int	(psi) External 716, 1142, 1714, 1780, 1781, 1780, 1781, 2249, 2249, 2285, 2812, 2857, 3428, 3936, (psi) External 716, 1142, 1714,
Casing	String Section g Load S String	Summa 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRee MD (m) 532,04 609,60 914,40 949,97	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607 178152 1774248 174241 146807 152520 150052 113902 13904 71563 38649 21072 13907 4xial Force (lbf) 19937 170072 130072 125404	0,00 8" Production C Dogleg ('/100ft) 0,00	Casing           Torque           (ft-lbf)           (ft-lbf)           (ft-lbf)           (ft-lbf)		0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 66,20 75,30 76,18 87,26 97,00 Temperature(°F) 35,00 43,25 54,23 55,53	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2285,71 2812,09 2812,09 2857,14 3428,57 3936,94 Pressure Internal 1251,29 1677,93 2249,36 2316,04	3936, (psi) External 716, 1142, 1714, 1780, 1780, 2249, 2249, 2249, 2249, 2245, 2812, 2812, 2812, 2857, 3428, 3936, (psi) External 716, 1142, 1714, 1780,
Casing	String Section g Load S String	Summa 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 914,40 914,97 950,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 609,60 914,40 949,97 950,03	38377 -3442 3442 3442 3442 3442 3442 3444 345685 345685 345685 345685 345685 345685 345685 345685 34568 34568 34569 3456	0,00 8" Production C Dogleg ('/100ft) 0,00	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (		0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature (°F) 35,00 43,25 54,23 55,53 64,50 64,50 65,20 75,30 75,555 75,555 75,555 75,555 75,555 75,555 75,555 75,555 75,555 75,555 75,5555	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2285,71 2812,09 2812,20 2857,14 3428,57 3936,94 Pressure Internal 1251,29 1677,93 2249,36 2316,04 2316,16	(psi) External T16 1142 1714 1780 1781 1780 1781 2249 2249 2249 2249 22812 2812 2812 2812 2812 2812 2813 2812 2813 2813
	String Section g Load S String	1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97	38377 -3442 3442 3442 3442 3442 3442 3442 344	0,00  8" Production C Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Casing Torque (R-lbf) (C (C) (C) (C) (C) (C) (C) (C) (C) (C)		0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 55,53 56,53 56,53 56,53 64,50 64,50 64,50 66,20 75,30 76,18 87,26 97,00 Temperature(°F) 55,00 43,25 54,23 55,53 55,53 55,53 64,50	3936,94  Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2285,71 2812,20 2857,14 3428,57 3936,94  Pressure Internal Pressure Internal 281,29 1677,93 2249,36 2316,04 2316,16 2784,74	(psi) External 716 1142 1714 1780 1780 1781 2249 2285 2812 2857 3428 3936 (psi) External 716 1142 1714 1780 1781 2249 2285 2817 2857 3428 3936
	String Section g Load S String	Summa 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 822,04 609,60 914,40 949,97 1200,03 1219,20 1429,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97 950,03 1199,97 1200,03	38377 -3442 -3442 -3442 -3442 -3442 -3442 -3442 -34585 -211607 -178152	0,00 8" Production C Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (		0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature (°F) 35,00 43,25 54,23 55,53 64,50 64,50 66,20 75,30 75,30 76,18 87,26 97,00 Temperature (°F) 35,00 43,25 54,23 55,53 64,50 6	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,78 2296,71 2812,09 2812,20 2812,20 2857,14 3428,57 3936,94 Pressure Internal 1251,29 1677,93 2249,36 2316,04 2316,16 2784,74 2784,85	(psi) External 716 1142 1714 1780 1781 2249 2285 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 2815 2815
	String Section g Load S String	1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 1200,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 609,60 914,40 949,97 1200,03 1199,97 1200,03 1199,97	38377 -3442 3442 3442 3442 3442 3442 3444 345 345 3444 345 3444 345 345 345	0,00 8" Production C Dogleg ('/100ft) 0,00	Casing Torque (ft-lbf) ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( ( (		0,0 Friction Force (lbf/ft) 0.0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature (°F) 35,00 43,25 54,23 55,53 64,50 64,50 65,20 75,30 75,53 54,50 64,50 65,53 64,50 65,53 64,50 65,53 64,50 65,53 64,50 65,53 64,50 65,53 64,50 65,53 64,50 65,53 65,53 64,50 65,53 65,53 65,53 65,53 65,53 65,53 65,53 65,53 65,53 65,52	3936,94  Pressure Internal I714,29 1780,97 1781,09 2249,78 2285,71 2812,09 2812,20 2857,14 3428,57 3936,94  Pressure Internal 1251,29 1677,93 1677,93 1677,93 2249,36 2316,04 2316,16 2316,16 2784,85 2820,79	(psi) External 716 1142 1714 1780 2249 2249 2249 2812 2857 3428 3936 (psi) External 716 1142 1714 1142 1714 1142 21714 2249 2249 2249 2249 2249 2249 2249 22
Casing Casing Dasing	String Section g Load S String	1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 1200,03 1219,20 1499,98 1500,04 1524,00 1628,80 2099,98 ary - LostRee MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20 1499,98	38377 -3442 gHole #1 - 9 5/ Axial Force (lbf) 236585 211607 178152 1774248 174241 146807 152520 150052 113902 13894 110808 71563 36649 36649 4xial Force (lbf) 199937 170072 130072 130072 130072 125404 425366 92567 93731 40437	0,00 8" Production C Dogleg ('/100ft) 0,00	Zasing           Torque           (ft-lbf)		0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 66,20 75,30 76,18 87,26 97,00 Temperature(°F) 35,00 43,25 54,23 55,53 64,50 64,50 64,50 64,50 64,50 64,50 64,50 64,50 64,50 64,50 64,50 64,50 64,50 65,53 64,50 64,50 65,53 64,50 64,50 65,53 64,50 64,50 64,50 64,50 64,50 64,50 64,50 64,50 75,30 76,30 76,30 75,53 75,53 75,53 75,53 75,53 75,53 75,53 75,53 75,53 75,50 75,50 75,53 75,53 75,50 75,50 75,50 75,50 75,50 75,50 75,50 75,50 75,50 75,50 75,50 75,50 75,50 75,53 75,55 75,55 75,53 75,55 75,55 75,55 75,55 75,55 75,55 75,53 75,55 75,55 75,55 75,55 75,555 75,5	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2285,71 2812,09 2812,20 2857,14 3428,57 3936,94 Pressure Internal 1251,29 1677,93 2249,36 2316,04 2316,16 2784,74 2316,04 2316,04 2316,04 2346,78 2820,79 33347,16	3936 (psi) External 716 1142 1744 1780 1780 1781 2249 2285 2812 2857 3428 3936 (psi) External 716 1142 1714 1780 1781 716 1142 2249
	String Section g Load S String	1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 0,960,03 1199,97 1200,03 1199,97 1200,03 1199,97 1200,03 1199,97 1200,03 1199,97	38377 -3442 3442 3442 3442 3442 3442 3444 345685 345685 345685 345685 345685 345685 345685 345685 345685 345685 345685 34568 3	0,00 8" Production C Dogleg ('/100ft) 0,00	Casing           Torque           (ft-lbf)           (f		0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature _(°F) 35,00 43,25 54,23 55,53 64,50 64,50 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 55,53 64,50 64,50 64,23 55,53 64,50 75,30 75,3	3936,94 Pressure Internal T16,22 1142,86 1714,29 1780,97 1781,09 2249,78 2285,71 2812,09 2812,20 2857,14 3428,57 3936,94 Pressure Internal I251,29 1677,93 2249,36 2316,04 2316,16 2784,74 2784,85 2820,79 3347,16 3347,28	(psi) External External T716, 1142, 1714, 1780, 1781, 2249, 2285, 2812, 2857, 3428, 3936, External 716, 1142, 1714, 1780, 1781, 2249
Casing Casing Casing Casing	String Section g Load S String	1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 2099,98 (m) 82,04 609,60 914,40 949,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 2009,98	38377 -3442 3442 3442 3442 3442 3442 3442 3458 3458 3458 3458 3458 3458 3458 3458	0,00 8" Production C Dogleg ('/100ft) 0,00	Casing         Torque           (ft-lbf)         (ft-lbf)		0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature (°F) (°F) 55,00 43,25 54,23 55,53 64,50 64,50 64,50 66,20 75,30 76,18 87,26 97,00 Temperature (°F) (°F) 35,00 43,25 54,23 55,53 55,53 64,50 64,50 65,53 64,50 65,53 64,50 65,53 64,50 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,53 64,50 64,50 75,53 64,57 75,53 75,30 75,	3936,94 Pressure Internal 716,22 1142,86 1714,29 1780,97 1781,09 2249,66 2249,78 2285,71 2812,09 2812,20 2857,14 3428,57 3936,94 Pressure Internal 1251,29 1677,93 2249,36 2316,04 2316,16 2784,74 2286,79 3347,16 3347,28 3392,21	3936, (psi) External 716, 1142, 1714, 1781, 2249, 2249, 2285, 2812, 2857, 3428, 3936, (psi) External External 716, 1142, 1714, 1780, 1781, 2249, 22
	String Section g Load S String	1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80 2099,98 ary - Runnin MD (m) 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20 1499,98 1500,04 1524,00 1828,80 2099,98 ary - LostRe MD (m) 382,04 0,960,03 1199,97 1200,03 1199,97 1200,03 1199,97 1200,03 1199,97 1200,03 1199,97	38377 -3442 3442 3442 3442 3442 3442 3444 345685 345685 345685 345685 345685 345685 345685 345685 345685 345685 345685 34568 3	0,00 8" Production C Dogleg ('/100ft) 0,00	Casing Torque (ft-lbf) (		0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	97,00 Temperature _(°F) 35,00 43,25 54,23 55,53 64,50 64,50 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 75,30 55,53 64,50 64,50 64,23 55,53 64,50 75,30 75,3	3936,94 Pressure Internal T16,22 1142,86 1714,29 1780,97 1781,09 2249,78 2285,71 2812,09 2812,20 2857,14 3428,57 3936,94 Pressure Internal I251,29 1677,93 2249,36 2316,04 2316,16 2784,74 2784,85 2820,79 3347,16 3347,28	(psi) External T16 1142 1714 1780 1781 2249 2285 2812 2855 2812 2855 2812 2855 2812 2855 2812 2855 2812 1714 1714 1714 1780 1781 2249 2249 2249 2249 2249 2249 2249 224

## Date/Time: March 01. 2018 03:03:21 PM Page: 7 of 22

Conventional Well Design

		ion Well Des				Date/Time: N	March 01, 2018	03:03:21 PM 1	-age. o o
	Summa			<u>3" Production Ca</u>					
String		MD	Axial Force	Dogleg (°/100ft)	Torque	Friction Force	Temperature	Pressure	(psi)
Section	1	(m) 382,04	(lbf) 190880	(7100π)	(ft-lbf) 0,1	(lbf/ft) 0 0.0	(°F) 35.00	Internal 716,22	External 71
	1	609,60	161015	0,00	0,0		43,22	1142,86	103
	1	914,40	121015	0,00	0,0		54,23	1714,28	147
	1	949,97	116347	0.00	0,1		55,51	1780,97	152
	1	950,03	116339	0,00	0,0		55,51	1781,08	152
	1	1199,97	83539	0,00	0,0		64,54	2249,66	187
	2	1200,03	78764	0,00	0,0	0,0	64,54	2249,78	187
	2	1219,20	75808	0,00	0,0		65,23	2285,71	190
	2	1499,98	32514	0,00	0,0		75,37	2812,09	230
	2	1500,04	21578	0,00	0,0	0,0	75,37	2812,20	281
	2	1524,00	18663	0,00	0,0	0,0	76,24	2857,14	284
	2	1828,80	-18819	0,00	0,0		87,25	3428,57	327
	2	2099,98	-48543	0,00	0,0	0,0	97,03	3936,94	366
asing Load	Summa	arv - Initial C	Conditions - 7"	Production Liner					
String Section		MD L	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-Ibf)	Friction Force (lbf/ft)	Temperature	Pressure Internal	(psi) External
Section	1	(m) 2050.02	(101) 9919	0.00	(101)		(°F) 95,20	3843,33	External 384
	1	(m) 2050,02 2099,98	5162	0.00	0,1		97,00	3936,94	393
	1	2100,04	5162	0,00	0,0		97,00	3937,06	393
	1	2133,60	1965	0,00	0,0		98,23	4000,00	400
	1	2438,40	-27035	0,00	0,1	0,0	109,21	4571,42	465
	1	2699,98	-51925	0,00	0,1		118,70	5061,80	529
asing Load <sub>String</sub>	Summa	MD MD	reTest #1 - 7" Axial Force	Production Liner Dogleg	Torque	Friction Force	Temperature	Pressure	(nci)
Section		(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	2050,02	66708	0.00	0,0		95,20	7004,78	384
	1	2099,98	61951	0,00	0,1		97,00	7077,97	393
	1	2100,04	61767	0,00	0,0		97,00	7078,06	393
	1		58873	0,00	0,0	0,0	98,23	7127,27	398
	1 1	2133,60 2438,40	32628	0,00	0,0	0,0	98,23 109,21	7127,27 7574,02	398 441
	1 1 1	2133,60				0,0	98,23 109,21 118,70	7127,27 7574,02 7957,42	398 441
	1 1 1	2133,60 2438,40 2699,98	32628 12051	0,00 0,00	0, 0,	0,0	109,21	7574,02	398 441 478
	1 1 1 Summa	2133,60 2438,40 2699,98 ary - Green0	32628 12051 Cement #1 - 7''	0,00 0,00 Production Line	0,1 0,1	0 0,0 0 0,0	109,21 118,70	7574,02 7957,42	398 441 478
String		2133,60 2438,40 2699,98 ary - Green( MD	32628 12051 Cement #1 7'' Axial Force	0,00 0,00 Production Line Dogleg	0,i 0,i Torque	0 0,0 0 0,0 Friction Force	109,21 118,70 Temperature _	7574,02 7957,42 Pressure	398 441 478 (psi)
		2133,60 2438,40 2699,98 ary - Green( MD (m)	32628 12051 Cement #1 - 7'' Axial Force (lbf)	0,00 0,00 Production Line Dogleg (°/100ft)	0,1 0,1 [ Torque (ft-lbf)	0 0,0 0 0,0	109,21 118,70 Temperature(°F)	7574,02 7957,42 Pressure Internal	398 441 478 (psi) External
String		2133,60 2438,40 2699,98 ary - Green( MD (m) 2050,02	32628 12051 Cement #1 - 7'' Axial Force (lbf) 130060	0,00 0,00 Production Line Dogleg (°/100ft) 0,00	0,1 0,1 [ [ [ (ft-lbf) 0,1	0 0,0 0 0,0 Friction Force (lbf/ft) 0 0,0	109,21 118,70 Temperature (°F) 95,20	7574,02 7957,42 Pressure Internal 7843,33	398 441 478 (psi) External 384
String		2133,60 2438,40 2699,98 ary - Green( MD (m) 2050,02 2059,98	32628 12051 Cement #1 - 7'' Axial Force (lbf) 130060 125302	0,00 0,00 Production Line Dogleg (°/100ft) 0,00 0,00	0, 0, 0, 1 Torque (ft-lbf) 0, 0,	0 0,0 0 0,0 Friction Force (lbf/ft) 0 0,0	109.21 118.70 Temperature	7574.02 7957,42 Pressure Internal 7843,33 7936,94	398 441 478 (psi) External 384 393
String		2133,60 2438,40 2699,98 ary - GreenC MD (m) 2050,02 2099,98 2100,04	32628 12051 Cement #1 - 7'' Axial Force (lbf) 130060 125302 125302	0,00 0,00 Production Line Dogleg (°/100tt) 0,00 0,00	0, 0,1 Torque (ft-lbf) 0, 0, 0,1	0 0,0 0 0,0 Friction Force (lbf/ft) 0 0,0 0 0,0	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00	7574,02 7957,42 Pressure Internal 7843,33 7936,94 7937,06	398 441 478 (psi) External 384 393 393
String		2133,60 2438,40 2699,98 ary - Green( MD (m) 2050,02 2099,98 2100,04 2133,60	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 125302 122105	0.00 0,00 Production Line Dogleg ('/100t) 0,00 0,00 0,00	0, 0, 0, <u>0,</u> (ft-lbf) 0, 0, 0, 0, 0, 0, 0,	0 0,00 Friction Force (ibf/t) 0 0,00 0 0,00 0 0,00	109,21 118,70 Temperature _ (°F) 95,20 97,00 97,00 98,23	7674,02 7967,42 Pressure Internai 7943,33 7936,94 7937,06 8000,00	398 441 478 (psi) External 384 393 400
String		2133,60 2438,40 2699,98 ary - GreenC MD (m) 2050,02 2099,98 2100,04	32628 12051 Cement #1 - 7'' Axial Force (lbf) 130060 125302 125302	0,00 0,00 Production Line Dogleg (°/100tt) 0,00 0,00	0, 0,1 Torque (ft-lbf) 0, 0, 0,1	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,00 0 0,00	109,21 118,70 Temperature(^F) 95,20 97,00 97,00 98,23 109,21	7574,02 7957,42 Pressure Internal 7843,33 7936,94 7937,06	398 441 478 (psi) External 384 393 393 400 465
String		2133,60 2439,40 2699,98 ary - Green( MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40	32628 12051 Cement #1 - 7'' Axial Force (lbf) 130060 125302 125302 125302 122105 93105	0,00 0,00 Production Line Dogleg (*/100 ft) 0,00 0,00 0,00 0,00	0, 0, 0, 1 Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0,	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,00 0 0,00	109,21 118,70 Temperature _ (°F) 95,20 97,00 97,00 98,23	7674,02 7967,42 Pressure Internal 7843,33 7936,94 7937,06 8000,00 8571,42	396 441 476 (psi) External 384 393 393 393 400 465
String Section	1 1 1 1 1	2133,60 2438,40 2699,98 mry - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98	32628 12051 Cement #1 - 7'' Axial Force (lbf) 130060 125302 125302 125302 122105 93105	0,00 0,00 Production Line Dogleg (°/100#) 0,00 0,00 0,00 0,00 0,00	0, 0, 0, 1 Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0,	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,00 0 0,00	109,21 118,70 Temperature(^F) 95,20 97,00 97,00 98,23 109,21	7674,02 7967,42 Pressure Internal 7843,33 7936,94 7937,06 8000,00 8571,42	398 441 478 (psi) External 384 393 393 393 400 465
String Section	1 1 1 1 1 5umma	2133.60 2438.40 2438.40 2659.98 mD (m) 2050.02 2099.98 2100.04 2133.60 2438.40 2699.98 ary - OverPu MD	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 122105 93105 68216 	0,00 0,00 Production Line Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	0, 0, 0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,0 0 0,0 Friction Force (lbf/ft) 0 0,0 0 0,0	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 97,00 98,23 109,21 118,70	7674,02 7967,42 Pressure Internal 7843,33 7936,84 7937,06 8000,00 80571,42 9061,80 Pressure	398 441 478 (psi) External 393 393 393 393 400 466 529 (psi)
String Section	1 1 1 1 1 5umma	2133,60 2438,40 2699,98 mry - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 ary - OverPu MD (m)	32628 12051 Cement #1 - 7" (lbf) 130060 125302 125302 125302 122105 93105 68216 ull #1 - 7" Prod Axial Force (lbf)	0,00 0,00 Dogleg ('/100h) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, 0, 0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,0 0 0,0 Friction Force (lb/ft) 0 0,0 0 0,0	109,21 118,70 Temperature(°F) 95,20 97,00 97,00 97,00 98,23 109,21 118,70 Temperature(°F)	7674,02 7967,42 7967,42 Pressure Internal 7943,33 7936,94 7937,06 8000,00 8571,42 9061,80 Pressure Pressure Internal	(psi) (psi) External 384 393 400 465 525 (psi) External
String Section	1 1 1 1 1 5umma	2133,60 2438,40 2438,40 2438,40 (m) (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 ary - OverPt MD (m) (m) (m) 2050,02	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 125302 122105 68216 68216 Axial Force (lbf) 68070	0,00 0,00 Dogleg (*/100R) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0, 0, 0, 0, 1 Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,00 0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,0,0	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 97,00 97,00 97,00 109,21 118,70 Temperature (°F) 95,20	7674,02 7967,42 Pressure Internal 7843,33 7936,94 7937,06 8000,00 8571,42 9061,80 Pressure Internal 3843,32	396 441 478 (psi) External 393 393 400 525 525 525 525 525 525 525 525 525 5
String Section	1 1 1 1 1 5umma	2133,60 2438,40 2699,98 mp (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 ary - OverPt MD (m) 2050,02 2099,98	32628 12051 2ement #1 - 7" Axial Force (lbf) 130060 125302 125302 122105 93105 68216 Axial Force (lbf) 69070 64313	0,00 0,00 Production Line Dogleg (*/100R) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, 0, 0, 1 Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,0,0 0 0,0,0 Friction Force (lbf/ft) 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0	109,21 118,70 Temperature(°F) 95,20 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00	7674,02 7967,42 Pressure Internal 7843,33 7936,94 8000,00 8571,42 9061,80 Pressure Internal 3843,32 3936,94	(psi) (psi) External 393 393 400 465 529 (psi) External 394 393
String Section	1 1 1 1 1 5umma	2133,60 2438,40 2699,98 mty - Green( MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 ary - OverPu MD (m) (m) 2050,02 2099,98 2100,04	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 125302 125302 122105 93105 68216 Axial Force (lbf) 69070 64313	0,00 0,00 Production Line Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, 0, 0, 0, 1 Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,00 0 0,00 Friction Force (lb/ft) 0 0,00 0 0,00	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) (°F) 95,20 97,00 97,00	7674,02 7967,42 7967,42 Pressure 1nternal 7843,33 7936,94 7937,06 8000,00 8571,42 9061,80 Pressure Internal 9643,32 3936,94 3937,06	(psi) (psi) External 384 393 400 465 529 External 384 393 393 393
String Section	1 1 1 1 1 5umma	2133,60 2438,40 2699,98 ary - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 122105 93105 68216 03105 68216 4313 64313 64313 64313	0.00 0,00 Production Line Dogleg (*/100R) 0.00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	0 0,0,0 0 0,0,0 Friction Force (lbf/t) 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0 0 0,0,0	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 97,00 97,00 98,23	7674,02 7967,42 Pressure Internal 7843,33 7936,94 7937,06 8000,00 8571,42 9061,80 Pressure Internal 3843,32 3936,94 3937,06 4000,00	398 441 475 (psi) External 393 393 400 465 525 (psi) External 393 393 400 405 525 (psi) External 393 393 400
String Section	1 1 1 1 1 5umma	2133,60 2438,40 2699,98 mry - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2050,02 2059,98 2100,04 2133,60	32628 12051 Cement #1 - 7" (lbf) 130060 125302 125302 125302 122105 93105 68216 93105 68216 4313 64313 64313 64313 64313	0,00 0,00 0,00 Dogleg (*/100ħ) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,00	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 97,00 97,00 97,00 97,00	Pressure Internal Pressure Pressure Pressure Pressure Pressure Pressure Pressure Internal 3843,32 3936,94 3937,06 4000,00 4571,43	(psi) External 393 393 393 400 466 529 External 844 394 393 393 400 455
String Section	1 1 1 1 1 5umma	2133,60 2438,40 2699,98 ary - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 122105 93105 68216 03105 68216 4313 64313 64313 64313	0.00 0,00 Production Line Dogleg (*/100R) 0.00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,00	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 97,00 97,00 98,23	7674,02 7967,42 Pressure Internal 7843,33 7936,94 7937,06 8000,00 8571,42 9061,80 Pressure Internal 3843,32 3936,94 3937,06 4000,00	(psi) (psi) External 393 400 466 525 External 384 393 400 457 525 (psi)
String Section	1 1 1 1 1 1 5 Summa 1 1 1 1 1 1	2133,60 2438,40 2699,98 MD (m) 2050,02 2099,98 2109,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 125302 1250 12502	0,00 0,00 Dogleg (*/100R) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,00	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 97,00 97,00 97,00 97,00	Pressure Internal Pressure Pressure Pressure Pressure Pressure Pressure Pressure Internal 3843,32 3936,94 3937,06 4000,00 4571,43	(psi) (psi) External 393 400 466 525 External 384 393 400 457 525 (psi)
String Section asing Load String Section asing Load String	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2133,60 2438,40 2699,98 MD (m) 2050,02 2099,98 2109,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 122105 93105 68216 JII #1 - 7" Prod Axial Force (lbf) 69070 64313 64313 61116 32116 7226 gHole #1 - 7" F	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0, 0, 0, 0, 1 Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,00 0 0,00 Friction Force (lb/ft) 0 0,00 0 0,000 0 0,0000 0 0,00000000	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 97,00 97,00 97,00 97,00	7674,02 7967,42 7967,42 Pressure 1nternal 7843,33 7936,94 7937,06 8000,00 8571,42 9061,80 Pressure Internal 3943,32 3936,94 3937,06 4000,00 4571,43 5061,80	(psi) (psi) External 393 400 466 525 (psi) External 846 393 393 400 465 525 525 (psi) (p
String Section	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2133,60 2438,40 2699,98 MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 125302 12502	0.00 0.00 0.00 Dogleg (°/100R) 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	0 0,0,0 0 0,0,0 Friction Force (lbf/t) 0,0 0 0,0,0 0 0,0,0,0 0 0,0,0,0,	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97,00 97,00 118,70 	7674,02           7967,42           7967,42           Internal           7843,33           7936,94           7937,06           8000,00           8571,42           9061,80           Pressure           Internal           3943,32           3936,84           3937,06           4000,00           4571,43           5061,80           Pressure           Internal	(psi) (psi) External 383 400 465 529 (psi) External 384 393 400 457 506 (psi) External (psi) External 293
String Section asing Load String Section asing Load String	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2133,60 2438,40 2699,98 mty - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2050,02 2050,02 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 12502 12502 122105 93105 68216 Axial Force (lbf) 69070 64313 64313 61116 32116 7226 QHole #1 - 7" F	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	0 0,0,0 0 0,0,0 Friction Force (lb/ft) 0 0,0,0 0 0,0,0,0 0 0,0,0,0 0 0,0,0,0,	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 98,23 109,21 118,70 	Pressure Internal Pressure 1114 7843,33 7936,94 7937,06 8000,00 8571,42 9061,80 Pressure 1114 3843,32 3936,94 3937,06 4000,00 4571,43 5061,80 Pressure 1114 Pressure 1114 Pressure	(psi) External (psi) External 393 303 400 465 529 External 384 393 393 400 (psi) External 394 395 395 395 405 (psi) External 394 395 395 395 395 395 395 395 395
String Section asing Load String Section asing Load String	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2133,60 2438,40 2699,98 ary - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98	32628 12051 2ement #1 - 7" Axial Force (lbf) 130060 125302 122105 93105 68216 411 - 7" Prod Axial Force (lbf) 69070 64313 64313 64313 64313 64313 61116 32116 7226 7226 226 7276 7359 70388	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	C Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,00 0 0,00 Friction Force (lbf/ft) 0 0,00 0 0,000 0 0,00000000	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97	7674,02           7967,42           7967,42           Internal           7843,33           7936,94           7937,06           8000,00           8571,42           9061,80           Pressure           Internal           3943,32           3936,94           3937,06           4000,00           4571,43           5061,80           Pressure           Internal           3943,32           3943,32           3936,94	(psi) (psi) External 383 393 400 465 525 (psi) External 384 393 393 400 465 525 (psi) External 384 393 393 400 457 506 (psi) External 384 393 393 400 457 506 384 393 393 400 457 506 384 393 393 400 457 506 507 506 507 506 507 506 507 506 507 506 507 506 506 507 507 506 507 506 507 507 506 507 507 507 507 507 507 507 507
String Section asing Load String Section asing Load String	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2133,60 2438,40 2699,98 mp (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 ary - OverPt MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 ary - Runnin MD (m) 2050,02 2099,98 2100,04	32628 12051 Cement #1 - 7" Axial Force (lbf) 130060 125302 125302 122105 93105 68216 93105 68216 212205 93105 68216 33105 68216 32116 7226 Axial Force (lbf) Axial Force (lbf) 7226 7226 7236 70389 70389	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0	0 0,00 0 0,00 Friction Force ((bf/ft) 0 0,00 0 0,000 0 0,00000000	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 7,00 97,	Pressure Internal Pressure Pressure Pressure Pressure Pressure Pressure Pressure Internal 3843,32 3936,84 3937,06 4000,00 4571,43 5061,80 Pressure Internal 3843,32 3936,84 3937,06	(psi) External 398 441 478 (psi) External 393 393 400 465 529 External 844 393 393 400 455 506 External 384 393 393 393 393 393 393 393
String Section asing Load String Section asing Load String	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	2133,60 2438,40 2699,98 ary - GreenC MD (m) 2050,02 2099,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98 2100,04 2133,60 2438,40 2699,98	32628 12051 2ement #1 - 7" Axial Force (lbf) 130060 125302 122105 93105 68216 411 - 7" Prod Axial Force (lbf) 69070 64313 64313 64313 64313 61116 32116 7226 7226 226 7276 7359 70398	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	C Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	0 0,0,0 0 0,0,0 Friction Force (lbf/t) 0 0,0,0 0 0,0,0,0 0 0,0,0,0 0 0,0,0,0,	109,21 118,70 Temperature (°F) 95,20 97,00 97,00 98,23 109,21 118,70 Temperature (°F) 95,20 97,00 97	7674,02           7967,42           7967,42           Internal           7843,33           7936,94           7937,06           8000,00           8571,42           9061,80           Pressure           Internal           3943,32           3936,94           3937,06           4000,00           4571,43           5061,80           Pressure           Internal           3943,32           3943,32           3936,94	(psi) (psi) External 383 393 400 465 525 (psi) External 384 393 393 400 465 525 (psi) External 384 393 393 400 457 506 (psi) External 384 393 393 400 457 506 384 393 393 400 457 506 384 393 393 400 457 506 507 506 507 506 507 506 507 506 507 506 507 506 506 507 507 506 507 506 507 507 506 507 507 507 507 507 507 507 507

String Section 1 1 1	MD							
1	(m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)	Friction Force (lbf/ft)	Temperature (°F)	Pressure (p Internal	External
1	2050,02	-60121	0,00	0,0	0,0	95,20	3,49	3843,3
1	2099,98	-64879	0,00	0,0	0,0	97,00	3,58	3936,9
1	2100,04 2133,60	-65723 -69503	0,00 0,00	0,0 0,0	0,0 0,0	97,00 98,23	3,58 3,64	3937,0 3984,7
i	2438,40	-103789	0,00	0,0	0,0	109,21	4,16	4417,4
1	2699,98	-131267	0,00	0,0	0,0	118,70	4,63	4788,7
asing Load Summa String	MD MD	Leak #1 - 7" Pr Axial Force	oduction Liner Dogleg	Torque	Friction Force	Temperature	Pressure (p	osi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
	2050,02 2099,98	10182 5425	0,00 0,00	0,0 0,0	0,0 0,0	95,20 97,00	3843,32 3936,94	3843,3
1	2100,04	5425	0,00	0,0	0,0	97,00	3937,06	3914,2 3937,0
1	2133,60	2517	0,00	0,0	0,0	98,23	4000,00	3984,7
1	2438,40	-21482	0,00	0,0	0,0	109,21	4571,42	4417,4
1	2699,98	-40131	0,00	0,0	0,0	118,70	5061,81	4788,7
afety Factor Summ	any Initial	Conditions 16	" Conductor Ca	eina				
String	MD	Yield Strength	VME Stress		Abs	olute Safety Factors	\$	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	382,04 421,97	40000,0 40000,0	586,2	N 68,232 91,171	N/A N/A	63,089 100+	100+ 12,524	M 91,96
<b></b>	421,97	40000,0	438,7	91,171	N/A	100+	12,524	M 45,63
Burst and Axial Flags Default = Pipe Body, L								
fety Factor Summ	arv - Press	ureTest #1 - 16	" Conductor Ca	Isina				
	MD	Yield Strength	VME Stress			olute Safety Factors	\$	
String			(psi)	Triaxial			-	
String Section	(m)	(psi)			Envelope	Burst	Collapse	Axial
	382,04	40000,0 40000,0	12772,2 12833,3	N 3,132	N/A N/A	2,858 2,849	Collapse 100+ 100+	Axial 13,96 14,82
Section 1 1 Burst and Axial Flags	382,04 421,97	40000,0 40000,0	12772,2 12833,3	N 3,132 N 3,117	N/A N/A	2,858 2,849	Collapse 100+ 100+	13,96 14,82
Section 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M =	382,04 421,97 - = Connection	40000,0 40000,0	12772,2 12833,3	N 3,132 N 3,117	N/A N/A	2,858 2,849	Collapse 100+ 100+	13,96 14,82
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags	382,04 421,97 - = Connection = Compression	40000,0 40000,0	12772,2 12833,3	N 3, 132 N 3, 117 Inection Fracture	N/A N/A	2,858 2,849 Jump-out, Y = Con	Collapse 100+ 100+	13,96 14,82
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall al Envelope Flags	382,04 421,97 - = Connection = Compression nd Positive Ber	40000,0 40000,0	12772,2 12833,3 ion Burst, F = Con ing, D = Outer wall	N 3, 132 N 3, 117 Inection Fracture	N/A N/A	2,858 2,849 Jump-out, Y = Con	Collapse 100+ 100+	13,96 14,82
Section 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall au Envelope Flags EB = Envelope Burst,	382,04 421,97 - = Connection = Compression nd Positive Ber EC = Envelope	40000,0 40000,0 I Leak, B = Connect I Inding OR No Bend	ion Burst, F = Con ing, D = Outer wall	N 3,132 N 3,117 Inection Fracture safety factor, N	N/A N/A =, J = Connection S = Negative Bendin	2,858 2,849 Jump-out, Y = Con	Collapse 100+ 100+	13,96 14,82
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall ar Envelope Flags EB = Envelope Burst, afety Factor Summ	382,04 421,97 - = Connection = Compression nd Positive Ber EC = Envelope	40000,0 40000,0 I Leak, B = Connect I Inding OR No Bend	ion Burst, F = Con ing, D = Outer wall	N 3,132 N 3,117 Inection Fracture safety factor, N	N/A N/A = Negative Bendin	2,858 2,849 Jump-out, Y = Con g	Collapse 100+ 100+ nection Yield, C = C	13,96 14,82
Section 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall au Envelope Flags EB = Envelope Burst,	382,04 421,97 - = Connection - Compression -	40000,0 40000,0 I Leak, B = Connect Inding OR No Bend e Collapse, N/A = n eturnsWithMudl Yield Strength ((psi)	12772,2 12833,3 ion Burst, F = Con ing, D = Outer wall b ISO Connection Drop #1 - 16'' C	N 3,132 N 3,117 Inection Fracture safety factor, N	N/A N/A = Negative Bendin	2,858 2,849 Jump-out, Y = Con	Collapse 100+ 100+ nection Yield, C = C	13,96 14,82 onnection
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall ar Envelope Flags EB = Envelope Burst, <u>String</u> Section 1	382,04 421,97 - = Connection - Compression nd Positive Ber EC = Envelope EC = Envelope (m) (m) 382,04	40000,0 40000,0 • Leak, B = Connect • • • • • • • • • • • • • • • • • • •	12772,2 12833,3 tion Burst, F = Con ing, D = Outer wall b ISO Connection <u>Drop #1 - 16" C</u> VME Stress (psi) 2865,4	N 3,132 N 3,117 Intection Fracture safety factor, N Conductor Cas Triaxial	sing Envelope NA	2,858 2,849 lump-out, Y = Con g olute Safety Factors Burst 100+	Collapse 100+ 100+ nection Yield, C = C Collapse 4,264	13,96 14,82 onnection Axial M 29,55
Section 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall an Envelope Flags EB = Envelope Burst, afety Factor Summ String	382,04 421,97 - = Connection - Compression -	40000,0 40000,0 I Leak, B = Connect Inding OR No Bend e Collapse, N/A = n eturnsWithMudl Yield Strength ((psi)	12772,2 12833,3 ilon Burst, F = Con ing, D = Outer wall b ISO Connection Drop #1 - 16" C VME Stress (psi)	N 3,132 N 3,117 Inection Fracture safety factor, N Conductor Cas	N/A N/A P, J = Connection . = Negative Bendin sing <u>Abs</u> Envelope	2,859 2,849 Jump-out, Y = Con g g <u>olute Safety Factors</u> Burst	Collapse 100+ 100+ nection Yield, C = C S Collapse	13,94 14,82 onnection
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall au Envelope Flags EB = Envelope Burst, <u>String</u> String Section 1	382,04 421,97 - = Connection - Compression -	40000,0 40000,0 • Leak, B = Connect • • • • • • • • • • • • • • • • • • •	12772,2 12833,3 tion Burst, F = Con ing, D = Outer wall b ISO Connection <u>Drop #1 - 16" C</u> VME Stress (psi) 2865,4	N 3,132 N 3,117 Intection Fracture safety factor, N Conductor Cas Triaxial	sing Envelope NA	2,858 2,849 lump-out, Y = Con g olute Safety Factors Burst 100+	Collapse 100+ 100+ nection Yield, C = C Collapse 4,264	13,9( 14,8) onnection Axial M 29,5(
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall ar Envelope Flags EB = Envelope Burst, String String Section 1 1	382,04 421,97 - = Connection - Compression -	40000,0 40000,0 Leak, B = Connect Inding OR No Bend Collapse, N/A = n eturnsWithMudl Yield Strength (psi) 40000,0 40000,0	12772,2 12833,3 tion Burst, F = Con ing, D = Outer wall b ISO Connection Drop #1 - 16" C VME Stress (psi) 2865,4 2771,8	N 3,132 N 3,117 Inection Fracture safety factor, N <u>Conductor Cas</u> Triaxial 13,960 14,431	N/A N/A e, J = Connection = Negative Bendin sing Envelope N/A N/A	2,858 2,849 Iump-out, Y = Con g g <u>olute Safety Factors</u> Burst 100+ 100+	Collapse 100+ 100+ nection Yield, C = C S Collapse 4,264 4,263	13,9( 14,8) onnection Axial M 29,5( M 26,9(
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall at Envelope Flags EB = Envelope Burst, String Section 1 Burst and Axial Flags Default = Pipe Body, L	382,04 421,97 - = Connection - Compression -	40000,0 40000,0 Leak, B = Connect Inding OR No Bend Collapse, N/A = n eturnsWithMudl Yield Strength (psi) 40000,0 40000,0	12772,2 12833,3 tion Burst, F = Con ing, D = Outer wall b ISO Connection Drop #1 - 16" C VME Stress (psi) 2865,4 2771,8	N 3,132 N 3,117 Inection Fracture safety factor, N <u>Conductor Cas</u> Triaxial 13,960 14,431	N/A N/A e, J = Connection = Negative Bendin sing Envelope N/A N/A	2,858 2,849 Iump-out, Y = Con g g <u>olute Safety Factors</u> Burst 100+ 100+	Collapse 100+ 100+ nection Yield, C = C S Collapse 4,264 4,263	13,9 14,8 onnection Axial M 29,5 M 26,9
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall at Envelope Flags EB = Envelope Burst, 3 afety Factor Summ String Section 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags	382,04 421,97 - = Connection - Compression - Compression - Compression - Compression - Compression - Connection - Connection	40000,0 40000,0 1 Leak, B = Connect nding OR No Bend 2 Collapse, N/A = n eturnsWithMudl (psi) 40000,0 40000,0	12772,2 12833,3 tion Burst, F = Con ing, D = Outer wall b ISO Connection Drop #1 - 16" C VME Stress (psi) 2865,4 2771,8	N 3,132 N 3,117 Inection Fracture safety factor, N <u>Conductor Cas</u> Triaxial 13,960 14,431	N/A N/A e, J = Connection = Negative Bendin sing Envelope N/A N/A	2,858 2,849 Iump-out, Y = Con g g <u>olute Safety Factors</u> Burst 100+ 100+	Collapse 100+ 100+ nection Yield, C = C S Collapse 4,264 4,263	13,9 14,8 onnection Axial M 29,5/ M 26,9
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall at Envelope Flags EB = Envelope Burst, String Section 1 Burst and Axial Flags Default = Pipe Body, L	382,04 421,97 - = Connection - Compression - Compression - Compression - Compression - Compression - Connection - Connection	40000,0 40000,0 1 Leak, B = Connect nding OR No Bend 2 Collapse, N/A = n eturnsWithMudl (psi) 40000,0 40000,0	12772,2 12833,3 tion Burst, F = Con ing, D = Outer wall b ISO Connection Drop #1 - 16" C VME Stress (psi) 2865,4 2771,8	N 3,132 N 3,117 Inection Fracture safety factor, N <u>Conductor Cas</u> Triaxial 13,960 14,431	N/A N/A e, J = Connection = Negative Bendin sing Envelope N/A N/A	2,858 2,849 Iump-out, Y = Con g g <u>olute Safety Factors</u> Burst 100+ 100+	Collapse 100+ 100+ nection Yield, C = C S Collapse 4,264 4,263	13,9 14,8 onnection Axial M 29,5/ M 26,9
Section 1 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall at Envelope Flags EB = Envelope Burst, 3 afety Factor Summ String Section 1 Burst and Axial Flags Default = Pipe Body, L Axial Flags	382,04 421,97 = Connection = Compression nd Positive Bet EC = Envelope tary - LostR MD (m) 382,04 421,97 = Connection	40000,0 40000,0 1 Leak, B = Connect nding OR No Bend e Collapse, N/A = n eturnsWithMudi Yield Strength (psi) 40000,0 40000,0	12772,2 12833,3 ion Burst, F = Con ing, D = Outer wall b ISO Connection Drop #1 - 16" C VME Stress (psi) 2865,4 2771,8 ion Burst, F = Con	N 3,132 N 3,117 Inection Fracture safety factor, N Conductor Case Triaxial 13,960 14,431	N/A N/A P, J = Connection = Negative Bendin sing Abs Envelope N/A N/A N/A	2,858 2,849 Jump-out, Y = Con g g burst 100+ 100+ 100+ Jump-out, Y = Con	Collapse 100+ 100+ nection Yield, C = C S Collapse 4,264 4,263	13,9 14,8 onnection Axial M 29,5 M 26,9

	File: Slend	er Exploration Wel	Vell Design, v0			Date/Time: March	h 01, 2018 C	3:03:21 PM Pa	age: 10 of 22
Section         (m)         (psi)         Triaxial         Envelope         Burst         Collapse         Axial           1         1         382,04         40000,0         1487,2         D 26,895         N/A         100+         23,081         44,41           2         1         421,97         40000,0         1487,2         D 26,895         N/A         100+         23,081         44,41           3         421,97         40000,0         1085,8         D 36,839         N/A         100+         20,897         91,21           3         5         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection         6           6         7         Axial Flags         5         Default = Tension, M = Compression         9	Safety Fa	ctor Summary - O	OverPull #1 - 16" Co	nductor Casing					
1       1       382,04       40000,0       1487,2       D 26,895       N/A       100+       23,081       44,41         2       1       421,97       40000,0       1085,8       D 36,839       N/A       100+       23,081       44,41         2       1       421,97       40000,0       1085,8       D 36,839       N/A       100+       20,897       91,21         4       Burst and Axial Flags       5       Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection       6         7       Axial Flags       9       Default = Tension, M = Compression       9       9	Stri	ng MD	Yield Strength	VME Stress		Absolut	e Safety Factors	\$	
2     1     421,97     40000,0     1085,8     D 36,839     N/A     100+     20,897     91,21       3     4     Burst and Axial Flags     D     Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection       7     Axial Flags       8     Default = Tension, M = Compression	Sec								
3       3         4       Burst and Axial Flags         5       Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection         6       Axial Flags         8       Default = Tension, M = Compression         9       9	1	1 38		1487,2				23,081	44,409
<ul> <li>Burst and Axial Flags</li> <li>Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection</li> <li>Axial Flags</li> <li>Default = Tension, M = Compression</li> <li>9</li> </ul>	2	1 42	421,97 40000,0	1085,8	D 36,839	N/A	100+	20,897	91,259
<ul> <li>Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection</li> <li>Axial Flags</li> <li>Befault = Tension, M = Compression</li> </ul>	-								
6 7 Axial Flags 8 Default = Tension, M = Compression 9									
7 Axial Flags 8 Default = Tension, M = Compression 9	5 Default =	Pipe Body, L = Conne	nnection Leak, B = Connec	tion Burst, F = Conn	ection Fracture	e, J = Connection Jum	ip-out, Y = Coni	nection Yield, C = (	Connection
8 Default = Tension, M = Compression 9									
9									
		Tension, IVI = Compre	pression						
10 Inaxia Flags									
						- Norretine Donations			
11 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 12		inner wan and Positiv	silive bending OR No Bend	ing, D = Outer wall s	arety factor, N	= Negative Bending			
		Flores							
13 Envelope Flags 14 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection			Envolono Collonoo N(A = n	a ISO Connection					
<b>14</b> ED - Envelope Burst, EC - Envelope Contapse, N/A - No 150 Contraction	14 CD - CIIV	elope Buist, EC - Eliv	Envelope Collapse, N/A - II	0 150 Connection					
Safety Factor Summary - RunningHole #1 - 16" Conductor Casing									

String	MD	Yield Strength	VME Stress			olute Safety Factor		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	382,04	40000,0	3687,7	D 10,847	N/A	100+	23,064	12,904
1	421,97	40000,0	3347,5	D 11,949	N/A	100+	20,885	14,822
Burst and Axial Flag	15							
Default = Pipe Body	, L = Connection	n Leak, B = Connec	tion Burst, F = Cor	nnection Fracture	, J = Connection J	lump-out, Y = Cor	nnection Yield, C =	Connection
Axial Flags								
Default = Tension, N	/I = Compression	ו						
Triaxial Flags	and Desitive De				- Nonotice Dondin	-		
Default = Inner Wall	and Positive Be	naing OR No Bend	ing, D = Outer wan	salety factor, N	= Negauve Bendin	g		
3 Envelope Flags								
	t. EC = Envelop	e Collapse. N/A = r	o ISO Connection					
EB = Envelope Burs	t, EC = Envelop	e Collapse, N/A = r	o ISO Connection					
	t, EC = Envelop	e Collapse, N/A = r	o ISO Connection					
EB = Envelope Burs								
EB = Envelope Burs Safety Factor Sum	mary - Initial	Conditions - 13	3 3/8" Surface C	Casing				
4 EB = Envelope Burs Safety Factor Sum String	mary - Initial MD	Conditions - 13 Yield Strength	3 3/8" Surface C VME Stress			olute Safety Factor		
EB = Envelope Burs Safety Factor Sum	<u>mary - Initial</u> MD (m)	Conditions - 13 Yield Strength (psi)	3 3/8'' Surface C VME Stress (psi)	Triaxial	Envelope	Burst	Collapse	Axial
4 EB = Envelope Burs Safety Factor Sum String	<u>marγ - Initial</u> MD (m) 382,04	Conditions - 13 Yield Strength (psi) 55000,0	3 3/8'' Surface C VME Stress	Triaxial D 29,867	Envelope N/A	Burst 100+	Collapse 33,887	43,840
4 EB = Envelope Burs Safety Factor Sum String	<u>mary - Initial</u> MD (m) 382,04 421,97	Conditions - 13 Yield Strength (psi) 55000,0 55000,0	3 3/8" Surface C VME Stress	Triaxial D 29,867 31,592	Envelope N/A N/A	Burst 100+ 100+	Collapse 33,887 18,637	43,840 69,224
4 EB = Envelope Burs Safety Factor Sum String	<u>mary - Initial</u> MD (m) 382,04 421,97 422,03	Conditions - 13 Yield Strength (psi) 55000,0 55000,0 55000,0	3 3/8" Surface C VME Stress (psi) 1841,5 1740,9 1740,9	Triaxial D 29,867 31,592 31,593	Envelope N/A N/A N/A	Burst 100+ 100+ 100+	Collapse 33,887 18,637 18,624	43,840 69,224 69,285
4 EB = Envelope Burs Safety Factor Sum String	mary - Initial MD (m) 382.04 421,97 422.03 609,60	Conditions - 13 Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0	3 3/8" Surface C VME Stress	Triaxial D 29,867 31,592 31,593 21,064	Envelope N/A N/A N/A N/A	Burst 100+ 100+ 100+ 100+	Collapse 33,887 18,637 18,624 5,987	43,840 69,22 69,285 M 40,240
4 EB = Envelope Burs Safety Factor Sum String	<u>mary - Initial</u> MD (m) 382,04 421,97 422,03	Conditions - 13 Yield Strength (psi) 55000,0 55000,0 55000,0	3 3/8" Surface C VME Stress (psi) 1841,5 1740,9 1740,9	Triaxial D 29,867 31,592 31,593	Envelope N/A N/A N/A	Burst 100+ 100+ 100+	Collapse 33,887 18,637 18,624	Axial 43,840 69,224 69,284 M 40,240 M 11,276

2	1 421,9	7 55000,0	1740,9	31,592	N/A	100+	18,637	69
3	1 422,03	55000,0	1740,9	31,593	N/A	100+	18,624	69
4	1 609,60	55000,0	2611,0	21,064	N/A	100+	5,987	M 40
5	1 914,40	55000,0	6837,4	8,044	N/A	100+	2,450	M 11
6	1 949,9	7 55000,0	7577,0	7,259	N/A	100+	2,235	M 10
7								
8	Burst and Axial Flags							
9	Default = Pipe Body, L = Connection	on Leak, B = Conne	ction Burst, F = C	onnection Fractur	re, J = Connection	Jump-out, Y = Co	nnection Yield, C	= Connection
10								
11	Axial Flags							
12	Default = Tension, M = Compression	on						
13								
14	Triavial Flags							

 14
 Triaxial Flags

 15
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 16
 17

 17
 Envelope Flags

 18
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Conventional Well Design

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	der Explorat		<b>U</b> /			Date/Time: Mar	ch 01, 2018 03	3:03:22 PM - Pa	age: 11 of 2
				13 3/8" Surface	Casing				
	tring	MD	Yield Strength	VME Stress			ute Safety Factors		
Se	ction	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	382,04	55000,0	6379,7	8,621	N/A	7,662	100+	18,46
	1	421,97	55000,0	6008,7	9,153	N/A	8,130	100+	21,50
	1	422,03	55000,0	6466,0	8,506	N/A	7,555	100+	20,39
	1	609,60	55000,0	4680,0	11,752	N/A	10,618	100+	85,05
	1	914,40	55000,0	2405,8	22,862	N/A	31,133	100+	M 23,48
	1	949,97	55000,0	2228,6	24,679	N/A	40,193	76,604	M 20,97
	nd Axial Flags			ction Burst, F = Con					
) Axial Fla	ags = Tension, M =		,	,	,			,	
Envelop	e Flags		-	ding, D = Outer wall	safety factor, N =	Negative Bending			
Safety Fa	actor Summ	ary - Press	ureTest #1 - 13	3 3/8" Surface C	asing				
St	tring	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
Se	ction	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	382,04	55000,0	36426,0	1,510	N/A	1,367	100+	5,03
	1	421,97	55000,0	36564,0	1,504	N/A	1,364	100+	5,18
	1	422,03	55000.0	37038,0	1,485	N/A	1.347	100+	5,11
	1	609,60	55000,0	37564,8	1,464	N/A	1,338	100+	5,93
	i	914,40	55000,0	38408,2	1,432	N/A	1,324	100+	7,62
	1	949,97	55000,0	38492,1	1,429	N/A	1,322	100+	7,8
		,	,-	,.	.,		.,		.,-
Burst ar	nd Axial Flags								
		= Connectior	Leak, B = Connec	ction Burst, F = Con	nection Fracture.	J = Connection Ju	mp-out. Y = Conn	ection Yield. C = 0	Connection
Axial Fla	ags = Tension, M =								
Default		nd Positive Be	nding OR No Bend	ding, D = Outer wall	safety factor, N =	Negative Bending			
Envelop	e Flags								
		EC = Envelope	e Collapse, N/A = n	no ISO Connection					
	actor Summ	arv - LostR	eturnsWithMud	IDrop #1 - 13 3/	8" Surface Ca	sina			
Safety Fa				VME Stress			ute Safety Factors		
	rina		Yield Strength						
St	tring	MD	Yield Strength		Triavial			Collapse	Avial
St	tring ction 1	MD (m)	(psi)	(psi)	Triaxial 4 833	Envelope	Burst	Collapse	Axial M 34 8
St		MD (m) 382,04	(psi) 55000,0	(psi) 11380,0	4,833	Envelope N/A	Burst 100+	1,930	M 34,8
St		MD (m) 382,04 421,97	(psi) 55000,0 55000,0	(psi) 11380,0 12397,9	4,833 4,436	Envelope N/A N/A	Burst 100+ 100+	1,930 1,747	M 34,8 M 25,0
St		MD (m) 382,04 421,97 422,03	(psi) 55000,0 55000,0 55000,0	(psi) 11380,0 12397,9 11842,9	4,833 4,436 4,644	Envelope N/A N/A N/A	Burst 100+ 100+ 100+	1,930 1,747 1,833	M 34,8 M 25,0 M 27,0
St		MD (m) 382,04 421,97 422,03 592,01	(psi) 55000,0 55000,0 55000,0 55000,0	(psi) 11380,0 12397,9 11842,9 15150,3	4,833 4,436 4,644 3,630	Envelope N/A N/A N/A N/A	Burst 100+ 100+ 100+ 100+	1,930 1,747 1,833 1,381	M 34,88 M 25,03 M 27,04 M 12,68
St		MD (m) 382,04 421,97 422,03 592,01 609,60	(psi) 55000,0 55000,0 55000,0 55000,0 55000,0	(psi) 11380,0 12397,9 11842,9 15150,3 14979,3	4,833 4,436 4,644 3,630 3,672	Envelope N/A N/A N/A N/A N/A	Burst 100+ 100+ 100+ 100+ 100+	1,930 1,747 1,833 1,381 1,390	M 34,88 M 25,03 M 27,04 M 12,68 M 12,28
St		MD (m) 382,04 421,97 422,03 592,01	(psi) 55000,0 55000,0 55000,0 55000,0	(psi) 11380,0 12397,9 11842,9 15150,3	4,833 4,436 4,644 3,630	Envelope N/A N/A N/A N/A	Burst 100+ 100+ 100+ 100+ 100+	1,930 1,747 1,833 1,381	M 34,8 M 25,0 M 27,0 M 27,0

 7
 1
 949,97
 55000,0
 12027,8
 4,573
 N/A
 100+
 1,594
 M 8,8

 8
 9
 Burst and Axial Flags
 10
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 10
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 11
 Axial Flags
 1

 12
 Axial Flags
 1

 13
 Default = Tension, M = Compression
 1

 14
 15
 Triaxial Flags
 1

 15
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
 1

 17
 18
 Envelope Flags
 1

 19
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

#### File: Slender Exploration Well Design, v0 Date/Time: March 01, 2018 03:03:22 PM Page: 12 of 22 Safety Factor Summary - GreenCement #1 - 13 3/8" Surface Casing String MD Yield Strength VME Stress Absolute Safety Factors Burst (m) 382,04 101,97 (psi) 55000,0 (psi) 35730,1 Section Triaxial Envelope Collapse Axia xial 1,539 1,558 1,558 1,650 N 1,898 N 1,948 1,367 1,384 1,384 1,467 1,690 1,734 3,169 3,255 3,255 3,732 4,897 N/A 100+ 35730,1 35307,9 35307,3 33334,8 28974,8 28235,5 421,97 422,03 609,60 914,40 949,97 55000,0 55000,0 55000,0 55000,0 N/A N/A N/A N/A 100+ 100+ 100+ 100+ 100+ 2 3 4 5 6 7 8 9 10 11 12 55000,0 N/A 5,085 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection Axial Flags Default = Tension, M = Compression 13 13 14 Triaxial Flags 15 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 16 16 17 Envelope Flags 18 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection Safety Factor Summary - OverPull #1 - 13 3/8" Surface Casing

	String	ND	riela Strength	VIVIE Stress		Ab	solute Safety Fact	ors	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	382,04	55000,0	8897,2	D 6,182	N/A	100+	33,434	6,621
2	1	421,97	55000,0	8498,2	D 6,472	N/A	100+	30,305	7,010
3	1	422,03	55000,0	8497,6	D 6,472	N/A	100+	30,301	7,010
4	1	609,60	55000,0	6623,4	D 8,304	N/A	100+	21,082	9,675
5	1	914,40	55000,0	3577,9	D 15,372	N/A	100+	14,146	25,299
3	1	949,97	55000,0	3222,5	D 17,068	N/A	100+	13,625	31,174
7									

Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

Axial Flags Default = Tension, M = Compression 11 12 13

 13
 Triaxial Flags

 15
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall

 16
 17

 17
 Envelope Flags

 18
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

 Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

10

Sa	fety Factor Summ	narγ - Runni	ingHole #1 - 13	3/8" Surface C	asing				
	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	382,04	55000,0	8961,0	D 6,138	N/A	100+	33,428	6,571
2	1	421,97	55000,0	8623,2	D 6,378	N/A	100+	30,296	6,900
3	1	422,03	55000,0	8622,7	D 6,379	N/A	100+	30,291	6,900
4	1	609,60	55000,0	7036,3	D 7,817	N/A	100+	21,064	9,020
5	1	914,40	55000,0	4458,3	D 12,337	N/A	100+	14,126	18,010
6	1	949,97	55000,0	4157,4	D 13,229	N/A	100+	13,605	20,380
7									
8	Burst and Axial Flags	;							
9	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Cor	nnection Fracture	, J = Connection Ju	imp-out, Y = Con	nection Yield, C =	Connection
10									
11	Axial Flags								
12	Default = Tension, M	= Compression	า						
13									
14	Triaxial Flags								
15	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N	= Negative Bending			

 16

 17
 Envelope Flags

 18
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	ety Factor Summ String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	382,04	65000,0	16444,3	D 3,953	N/A	100+	43,951	4,13
	1	609,60	65000,0	14263,5	D 4,557	N/A	100+	27,847	4,95
	1	914,40	65000,0	11342,7	D 5,731	N/A	100+	18,799	6,75
	1	949,97	65000,0	11001,8	D 5,908	N/A	100+	18,119	7,05
	1	950,03	65000,0	11001,2	D 5,908	N/A	100+	18,118	7,054
	1	1199,97	65000,0	8606,1	D 7,553	N/A	100+	14,535	10,23
	2	1200,03	75000,0	7262,2	D 10,327	N/A	100+	20,536	14,97
	2	1219,20	75000,0	7080,4	D 10,593	N/A	100+	20,230	15,65
	2	1499,98	74835,3	4416,9	D 16,943	N/A	100+	16,616	46,66
5	2	1500,04	74835,2	4416,3	D 16,945	N/A	100+	16,615	46,68
1	2 2 2 2	1524,00	74815,4	4226,7	17,700	N/A	100+	16,017	56,210
2	2	1828,80	74565,4	2014,5	37,014	N/A	100+	10,943	M 35,01
3		1949,99	74467,4	1480,0	50,317	N/A	100+	9,706	M 21,24
4	2	2099,98	74345,5	2512,5	29,590	N/A	100+	7,362	M 14,27
5									
	urst and Axial Flags efault = Pipe Body, L			tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	onnection
	xial Flags efault = Tension, M =	Compression							
A	efault = Tension, M =	Compression							
B A D D 2 T				ling, D = Outer wall	safety factor, N =	Negative Bending			
18									

Safety Factor Summary - DisplaceToGas #1 - 9 5/8" Production Casing

	String	MD	Yield Strength	VME Stress			ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	382,04	65000,0	23825,7	2,728	N/A	2,405	100+	3,21
2	1	609,60	65000,0	20955,3	3,102	N/A	2,757	100+	3,69
3	1	914,40		17124,0	3,796	N/A	3,432	100+	4,60
4	1	949,97	65000,0	16678,3	3,897	N/A	3,533	100+	4,74
5	1	950,03	65000,0	16677,5	3,897	N/A	3,533	100+	4,74
3	1	1199,97	65000,0	13558,3	4,794	N/A	4,452	100+	5,99
7	2	1200,03	75000,0	12237,4	6,129	N/A	6,139	100+	8,62
3	2	1219,20	75000,0	12002,0	6,249	N/A	6,264	100+	8,84
9	2	1499,98	74833,7	8559,3	8,743	N/A	8,907	100+	14,13
10	2	1500,04	74833,7	4476,6	16,717	N/A	30,271	54,155	34,91
11	2	1524,00	74814,1	4216,8	17,742	N/A	34,520	41,100	40,83
12	2	1828,80	74565,7	2422,0	30,787	N/A	100+	10,133	M 34,51
13	2	2099,98	74344,7	4691,5	15,847	N/A	100+	6,054	M 13,65
14									
	Burst and Axial Flags								
	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Cor	nnection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
17									
	Axial Flags								
	Default = Tension, M	= Compression	1 <u> </u>						
20									
	Triaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N =	Negative Bending			
23									
24	Envelope Flags EB = Envelope Burst.								

Conventional Well Design

#### File: Slender Exploration Well Design, v0 Safety Factor Summary - PressureTest #

Date/Time: March 01, 2018 03:03:23 PM Page: 14 of 22

LIE	. Sienuer Explora	tion well be	sign, vu			Date/Time. Ma		J3.03.23 FIVE F	aye. 14 01 22
Sa	afety Factor Sumn	nary - Press	ureTest #1 - 9	5/8" Productio	n Casing				
	String	MD	Yield Strength	VME Stress		Abso	olute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	382,04	65000,0	42963,5	1,513	N/A	1,214	100+	2,371
2	1	609,60	65000,0	41685,2	1,559	N/A	1,245	100+	2,620
3	1	914,40	65000,0	40060,7	1,623	N/A	1,287	100+	3,050
4	1	949,97	65000,0	39878,2	1,630	N/A	1,293	100+	3,109
5	1	950,03	65000,0	39877,9	1,630	N/A	1,293	100+	3,109
6	1	1199,97	65000,0	38640,4	1,682	N/A	1,330	100+	3,602
7	2	1200,03	75000,0	37021,1	2,026	N/A	1,834	100+	5,234
8	2	1219,20	75000,0	36943,6	2,030	N/A	1,838	100+	5,315
9	2	1499,98	74835,3	35904,3	N 2,084	N/A	1,896	100+	6,663
10	2	1500,04	74835,2	35923,7	2,083	N/A	1,896	100+	7,155
11	2	1524,00	74815,4	35959,5	2,081	N/A	1,895	100+	7,324
12	2	1828,80	74565,4	36522,4	2,042	N/A	1,881	100+	10,465
13	2	2099,98	74345,5	37118,9	N 2,003	N/A	1,869	100+	16,000
14									
15	Burst and Axial Flags								

Burst and Axial Flags
Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection
Axial Flags
Default = Tension, M = Compression
Triaxial Flags
Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
Envelope Flags
Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	382,04	65000,0	46982,6	1,383	N/A	1,167	100+	1,75
	1	609,60	65000,0	46264,4	1,405	N/A	1,167	100+	1,88
	1	914,40	65000,0	45448,9	1,430	N/A	1,167	100+	2,09
	1	949,97	65000,0	45365,1	1,433	N/A	1,167	100+	2,12
	1	950,03	65000,0	45364,9	1,433	N/A	1,167	100+	2,12
	1	1199,97	65000,0	44844,3	1,449	N/A	1,167	100+	2,34
	2	1200,03	75000,0	42399,2	1,769	N/A	1,609	100+	3,34
	2	1219,20	75000,0	42380,9	1,770	N/A	1,609	100+	3,37
	2	1499,98	74835,3	42201,9	1,773	N/A	1,606	100+	3,93
D	2	1500,04	74835,2	42201,8	1,773	N/A	1,606	100+	3,93
1	2	1524,00	74815,4	42130,9	1,776	N/A	1,608	100+	3,98
2	2	1828,80	74565,4	41303,2	1,805	N/A	1,634	100+	4,87
3	2	2099,98	74345,5	39762,4	1,870	N/A	1,696	100+	6,08
1									
5	Burst and Axial Flags								
5 6	Burst and Axial Flags Default = Pipe Body, I		Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
5 6 7			Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
5 6 7 8	Default = Pipe Body, I Axial Flags	L = Connectior		tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
5 6 7 8 9	Default = Pipe Body, I	L = Connectior		tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
5 6 7 8 9	Default = Pipe Body, I Axial Flags Default = Tension, M	L = Connectior		tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
5 7 3 9 )	Default = Pipe Body,   Axial Flags Default = Tension, M Triaxial Flags	L = Connectior = Compressior	1				· ·	nection Yield, C = (	Connection
6 7 8 9 0	Default = Pipe Body, I Axial Flags Default = Tension, M	L = Connectior = Compressior	1				· ·	nection Yield, C = C	Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	;	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	382,04	65000,0	22320,1	D 2,912	N/A	100+	42,621	3,01
	1	609,60	65000,0	20139,4	D 3,228	N/A	100+	27,108	3,42
	1	914,40	65000,0	17218,5	D 3,775	N/A	100+	18,381	4,19
	1	949,97	65000,0	16877,7	D 3,851	N/A	100+	17,724	4,30
	1	950,03	65000,0	16877,1	D 3,851	N/A	100+	17,723	4,30
	1	1199,97	65000,0	14482,0	D 4,488	N/A	100+	14,195	5,31
	2	1200,03	75000,0	12220,8	D 6,137	N/A	100+	20,115	7,52
	2	1219,20	75000,0	12039,0	D 6,230	N/A	100+	19,818	7,69
1	2	1499,98	74835,3	9375,5	D 7,982	N/A	100+	16,310	11,40
0	2	1500,04	74835,2	9374,9	D 7,982	N/A	100+	16,309	11,41
1	2 2	1524,00	74815,4	9147,5	D 8,179	N/A	100+	16,068	11,90
2		1828,80	74565,4	6256,1	D 11,919	N/A	100+	13,545	26,38
3	2	2099,98	74345,5	3683,3	D 20,184	N/A	100+	11,895	100
4									
5	Burst and Axial Flags								
6	Default = Pipe Body,		Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
6 7	Default = Pipe Body,		Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
6  7  8	Default = Pipe Body,   Axial Flags	L = Connectior	·	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
6  7  8  9	Default = Pipe Body,	L = Connectior	·	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
6 7 8 9	Default = Pipe Body, Axial Flags Default = Tension, M	L = Connectior	·	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
6 7 8 9 20	Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags	L = Connectior = Compressior	1				· ·	nection Yield, C = C	Connection
6 7 8 9 20 21	Default = Pipe Body, Axial Flags Default = Tension, M	L = Connectior = Compressior	1				· ·	nection Yield, C = C	Connection
6 7 9 0 1 2 3	Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a	L = Connectior = Compressior	1				· ·	nection Yield, C = C	Connection
6 7 8 9 0 1 2 3 4	Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags	L = Connectior = Compressior nd Positive Be	nding OR No Bend	ing, D = Outer wall			· ·	nection Yield, C = C	Connection
6 7 8 9 0 1 2 3 4	Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a	L = Connectior = Compressior nd Positive Be	nding OR No Bend	ing, D = Outer wall			· ·	nection Yield, C = C	Connection

	String	MD	Yield Strength	VME Stress		Abso	olute Safety Factor:	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	382,04	65000,0	21371,6	D 3,041	N/A	100+	42,860	3,14
2	1	609,60	65000,0	19617,5	D 3,313	N/A	100+	27,182	3,52
3	1	914,40	65000,0	17268,1	D 3,764	N/A	100+	18,377	4,18
	1	949,97	65000,0	16993,9	D 3,825	N/A	100+	17,715	4,27
	1	950,03	65000,0	16993,4	D 3,825	N/A	100+	17,714	4,27
	1	1199,97	65000,0	15066,9	D 4,314	N/A	100+	14,163	5,07
	2	1200,03	75000,0	13487,2	D 5,561	N/A	100+	19,998	6,67
3	2	1219,20	75000,0	13341,3	D 5,622	N/A	100+	19,700	6,78
	2	1499,98	74835,3	11204,2	D 6,679	N/A	100+	16,186	8,92
0	2	1500,04	74835,2	11203,7	D 6,680	N/A	100+	16,185	8,92
1	2	1524,00	74815,4	11021,3	D 6,788	N/A	100+	15,944	9,16
2	2	1828,80	74565,4	8701,2	D 8,570	N/A	100+	13,421	14,15
3	2	2099,98	74345,5	6637,2	D 11,201	N/A	100+	11,784	27,54
4									
15	Burst and Axial Flags								
6	Default = Pipe Body,	= Connection	n Leak, B = Connec	tion Burst, F = Cor	nnection Fracture,	J = Connection J	ump-out, Y = Con	nection Yield, C =	Connection
17									
8	Axial Flags								
9	Default = Tension, M	= Compression	า						
20		-							

20 21 Triaxial Flags 22 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 23 24 Envelope Flags 25 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Conventional Well Design

#### File: Slender Exploration Well Design, v0 Date/Time: March 01, 2018 03:03:24 PM Page: 16 of 22 Safety Factor Summary - LostReturns #1 - 9 5/8" Production Casing Absolute Safety Factors Burst (m) 382,04 (psi) 65000,0 Section (psi) 16401,1 Triaxial Envelope Collapse Axia 3,963 4,518 5,517 5,658 5,658 6,834 9,176 9,325 N/A 8,724 100+ 3,726 382,04 609,60 914,40 949,97 950,03 1199,97 1200,03 1219,20 65000,0 65000,0 65000,0 65000,0 65000,0 75000,0 75000,0 74835,3 4,380 5,727 5,940 5,941 8,045 8,724 8,724 8,724 8,724 8,724 8,724 12,029 12,029 12,002 14387,0 11782,7 11488,7 11488,2 N/A N/A 100+ 100+ 100+ 100+ 100+ 100+ 100+ N/A N/A N/A N/A N/A 9511,0 8173,8 11,750 12,164 25,133 9,325 11,652 11,630 11,643 10,325 8043,2 6422,6 6434,6 6426,0 7221,6 100+ 100+ 2 N/A 1499 98 1499,98 1500,04 1524,00 1828,80 74835,2 74835,2 74815,4 74565,4 N/A N/A N/A 12,002 12,002 11,759 9,346 100+ 100+ 100+ 100+ 100+ 26,863 M 100+ 222 2 2099,98 74345,5 8913,2 N 8,341 N/A 7,895 M 34,287 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection Axial Flags Default = Tension, M = Compression Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection Safety Factor Summary - TubingLeak #1 - 9 5/8" Production Casing String MD Yield Strength VME Stress String Section Absolute Safety Factors Collapse 43,772 (psi) 17381,2 Triaxial Envelope Axia (m) (psi) 65000,0 Burst D 3,740 100+ 382.04 N/A 3,903 4,456 5,874 6,085 6,085 7,865 10,726 3,903 4,627 6,156 6,403 6,403 8,917 12,932 609,60 914,40 949,97 14587,2 11066,5 10682,5 45,072 19,268 18,062 65000,0 65000,0 N/A N/A 100+ 100+ 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 100+ 100+ 100+ 100+ 65000.0 N/A 950,03 1199,97 1200,03 65000,0 65000,0 75000,0 10682,3 10681,8 8264,7 6992,4 N/A N/A N/A 18,060 12,541 17,290 2 1200,03 1219,20 1499,98 1500,04 1524,00 1676,40 1828,80 75000,0 75000,0 74833,7 74833,7 74814,1 74689,9 74565,7 10,728 10,945 12,982 D 17,000 17,953 26,901 38,412 6852,7 5764,4 4402,0 4167,3 2776,4 1941,2 100+ 100+ 16,617 17,028 20,192 24,643 13,436 31,257 47,098 2 N/A N/A N/A N/A N/A 16,895 12,624

Conventional Well Design

2222

2

Axial Flags Default = Tension, M = Compression

2099,98

Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

74344,7

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

3159,3

N 23,532

Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

54,440 100+ M 53,810 M 20,797

40,605

100+ 100+ 79,854 42,769

23,369

N/A

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	;	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	2050,02	74386,1	5017,2	D 14,826	N/A	100+	14,861	63,40
	1	2099,98	74345,5	4547,8	D 16,347	N/A	100+	14,541	100
	1	2100,04	74345,5	4548,0	D 16,347	N/A	100+	14,540	100
.	1	2133,60	74317,7	4277,6	17,374	N/A	100+	14,074	M 100
	1	2438,40	74070,0	1976,5	37,475	N/A	100+	10,777	M 23,16
:	1	2549,99	73979,9	1379,5	53,627	N/A	100+	9,920	M 16,61
·	1	2699,98	73855,8	2131,8	34,644	N/A	100+	8,048	M 12,02
	Burst and Axial Flags								
0 1	Default = Pipe Body, L		Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
0 1 2	Default = Pipe Body, L Axial Flags	= Connection	,	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
0 1 2 3	Default = Pipe Body, L	= Connection	,	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
0 1 2 3 4	Default = Pipe Body, L Axial Flags Default = Tension, M =	= Connection	,	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
0 1 2 3 4 5	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags	. = Connection = Compression		-			· ·	nection Yield, C = C	Connection
0 1 2 3 4 5 6	Default = Pipe Body, L Axial Flags Default = Tension, M =	. = Connection = Compression		-			· ·	nection Yield, C = C	Connection
0 1 2 3 4 5 6 7	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall ai	. = Connection = Compression		-			· ·	nection Yield, C = C	Connection
0 1 2 3 4 5 6 7 8	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags	- = Connection = Compression nd Positive Ber	nding OR No Bend	ing, D = Outer wall			· ·	nection Yield, C = C	Connection

Safety Factor Summary - PressureTest #1 - 7" Production Liner

	String	MD	Yield Strength	VME Stress		Absolute Safety Factors				
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial	
1	1	2050,02	74386,1	28320,5	2,627	N/A	2,400	100+	9,428	
2	1	2099,98	74345,5	28160,2	2,640	N/A	2,414	100+	10,146	
3	1	2100,04	74345,5	28161,5	2,640	N/A	2,414	100+	10,176	
4	1	2133,60	74317,7	28196,5	2,636	N/A	2,412	100+	10,672	
5	1	2438,40	74070,0	28657,6	2,585	N/A	2,393	100+	19,193	
6	1	2699,98	73855,8	29196,6	N 2,530	N/A	2,377	100+	51,809	
7										

 Burst and Axial Flags
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jun
 Default = Tension, M = Compression
 13
 14 Triaxial Flags
 15 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending Burst and Axial Flags
Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

16 17 Envelope Flags 18 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	Safe	ety Factor Su	mmary - Greer	nCement #1 - 0	7" Production L	iner				
		String	MD	Yield Strength	VME Stress		Ab	solute Safety Facto	ors	
		Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1		1	2050,02	74386,1	35879,1	2,073	N/A	1,897	100+	4,835
2		1	2099,98	74345,5	35848,4	2,074	N/A	1,896	100+	5,016
3		1	2100,04	74345,5	35848,4	2,074	N/A	1,896	100+	5,016
4		1	2133,60	74317,7	35756,8	2,078	N/A	1,899	100+	
5		1	2438,40	74070,0	35018,1	2,115	N/A	1,931	100+	6,726
6		1	2699,98	73855,8	33738,0	2,189	N/A	2,002	100+	9,153
7										

 7
 Burst and Axial Flags

 9
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jur

 10
 IAxial Flags

 12
 Default = Tension, M = Compression

 13
 IAxial Flags

 14
 Triaxial Flags

 15
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 16
 Invelope Flags

 18
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

#### File: Slender Exploration Well Design, v0 Date/Time: March 01, 2018 03:03:24 PM Page: 18 of 22 Safety Factor Summary - OverPull #1 - 7" Production Liner String MD Yield Strength VME Stress Absolute Safety Factors Burst Triaxial D 6,190 D 6,438 D 6,438 D 6,616 D 8,847 Collapse 14,328 14,027 14,026 13,831 12,298 11,246 (psi) 12017,7 (psi) 74386,1 Section (m) 2050,02 Envelope Axia 9,105 9,773 9,773 10,281 19,499 N/A 100+ 2099,98 2100,04 2133,60 2438,40 74345,5 74345,5 74317,7 74070,0 11548,4 11548,5 11233,1 8372,3 N/A N/A N/A N/A 100+ 100+ 100+ 100+ 100+ 2 3 4 5 6 7 8 9 10 11 12 2699,98 N/A 73855,8 5917,0 D 12,482 86,409 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection Axial Flags Default = Tension, M = Compression 13 14 15 Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 16 16 17 Envelope Flags 18 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Safety Factor Summary - RunningHole #1 - 7" Production Liner

_	String	MD	Yield Strength	VME Stress		Ab	solute Safety Facto	ors	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1		1 2050,02	74386,1	12643,6	D 5,883	N/A	100+	14,276	8,458
2		1 2099,98	74345,5	12268,5	D 6,060	N/A	100+	13,969	8,929
3		1 2100,04	74345,5	12268,1	D 6,060	N/A	100+	13,969	8,929
4		1 2133,60	74317,7	12015,9	D 6,185	N/A	100+	13,770	9,277
5	· ·	1 2438,40	74070,0	9726,6	D 7,615	N/A	100+	12,211	
6	· ·	1 2699,98	73855,8	7762,0	D 9,515	N/A	100+	11,145	27,368

Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

Axial Flags Default = Tension, M = Compression 11 12 13

14

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

10

Interface Finance Finance Wall and Positive Bending OR No Bending, D = Outer wall
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall
 Finance Finace Finance Finance Finance Finance Finance Finace Finance Finance F

ction 1 1	(m) 2050,02 2099,98	(psi) 74386,1 74345,5	(psi) 36633,7	Triaxial 2,031	Envelope N/A	Burst	Collapse	Axial
1			36633,7	2 031	NI/A			
1	2099,98	74945 5		2,001	IN/A	100+	1,743	M 10,460
		/4345,5	37392,5	1,988	N/A	100+	1,701	M 9,688
1	2100,04	74345,5	37359,9	1,990	N/A	100+	1,701	M 9,564
1	2133,60	74317,7	37694,9	1,972	N/A	100+	1,680	M 9,040
1	2438,40	74070,0	40860,7	1,813	N/A	100+	1,512	M 6,034
1	2699,98	73855,8	43775,8	1,687	N/A	100+	1,392	M 4,757
= Pipe Body,	L = Connection	Leak, B = Connect	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	mp-out, Y = Coni	nection Yield, C = C	onnection
ags								
	= Compression	1						
	= Compression	I						
	= Compression	ı						
		1 2438,40 1 2699,98 nd Axial Flags	1 2438,40 74070,0 1 2699,98 73855,8 nd Axial Flags	1 2438.40 74070.0 40860.7 1 2699.98 73855.8 43775.8 nd Axial Flags	1 2438,40 74070,0 40860,7 1,813 1 2699,98 73855,8 43775,8 1,687 nd Axial Flags	1 2438,40 74070,0 40860,7 1,813 N/A 1 2699,98 73855,8 43775,8 1,697 N/A nd Axial Flags	1 2438,40 74070.0 40860.7 1,813 N/A 100+ 1 2699,98 73855.8 43775.8 1,687 N/A 100+ nd Axial Flags	1 2438,40 74070,0 40860,7 1,813 N/A 100+ 1,512 1 2699,98 73855,8 43775,8 1,687 N/A 100+ 1,392

18 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

File: Slender Expl	loration Well De	sign, v0		[	Date/Time: Mar	ch 01, 2018 (	03:03:24 PM F	Page: 19 of 22
Safety Factor Su	ummarv - Tubin	gLeak #1 - 7"	Production Liner					-
String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	s	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1 2050,02	74386,1	5048,3	D 14,735	N/A	100+	14,859	61,767
· · ·	1 2099,98	74345,5	4466,1	16,647	N/A	100+	15,296	100-
· · ·	1 2100,04	74345,5	4547,9	D 16,347	N/A	100+	14,540	100-
	1 2133,60	74317,7	4221,1	17,606	N/A	100+	14,814	M 100-
•	1 2286,00	74193,8	2829,4	26,222	N/A	89,411	16,105	M 66,15
	1 2438,40	74070,0	1849,3	40,053	N/A	49,063	17,617	M 29,15
	1 2699,98	73855,8	2678,1	N 27,578	N/A	27,593	21,013	M 15,55
Burst and Axial F	, , , , , , , , , , , , , , , , , , ,			· ·			, i i	
1 2 Axial Flags 3 Default = Tension 4 5 Triaxial Flags 6 Default = Inner W 7 8 Envelope Flags	n, M = Compressior	nding OR No Ben	ction Burst, F = Coni ding, D = Outer wall no ISO Connection				nection field, C -	Connection
	mary - Initial Co MD (m)	nditions - 16" Hooke's	Conductor Casing Buckling	g Ballo	on The	ermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)		m)	(m)	Length (m)
	Duse	, East (III)	(11)	(11)	(	.,		20.1911 (11)
			No length chan	ges - Pipe is fully c	emented			
Movement Sumr	mary - Pressure	eTest #1 - 16"	Conductor Casing	g				
	MD (m)	Hooke's	Buckling	Ballo		ermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(1	m)	(m)	Length (m)
			No length chan	ges - Pipe is fully c	emented			
Movement Sum	<u>marγ - LostRetu</u> MD (m)	<u>ırnsWithMudDr</u> Hooke's	op #1 - 16'' Cone Buckling	ductor Casing Balloo	an The	ermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)		m)	(m)	Length (m)
	Dase	Law (III)		ges - Pipe is fully o			(11)	Lengur (m)
Movement Sumr	mary - OverPull	#1 - 16" Conc	luctor Casing					
	VID (m)	Hooke's	Buckling	Ballo	on The	ermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)		m)	(m)	Length (m)
-		1 200 (11)		ges - Pipe is fully c		.,		
Movement Sumr	mary - Running	Hole #1 - 16" (	Conductor Casing	1				
	MD (m)	Hooke's	Buckling	a Ballo	on The	ermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)		m)	(m)	Length (m)
		, (1)		ges - Pipe is fully c			. /	

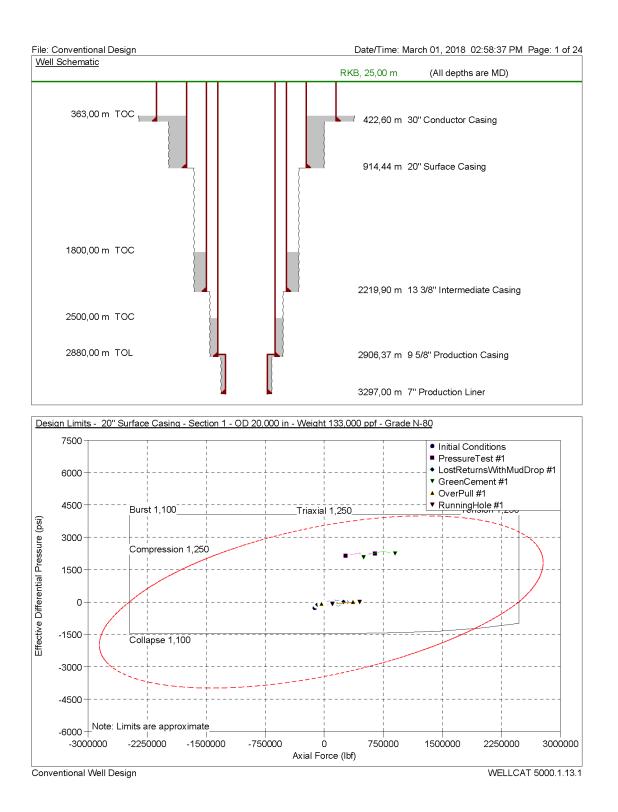
Movement Summary	on Well Design,	v0		Date/Time	: March 01, 201	3 03:03:24 PM	Page: 20 of 2
	- Initial Conditin	ons - 13 3/8'	Surface Casing				
MD (m	)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
2 3							
			No length changes - Pi	pe is fully cemented			
5							
Movement Summary	DisplaceTeC	ac #1 12 3	8" Surface Casing				
				Dellasa	The sum of	Total	Buckled
MD (m Top	Base	Hooke's	Buckling	Balloon	Thermal	(m)	Length (m)
төр	Dase	Law (m)	(m)	(m)	(m)	(11)	Lengur (III)
2							
3			No length changes - Pi	pe is fully cemented			
<u> </u>							
Movement Summary	- PressureTest	#1 - 13 3/8'	Surface Casing				
MD (m		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
							/
2							
3			No length changes - Pi	pe is fully cemented			
•							
Movement Summary	<ul> <li>LostReturnsV</li> </ul>						
MD_(m		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
<u> </u>							
5			No length changes - Pi	pe is fully cemented			
1							
5							
Movement Summary			" Surface Casing				
MD (m	)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
			No length changes - Pip	pe is fully cemented			
Movement Current		12 2/01 0	inco Cocin-				
Movement Summary							
MD (m	)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
				Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
MD (m Top	)	Hooke's	Buckling				
MD (m Top	)	Hooke's	Buckling (m)	(m)			
MD (m	)	Hooke's	Buckling	(m)			
MD (m Top	)	Hooke's	Buckling (m)	(m)			
MD (m Top	)	Hooke's	Buckling (m)	(m)			
MD (m Top	)	Hooke's	Buckling (m)	(m)			
MD (m Top	)	Hooke's	Buckling (m)	(m)			
MD (m Top	) Base	Hooke's Law (m)	Buckling (m) No length changes - Pij	(m)			
MD (m Top	) Base	Hooke's Law (m) #1 - 13 3/8"	Buckling (m) No length changes - Pip Surface Casing	(m)	(m)	(m)	Length (m)
MD (m Top Movement Summary MD (m	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling	(m) ce is fully cemented Balloon	(m) Thermal	(m) Total	Length (m)
MD (m Top	) Base	Hooke's Law (m) #1 - 13 3/8"	Buckling (m) No length changes - Pip Surface Casing	(m)	(m)	(m)	Length (m)
MD (m Top Movement Summary MD (m Top	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling	(m) ce is fully cemented Balloon	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m Top	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling (m)	(m) pe is fully cemented Balloon (m)	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m Top	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling	(m) pe is fully cemented Balloon (m)	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m MD (m	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling (m)	(m) pe is fully cemented Balloon (m)	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m MD (m	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling (m)	(m) pe is fully cemented Balloon (m)	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m 	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling (m)	(m) pe is fully cemented Balloon (m)	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m 	) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's	Buckling (m) No length changes - Pij Surface Casing Buckling (m)	(m) pe is fully cemented Balloon (m)	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m Top	) Base - RunningHole ) Base	Hooke's Law (m) #1 - 13 3/8" Hooke's Law (m)	Buckling (m) No length changes - Pip Surface Casing Buckling (m) No length changes - Pip	(m) pe is fully cemented Balloon (m)	(m) Thermal	(m) Total	Length (m)
MD (m Top Movement Summary MD (m Top Movement Summary	) Base - RunningHole ) Base - Initial Conditio	Hooke's Law (m) #1 - 13 3/8" Hooke's Law (m) Dons - 9 5/8" I	Buckling (m) No length changes - Pip <u>Surface Casing</u> Buckling (m) No length changes - Pip Production Casing	(m) De is fully cemented Balloon (m) De is fully cemented	(m) Thermal (m)	(m) Total (m)	Length (m) Buckled Length (m)
MD (m Top Movement Summary MD (m Top Movement Summary M0 (m	) Base - RunningHole ) Base - Initial Conditio	Hooke's Law (m) #1 - 13 3/8" Hooke's Law (m) Dns - 9 5/8" 1 Hooke's	Buckling (m) No length changes - Pli Surface Casing Buckling (m) No length changes - Pli Production Casing Buckling	(m) De is fully cemented Balloon (m) De is fully cemented Balloon	(m) Thermal (m) Thermal	(m) Total (m) Total	Length (m)
MD (m Top Movement Summary MD (m Top Movement Summary MD (m Top	) Base - RunningHole ) Base - Initial Condition Base	Hooke's Law (m) #1 - 13 3/8" Hooke's Law (m) Dons - 9 5/8"   Hooke's Law (m)	Buckling (m) No length changes - Pip Surface Casing Buckling (m) No length changes - Pip Production Casing Buckling (m)	(m) De is fully cemented Balloon (m) De is fully cemented Balloon (m)	(m) Thermal (m) Thermal (m)	(m) Total (m) Total (m)	Length (m) Buckled Length (m) Buckled Length (m)
Movement Summary Movement Summary MD (m Top	) Base - RunningHole ) Base - Initial Conditio	Hooke's Law (m) #1 - 13 3/8" Hooke's Law (m) Dns - 9 5/8" 1 Hooke's	Buckling (m) No length changes - Pip Surface Casing Buckling (m) No length changes - Pip Production Casing Buckling (m)	(m) De is fully cemented Balloon (m) De is fully cemented Balloon	(m) Thermal (m) Thermal	(m) Total (m) Total	Length (m)

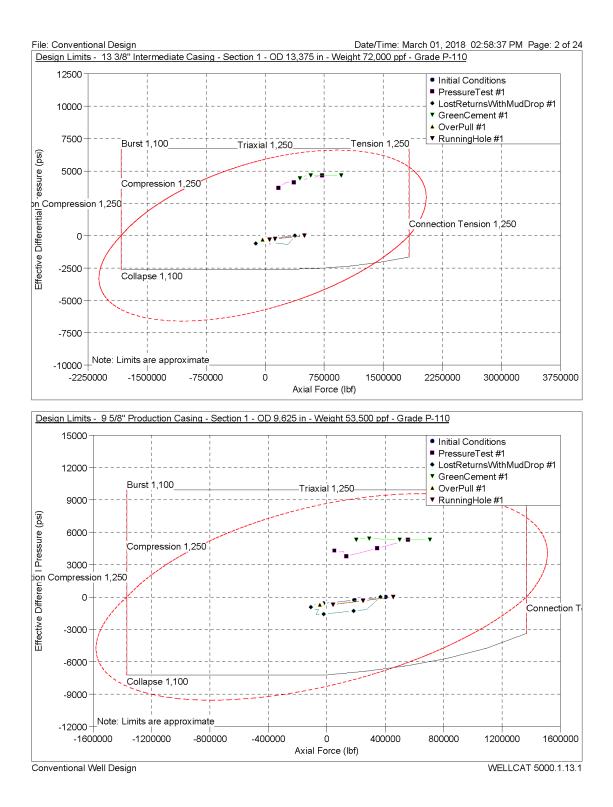
ement Summary	<ul> <li>DisplaceToGa</li> </ul>							
MD (m		Hooke's	Buckling	Balloon	Thermal	Total		Buckled
Top 382,04	Base 1500,00	Law (m) 0,126	(m) 0,000	(m) -0,126	(m) 0,000	(m)	0,000	Length (m) 0
	- PressureTest	#1 0 5/9" Drod	uction Cocing					
MD (m		Hooke's	Buckling	Balloon	Thermal	Total		Buckled
Top	Base	Law (m)	(m)	(m)	(m)	(m)		Length (m)
382,04	1500,00	0,412	0,000	-0,412	0,000		0,000	133
ement Summarv	- GreenCement	#1 - 9.5/8" Proc	luction Casing					
MD (m		Hooke's	Buckling	Balloon	Thermal	Total		Buckled
Top 202.04	Base	Law (m) 0,303	(m) 0,000	(m)	(m)	(m)	0.202	Length (m)
382,04	1500,00	0,303	0,000	0,000	0,000		0,303	C
ement Summary	- OverPull #1 -	9 5/8" Productio	n Casing					
MD (m		Hooke's	Buckling	Balloon	Thermal	Total		Buckled
Top 382,04	Base 1500,00	Law (m) 0,230	(m) 0,000	(m) 0,000	(m) 0,000	(m)	0,230*	Length (m)
, í	t due to pickup (+) o	, , , , , , , , , , , , , , , , , , ,	0,000	0,000	0,000		0,200	
			untion On the second					
<u>ement Summarγ</u> MD (m	- RunningHole #	<u>+1 - 95/8" Produ</u> Hooke's	Buckling	Balloon	Thermal	Total		Buckled
Top	Base	Law (m)	(m)	(m)	(m)	(m)		Length (m)
ement Summary	- LostReturns #	1 - 9 5/8'' Produ	ction Casing					
MD (m	)	Hooke's	Buckling	Balloon	Thermal	Total		Buckled
	) Base	Hooke's Law (m)	Buckling (m)	(m)	(m)	Total (m)	0.000	Length (m)
MD (m Top	)	Hooke's	Buckling				0,000	Length (m)
MD (m Top 382,04 ement Summary	) Base 1500,00 - TubingLeak #	Hooke's Law (m) 0,061	Buckling (m) 0,000	(m) -0,061	(m) 0,000	(m)	0,000	Length (m)
MD (m Top 382,04 ement Summary MD (m	) Base 1500,00 - TubingLeak #	Hooke's Law (m) 0,061 1 - 9 5/8'' Produc Hooke's	Buckling (m) 0,000 ction Casing Buckling	(m) -0,061	(m) 0,000	(m) Total	0,000	Length (m)
MD (m Top 382,04 ement Summary	) Base 1500,00 - TubingLeak #	Hooke's Law (m) 0,061	Buckling (m) 0,000	(m) -0,061	(m) 0,000	(m)	0,000	Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04	) Base 1500,00 - TubingLeak # ) Base 1500,00	Hooke's Law (m) 0,061 1 - 9 5/8'' Produc Hooke's Law (m) 0,000	Buckling (m) 0,000 Ction Casing Buckling (m) 0,000	(m) -0,061 Balloon (m)	(m) 0,000 Thermal (m)	(m) Total		Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary Top MD (m Top 382,04 ement Summary MD (m	) Base - TubingLeak # ) Base 1500,00	Hooke's Law (m) 0,061 1 - 9.5/8'' Produc Hooke's Law (m) 0,000 0,000 ns - 7'' Productie Hooke's	Buckling (m) 0,000 stion Casing Buckling (m) 0,000 0,000 Don Liner Buckling	(m) -0,061 Balloon (m) 0,000 Balloon	(m) 0,000 Thermal (m) 0,000 Thermal	(m) Total (m) Total		Length (m) Buckled Length (m) Buckled
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary Top MD (m	) Base - TubingLeak # ) Base 1500,00 - Initial Conditio ) Base	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 ns - 7" Productie Hooke's Law (m)	Buckling (m) 0,000 Etion Casing Buckling (m) 0,000 Dn Liner Buckling (m)	(m) -0,061 Balloon (m) Balloon (m)	(m) 0,000 Thermal (m) 0,000 Thermal (m)	(m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary Top MD (m Top 382,04 ement Summary MD (m	) Base - TubingLeak # ) Base 1500,00	Hooke's Law (m) 0,061 1 - 9.5/8'' Produc Hooke's Law (m) 0,000 0,000 ns - 7'' Productie Hooke's	Buckling (m) 0,000 stion Casing Buckling (m) 0,000 0,000 Don Liner Buckling	(m) -0,061 Balloon (m) 0,000 Balloon	(m) 0,000 Thermal (m) 0,000 Thermal	(m) Total (m) Total		Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary	) Base 1500,00 - TubingLeak # Base 1500,00 - Initial Conditio Base 2100,00 - PressureTest :	Hooke's Law (m) 0,061 1 - 9 5/8" Produc Hooke's Law (m) 0,000 ms - 7" Productie Hooke's Law (m) 0,000	Buckling (m) 0,000 otion Casing Buckling (m) 0,000 on Liner Buckling (m) 0,000	(m) -0,061 (m) 0,000 Balloon (m) 0,000	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary 2050,02 ement Summary MD (m	) Base 1500,00 - TubingLeak # ) Base 1500,00 - Initial Conditio ) Base 2100,00 - PressureTest :	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 ns - 7" Productie Hooke's Law (m) 0,000 #1 - 7" Productie Hooke's	Buckling (m) 0,000 ction Casing Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling	(m) -0,061 Balloon (m) 0,000 Balloon (m) 0,000	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m) Total	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary	) Base 1500,00 - TubingLeak # Base 1500,00 - Initial Conditio Base 2100,00 - PressureTest :	Hooke's Law (m) 0,061 1 - 9 5/8" Produc Hooke's Law (m) 0,000 ms - 7" Productie Hooke's Law (m) 0,000	Buckling (m) 0,000 otion Casing Buckling (m) 0,000 on Liner Buckling (m) 0,000	(m) -0,061 (m) 0,000 Balloon (m) 0,000	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02	) Base 1500,00 - TubingLeak # Base 1500,00 - Initial Conditio Base 2100,00 - PressureTest : Base 2100,00	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 ns - 7" Productie Hooke's Law (m) 0,000 #1 - 7" Productie Hooke's Law (m) 0,011	Buckling (m) 0,000 Etion Casing Buckling (m) 0,000 On Liner Buckling (m) 0,000 On Liner Buckling (m) 0,000	(m) -0,061 Balloon (m) 0,000 Balloon (m) 0,000	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m) Total	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02 ement Summary MD (m	) Base 1500,00 - TubingLeak # ) Base 1500,00 - Initial Conditio ) Base 2100,00 - PressureTest : ) Base 2100,00 - GreenCement	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 ns - 7" Productir Hooke's Law (m) 0,000 #1 - 7" Productir Hooke's Law (m) 0,011 #1 - 7" Productir Hooke's	Buckling (m) 0,000 ction Casing Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000	(m) -0,061 Balloon (m) 0,000 Balloon (m) -0,011 Balloon	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	(m) Total (m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 382,04	) Base 1500,00 - TubingLeak # Base 1500,00 - Initial Conditio Base 2100,00 - PressureTest : Base 2100,00 - GreenCement Base	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 ms - 7" Productic Hooke's Law (m) 0,011 #1 - 7" Productic Hooke's Law (m) #1 - 7" Productic Hooke's Law (m)	Buckling (m) 0,000 ction Casing Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000	(m) -0,061 Balloon (m) 0,000 Balloon (m) -0,011 Balloon (m)	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02 ement Summary MD (m	) Base 1500,00 - TubingLeak # ) Base 1500,00 - Initial Conditio ) Base 2100,00 - PressureTest : ) Base 2100,00 - GreenCement	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 ns - 7" Productir Hooke's Law (m) 0,000 #1 - 7" Productir Hooke's Law (m) 0,011 #1 - 7" Productir Hooke's	Buckling (m) 0,000 ction Casing Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000	(m) -0,061 Balloon (m) 0,000 Balloon (m) -0,011 Balloon	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	(m) Total (m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02 ement Summary MD (m	) Base 1500,00 - TubingLeak # Base 1500,00 - Initial Conditio Base 2100,00 - GreenCement Base 2100,00 - GreenCement - CoverPull #1 -	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 0,000 0,000 #1 - 7" Productic Hooke's Law (m) 0,011 #1 - 7" Product Hooke's Law (m) 0,009 7" Production Li	Buckling (m) 0,000 Ction Casing Buckling (m) 0,000 On Liner Buckling (m) 0,000 On Liner Buckling (m) 0,000 On Liner Buckling (m) 0,000 On Liner Buckling (m) 0,000	(m) -0,061 Balloon (m) 0,000 Balloon (m) -0,011 Balloon (m) 0,000	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m)
MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02	) Base 1500,00 - TubingLeak # Base 1500,00 - Initial Conditio Base 2100,00 - PressureTest : Base 2100,00 - GreenCement 2100,00 - OverPull #1 -	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 0,000 1 - 7" Production Hooke's Law (m) 0,000 #1 - 7" Production Hooke's Law (m) 0,009 7" Production Li Hooke's	Buckling (m) 0,000 ction Casing Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000 on Liner Buckling (m) 0,000	(m) -0,061 Balloon (m) 0,000 Balloon (m) -0,011 Balloon (m) 0,000 Balloon	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m) Total (m) Total (m)	0,000	Length (m)
MD (m Top 382,04 ement Summary MD (m Top 382,04 ement Summary MD (m Top 2050,02 ement Summary MD (m Top 2050,02 ement Summary MD (m	) Base 1500,00 - TubingLeak # Base 1500,00 - Initial Conditio Base 2100,00 - GreenCement Base 2100,00 - GreenCement - CoverPull #1 -	Hooke's Law (m) 0,061 1 - 9 5/8" Product Hooke's Law (m) 0,000 0,000 0,000 #1 - 7" Productic Hooke's Law (m) 0,011 #1 - 7" Product Hooke's Law (m) 0,009 7" Production Li	Buckling (m) 0,000 Ction Casing Buckling (m) 0,000 On Liner Buckling (m) 0,000 On Liner Buckling (m) 0,000 On Liner Buckling (m) 0,000 On Liner Buckling (m) 0,000	(m) -0,061 Balloon (m) 0,000 Balloon (m) -0,011 Balloon (m) 0,000	(m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m) Total (m) Total (m) Total (m)	0,000	Length (m)

File: Slender	r Exploration	Well Design,	vO		Date/Time	: March 01, 2018	03:03:25 PM	Page: 22 of 22
Movement	Summary -	RunningHole :	#1 - 7" Productio	n Liner				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
To	p	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1								
2				lo results available fo	which loop a second			
3			ľ	to results available it	ir triis load case			
5								
Movement	Summary -	FullEvacuation	n #1 - 7" Product	ion Liner				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
To		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1	2050,02	2100,00	-0,014	0,000	0,014	0,000	0,000	0,00
	-							
Movement		lubingLeak#	1 - 7" Production					
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
	p	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
То								
1	2050,02	2100,00	0,000	0,000	0,000	0,000	0,000	0,00

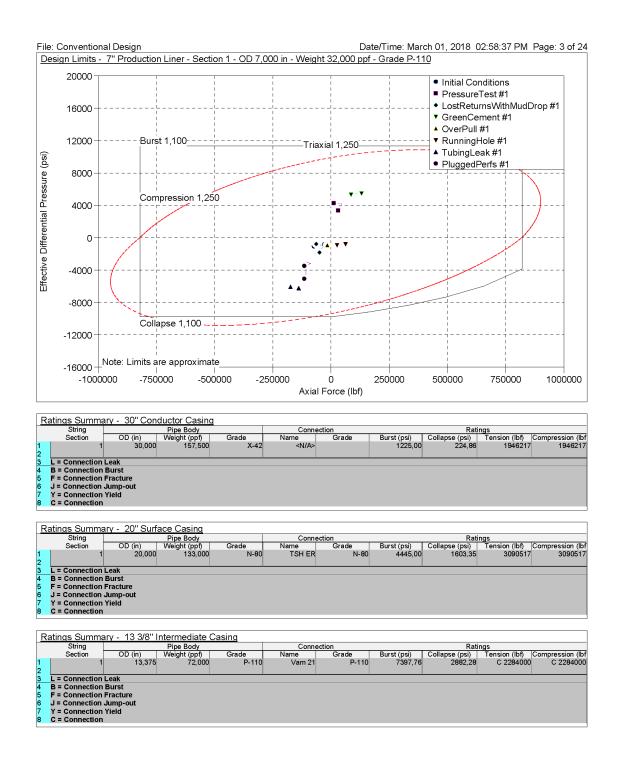
5.2.2 Norwegian Sea

5.2.2.1 Conventional Well Design





196



	0 5 (0) 5					Date/Time: N	arch 01, 2010	02.00.07 1 10	<u> </u>
	ary - 95/8" Pr		ng	^				- <b>1</b>	
String Section	OD (in)	Pipe Body	Grade	Coni Name	nection Grade	Burst (psi)	Collapse (psi)	tings Tension (lbf)	Compression
. Section	1 9,625	Weight (ppf) 53,500	P-110	Vam 2	1 I	Burst (psi) P-110 10900	00 7950,0		C 1710
L = Connection	n Leak								
B = Connection									
F = Connection									
J = Connection Y = Connection	n Jump-out n Yield								
C = Connection	n								
atings Summ	ary - 7" Produ	ction Liner							
String		Pipe Body			nection		Ra	atings	
Section	OD (in) 1 7,000	Weight (ppf) 32,000	Grade P-110	Name Vam TOP H	Grade	Burst (psi) 2-110 12457	Collapse (psi) 50 10780,8	Tension (lbf) 4 1024904	Compression 1024
		52,000	P-110	Valli TOP HV		-110 12437	10780,8	+ 1024904	1024
L = Connection									
B = Connection F = Connection									
J = Connection									
Y = Connection									
C = Connection	n								
asing Load S String	ummary - Initi MD	Axial Force			orque	Friction Force	Temperature	Pressure	e (nsi)
Section	(m)	(lbf)	(°/100ft	) (	(ft-lbf)	(lbf/ft)	(°F) —	Internal	e (psi) External
	1 0,	03 279	344	0,00	0,0	0,0	50,00	0,05	
	1 24 1 304	96 268		0,00	0,0	0,0	49,00	44,68	3
	1 362			0,00 0.00	0,0 0,0	0,0 0,0	37,39 35.00	545,45 647,82	46 55
	1 362			0,00	0,0	0,0	35,05	649,56	55
	1 363	02 120		0,00	0,0	0,0	35,05	649,66	55
	1 422	57 94	969 943	0,00	0,0	0,0 0,0	38,02 38,02	756,21	68
	1 422	.64 94							
	1 609	60 13	358	0,00	0,0			756,32	
	1 609 1 914	.60 13	358	0,00	0,0	0,0	47,18	1090,90	108
	1 609 1 914 1 914	60 13 40 -119	358 642					1090,90 1636,36 1636,37	108 181
	1 914	60 13 40 -119	358 642	0,00 0,00	0,0 0,0	0,0 0,0	47,18 62,20	1090,90 1636,36	108 181
	1 914 1 914	.60 13 .40 -119 .40 -119	358 642 646	0,00 0,00 0,00	0,0 0,0	0,0 0,0	47,18 62,20	1090,90 1636,36	108 181
	1 914 1 914	60 13 40 -119 40 -119 ssureTest #1 -	358 642 646 20'' Surface	0,00 0,00 0,00	0,0 0,0 0,0	0,0 0,0 0,0	47,18 62,20 62,20	1090,90 1636,36 1636,37	108 181 181
asing Load S String Section	1 914 1 914 <u>Summary - Pres</u> MD (m)	60 13 40 -119 40 -119 <u>ssureTest #1 -</u> Axial Force (lbf)	358 342 346 20'' Surface Dogleg (°/100ft	0,00 0,00 0,00 <u>e Casing</u> J T	0,0 0,0 0,0 (ft-lbf)	0,0 0,0	47,18 62,20 62,20 Temperature	1090,90 1636,36	108 181 181
String	1 914 1 914 <u>ummary - Pres</u> MD (m) 1 0.	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (lbf) 03 646	358 342 20'' Surface Dogleg (°/100ft	0,00 0,00 0,00 <u>e Casing</u> g T )) (	0,0 0,0 0,0 (ft-lbf) 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	47,18 62,20 62,20 Temperature (°F) 50,00	1090,90 1636,36 1636,37 Pressum Internal 2250,05	108 181 181 (psi) External
String	1 914 1 914 <u>Summary - Pres</u> MD (m) 1 0, 1 24	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (lbf) 03 646 96 635	358 342 646 <u>20" Surface</u> Dogleg (°/100ft 187	0,00 0,00 0,00 Casing Casing T ( 0,00 0,00	0,0 0,0 0,0 (ft-lbf) 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	47,18 62,20 62,20 Temperature (°F) 50,00 49,00	1090,90 1636,36 1636,37 Pressure Internal 2250,05 2286,60	108 181 181 <u>e (psi)</u> External 3
String	1 914 1 914 <u>Summary - Pre</u> (m) 1 00 1 24 1 95	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (lbf) 03 646 96 635 83 604	558 542 546 <u>20" Surface</u> Dogleg (°/100ft 187 262	0,00 0,00 0,00 2 Casing 3 T 0 ( 0,00 0,00 0,02	0,0 0,0 0,0 (ft-lbf) 0,0 0,0 1,9	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	47,18 62,20 62,20 Temperature (°F) 50,00 49,00 46,05	1090,90 1636,36 1636,37 Pressum Internal 2250,05 2286,60 2390,48	108 181 181 (psi) External 3 14
String	1 914 1 914 ummary - Pre: MD (m) 1 0 1 24 1 95 1 143 1 152	60 13 40 -119 40 -119 5sureTest #1 - Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579	558 546 20" Surface Dogleg (*/100ft 187 262 353 553	0,00 0,00 0,00 2 Casing 3 T 0,00 0,00 0,00 0,02 0,07 0,08	0,0 0,0 0,0 (ft-lbf) 0,0 0,0 1,9 10,3 12,3	0,0 0,0 0,0 0,0 0,0 (lbf/ft) 0,0 0,0 0,0 0,0	47,18 62,20 62,20 52,20 62,20	1090,90 1636,36 1636,37 Pressur Internal 2250,05 2286,60 2390,48 2460,71 2473,38	108 181 181 (psi) External 3 14 22 23
String	1 914 1 914 <u>:ummary - Pre-</u> (m) 1 0 1 24 1 95 1 143 1 152 1 304	60 13 40 -119 40 -119 555000000000000000000000000000000000	558 542 546 Dogleg (*/100ft 769 187 762 553 583 583	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 (ft-lbf) 10,3 12,3 61,3	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 (°F) (°F) 50,00 49,00 46,05 44,05 44,05 43,70	1090,90 1636,36 1636,37 Pressum 1636,37 1636,37 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75	108 181 181 81 8 9 9 9 9 9 9 14 22 23 46
String	1 914 1 914 iummary - Pres MD (m) 1 0 1 24 1 95 5 1 143 1 152 1 304 1 362	60 13 40 -119 40 -119 <u>ssureTest #1 -</u> Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488	558 542 546 Dogleg (*/100k 187 262 553 553 583 983 124	0,00 0,00 0,00 2 Casing 3 T 5) ( 0,00 0,00 0,02 0,07 0,08 0,29	0,0 0,0 (ft-lbf) (ft-lbf) 0,0 1,9 10,3 12,3 61,3 85,3	0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	47,18 62,20 62,20 (°F) 50,00 48,05 44,05 44,05 43,70 37,39 35,00	1090,90 1636,36 1636,37 Internal 2250,05 2286,60 2390,48 2460,71 2473,39 2696,75 2780,59	108 181 181 81 81 81 81 81 81 81 81 81 81
String	1 914 1 914 1 914 1 914 1 00 1 00 1 24 1 95 1 143 1 152 1 304 1 362 1 362	60 13 40 -119 40 -119 55UreTest #1 - Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487	20" Surface 20" Surface Dogleg (*/100# 187 262 353 353 383 124 701	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 (ft-lbf) 0,0 0,0 1,3 10,3 12,3 61,3 85,3 85,7	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	47,18 62,20 62,20 (°F) (°F) 50,00 49,00 46,05 44,05 44,05 44,05 43,70 37,39 35,00 35,05	1090,90 1636,36 1636,37 Pressum Internal 2250,05 2286,60 2390,48 2460,71 2473,38 2996,75 2780,55 2782,01	108 181 181 (psi) External 3 14 22 23 46 55 55
String	1 914 1 914 1 914 1 914 1 01 (m) 1 00 1 24 1 95 1 143 1 152 1 362 1 362 1 363 1 422	60 13 40 -119 40 -119 55UreTest #1 - Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 02 473 57 452	558 542 5446 Dogleg (*/100m 187 262 553 553 553 553 124 701 124 701 284 286	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 (ft-lbf) (ft-lbf) 0,0 1,9 10,3 12,3 61,3 85,3 85,7 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	47,18 62,20 62,20 (°F) 50,00 48,00 48,05 44,05 44,05 43,70 37,39 35,05 35,05 36,05 38,02	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 2782,10 2869,37	108 181 181 e (psi) External 3 14 22 23 46 55 55 55 55 64
String	1 914 1 914 1 914 1 914 1 914 1 0 1 24 1 95 1 143 1 152 1 304 1 362 1 363 1 422 1 422	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (bf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 02 473 57 452 64 460	358 20'' Surface Dogleg (*/100ft 187 262 353 353 363 124 124 124 124 124 124 124 124	0,00 0,00 0,00 0,00 0,00 0,00 0,02 0,00 0,02 0,08 0,02 0,08 0,02 0,08 0,02 0,00 0,00	0,0 0,0 0,0 0,0 (f-lbf) 10,3 12,3 61,3 85,3 85,3 85,7 0,0 0,0 0,0 0,0	0.0 0.0 0.0 Friction Force ((bf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 (°F) 49,00 46,05 44,05 44,05 44,05 44,05 35,06 35,06 35,05 38,02 38,02	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 1636,37 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 2782,10 2669,37 2869,46	108 181 181 181 External 3 14 22 23 46 55 55 55 55 55 55 55 55 55 55 55 55 55
String	1 914 1 914 1 914 1 914 1 914 1 00 (m) 1 00 1 24 1 95 1 143 1 152 1 304 1 362 1 363 1 422 1 422 1 609	60 13 40 -119 40 -119 5sureTest #1 - Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 72 452 64 460 60 383	358 342 346 Dogleg (*/100k 187 262 353 383 124 701 484 286 393 151	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,02 0,07 0,08 0,24 0,29 0,30 0,29 0,30 0,00 0,00 0,00 0,02 0,24 0,29 0,30 0,00	0,0 0,0 0,0 (ft-lbf) 0,0 1,9 10,3 12,3 61,3 85,3 85,7 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	47,18 62,20 62,20 7 Emperature (°F) 50,00 48,05 44,05 44,05 44,05 44,05 43,70 37,39 35,06 35,05 38,02 38,02 38,02 47,18	1090,90 1636,36 1636,37 Internal 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 2869,37 2869,37 2869,43	e (psi) External External 3 14 222 23 46 55 56 56 56 56 56 56 56 56 56 56 56 56
String	1 914 1 914 1 914 1 914 1 914 1 0 1 24 1 95 1 143 1 152 1 304 1 362 1 363 1 422 1 422	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 02 473 57 452 64 460 60 383 40 273	20" Surface 20" Surface Dogleg (*/100ft 187 282 353 353 353 353 353 353 353 35	0,00 0,00 0,00 0,00 0,00 0,00 0,02 0,00 0,02 0,08 0,02 0,08 0,02 0,08 0,02 0,00 0,00	0,0 0,0 0,0 0,0 (f-lbf) 10,3 12,3 61,3 85,3 85,3 85,7 0,0 0,0 0,0 0,0	0.0 0.0 0.0 Friction Force ((bf/R) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 (°F) 49,00 46,05 44,05 44,05 44,05 44,05 35,06 35,06 35,05 38,02 38,02	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 1636,37 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 2782,10 2669,37 2869,46	108 181 181 External 3 14 22 233 46 55 55 55 56 44 55 55 56 44 55 55 56 44 144 41
Section	1 914 1 914 1 914 1 914 1 01 (m) 1 0 1 24 1 435 1 143 1 152 1 362 1 362 1 362 1 362 1 422 1 609 1 914 1 914	60 13 40 -119 40 -119 	558 542 546 Dogleg (*/100m 187 262 553 553 553 553 553 553 553 553 553 55	0,00 0,000 0,00	0,0 0,0 0,0 0,0 (ft-lbf) 10,3 12,3 85,3 85,3 85,7 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	0,0 0,0 0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	47,18 62,20 62,20 Temperature (°F) 50,00 48,05 44,05 44,05 44,05 43,70 37,39 35,06 35,05 35,05 35,05 36,02 38,02 35,05 3	1090,90 1636,36 1636,37 1636,37 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,10 2782,10 2696,37 2869,46 3143,50 3590,26	108 181 181 External 3 14 22 233 46 55 55 55 56 44 55 55 56 44 55 55 56 44 144 41
String Section	1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 915 1 24 1 95 1 143 1 152 1 304 1 362 1 362 1 363 1 422 1 422 1 609 1 914	60 13 40 -119 40 -119 	558 542 546 Dogleg (*/100m 187 262 553 553 553 553 553 553 553 553 553 55	0,00 0,000 0,00	0,0 0,0 0,0 0,0 (ft-lbf) 10,3 12,3 85,3 85,3 85,7 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	0,0 0,0 0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	47,18 62,20 62,20 Temperature (°F) 50,00 48,05 44,05 44,05 44,05 43,70 37,39 35,06 35,05 35,05 35,05 36,02 38,02 35,05 3	1090,90 1636,36 1636,37 1636,37 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,10 2782,10 2696,37 2869,46 3143,50 3590,26	108 181 181 External 3 14 22 233 46 55 55 55 56 44 55 55 56 44 55 55 56 44 144 41
String Section	1 914 1 914 1 914 1 914 1 01 (m) 1 0 1 24 1 435 1 143 1 152 1 362 1 362 1 362 1 362 1 422 1 609 1 914 1 914	60 13 40 -119 40 -119 	558 542 546 Dogleg (*/100m 187 262 553 553 553 553 553 553 553 553 553 55	0,00 0,000 0,00	0,0 0,0 0,0 0,0 (ft-lbf) 10,3 12,3 85,3 85,3 85,7 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	0,0 0,0 0,0 Friction Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	47,18 62,20 62,20 Temperature (°F) 50,00 48,05 44,05 44,05 44,05 43,70 37,39 35,06 35,05 35,05 35,05 36,02 38,02 35,05 3	1090,90 1636,36 1636,37 1636,37 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,10 2782,10 2696,37 2869,46 3143,50 3590,26	108 181 181 External 3 14 22 233 46 55 55 55 56 44 55 55 56 44 55 55 56 44 144 41
String Section	1 914 1 914 1 914 1 914 1 914 1 914 1 0 1 24 1 95 1 143 1 143 1 143 1 143 1 362 1 363 1 422 1 363 1 422 1 363 1 422 1 363 1 422 1 914 1 95 1 95	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (bf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 02 473 57 452 64 460 60 363 40 273 40 273 40 273 40 273	358 342 346 Dogleg (*/100t 187 262 353 583 124 286 383 124 124 124 126 124 126 127 124 126 127 127 128 129 129 129 129 129 129 129 129	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0.0 0.0 0.0 (ft-lb) 0.0 1.9 10.3 85.3 85.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	47,18 62,20 62,20 ***********************************	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 269,37 2869,46 3143,50 3590,28	108 181 181 External 3 14 22 23 46 55 55 64 55 55 64 4 55 55 55 55 54 44 144
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 914 1 01 1 0 1 24 1 24 1 35 1 143 1 152 1 362 1 363 1 422 1 363 1 422 1 363 1 422 1 914 1 914 1 914 1 362 1 362 1 363 1 422 1 363 1 422 1 363 1 422 1 363 1 422 1 365 1 914 1 362 1 365 1 914 1 915 1 143 1 152 1 364 1 362 1 366 1 914 1 914 1 915 1 914 1 915 1 914 1 915 1 914 1 915 1 914 1 915 1 914 1 915 1 914 1	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 702 473 57 452 64 460 60 383 40 273 40 273 ckling = 108389 lt tReturnsWithM Axial Force	358 346 20" Surface Dogleg (*/100k 187 262 353 383 124 701 484 286 383 151 140 151 140 138 fr 1udDrop #1 - Dogleg Dogleg 187 187 187 187 187 187 187 187	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 1,9 10,3 12,3 61,3 85,7 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Eemperature(°F) 50,00 48,05 44,05 43,70 37,39 35,06 36,05 38,02 47,18 62,20 62,20	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 1636,37 2286,60 2390,48 2460,71 2473,38 2696,75 2782,01 2782,10 2782,1	e (psi) External External 3 14 222 23 46 55 55 55 55 55 55 55 55 55 55 55 55 55
String Section	1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 24 1 24 1 24 1 433 1 152 1 304 1 304 1 362 1 362 1 362 1 362 1 422 1 363 1 422 1 914 1 95 1 95	60 13 40 -119 5sureTest #1 - Axial Force (bf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 02 473 57 452 64 460 60 383 40 273 40 273 40 273 40 273	358 20" Surface Dogleg (*/100f 187 262 253 353 353 124 286 353 124 124 124 126 126 126 126 126 126 126 126	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0.0 0.0 0.0 (ft-lb) 0.0 1.9 10.3 85.3 85.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 Friction Force ((bf/ft)) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Emperature (°F) 50,00 49,00 46,05 44,05 44,05 44,05 44,05 35,05 35,05 38,02 47,18 62,20 62,20	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 269,37 2869,46 3143,50 3590,28	108 181 181 181 External 3 3 4 22 23 46 55 55 55 64 59 92 2 144 144 144 144
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 24 1 24 1 24 1 43 1 152 1 362 1 362 1 362 1 362 1 362 1 362 1 362 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 915 1 143 1 152 1 152	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (lbf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 02 473 57 452 64 460 60 383 57 452 64 460 60 383 40 273 40 273 40 273 ckling = 108389 It tReturnsWithN kxial Force (lbf) 03 244	358 342 346 20'' Surface Dogleg (*/100t 353 353 353 353 353 353 353 35	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,07 0,08 0,07 0,08 0,00	0.0 0.0 0.0 0.0 0.0 1.0 1.9 10.3 12.3 61.3 85.3 85.3 85.3 85.3 85.3 85.3 85.3 85	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Eemperature(°F) 50,00 48,05 44,05 43,70 37,39 35,06 36,05 38,02 47,18 62,20 62,20	1090,90 1636,36 1636,37 Internal Pressum 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 2782,	e (psi) e (psi) External 3 14 22 23 46 55 55 64 99 92 144 144 144 e (psi) External
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 0 1 24 1 95 1 143 1 152 1 363 1 422 1 363 1 422 1 363 1 422 1 363 1 422 1 914 1 914 1 915 1 915 1 915 1 916 1 917 1 916 1 917 1 917	60 13 40 -119 -119 	358     358     20" Surface         Dogleg         (*/100k         262         353         553         553	0,00 0,00	0.0 0.0 0.0 (ft-lbf) 0.0 0.0 1.9 10.3 85.3 85.3 85.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Emperature (°F) 50,00 49,05 44,05 44,05 44,05 44,05 44,05 35,05 53,05 35,05,	1090,90 1636,36 1636,37 Internal 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 2782,10 2782,10 2782,10 3590,28 3590,28 3590,28 Pressum Internal 0,00 0,00 0,00 319,92	108 181 181 181 External 3 14 22 23 46 55 55 64 46 55 55 64 46 46 55 55 55 64 41 144 144 144 144 144 144 144 144 1
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 01 1 00 1 24 1 43 1 152 1 433 1 152 1 362 1 362 1 362 1 363 1 422 1 363 1 422 1 609 1 424 1 362 1 914 1 914 1 00 1 0 1 0 1 0 1 0 1 1 1 1 1	60 13 40 -119 40 -119 5sureTest #1 - Axial Force (bf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 70 473 57 452 64 460 60 383 40 273 40 273 ckling = 108389 It tReturnsWithM Axial Force (bf) 03 244 96 233 80 111 96 233	558 520" Surface 20" Surface Dogleg (*/100f 187 553 583 583 583 583 583 51 140 551 140 138 551 140 554 549 549 549 549 540 554 540 554 555 555 555 555 555 555	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,02 0,00 0,02 0,00 0,02 0,00 0,02 0,00 0,02 0,00	0.0 0.0 0.0 0.0 0.0 0.0 1.9 10.3 12.3 61.3 85.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Temperature (°F) 50,00 48,05 44,05 44,05 44,05 44,05 35,00 35,05 38,02 47,18 62,20 62,20 	1090,90 1636,36 1636,37 Pressum Internal 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2782,01 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2780,35 2780,28 3590,28 Pressum Internal Internal 0,00 0,00 319,92 422,28	e (psi) e (psi) External 3 14 22 23 46 55 55 64 59 92 144 144 144 144 24 55 55 55 64 55 55 64 55 55 64 55 55 64 55 55 55 64 55 55 64 55 55 55 64 55 55 55 55 64 55 55 55 55 55 55 55 55 55 5
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 24 1 24 1 24 1 304 1 362 1 362 1 362 1 363 1 422 1 363 1 422 1 914 1 362 1 304 1 914 1 95 1 143 1 152 1 365 1 914 1 95 1 143 1 152 1 365 1 914 1 95 1 143 1 152 1 365 1 914 1 95 1 143 1 95 1 95 1 95 1 143 1 95 1 95	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (bf) 03 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 02 473 57 452 64 460 60 383 40 273 40 273 ckling = 108389 It tReturnsWithM Axial Force (bf) 03 244 96 86 80 686	358 342 346 Dogleg (*/100ft 187 187 187 187 187 187 187 187	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,02 0,00	0.0 0.0 0.0 0.0 0.0 0.0 1.0 1.9 10.3 12.3 61.3 85.3 85.3 85.3 85.3 85.3 85.3 85.3 85	0.0 0.0 0.0 Friction Force ((bf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Emperature (°F) 50,00 49,00 46,05 44,05 44,05 44,05 35,05 38,02 35,05 38,02 47,18 62,20 62,20 7 Emperature (°F) (°F) (°F)	1090,90 1636,36 1636,37 Internal Internal 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2782,01 2782,01 2782,01 2782,01 2782,03 3590,26 3143,50 3590,28 3590,28 	108 181 181 181 External 3 3 14 22 23 46 55 55 64 45 59 92 92 144 144 144 144 144 144 55 55 55 64 55 55 55 64 55 55 55 64 14 14 15 14 14 14 14 15 14 14 14 14 14 14 14 14 14 14 14 14 14
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 01 1 00 1 24 1 43 1 152 1 433 1 152 1 362 1 362 1 362 1 363 1 422 1 363 1 422 1 609 1 424 1 362 1 914 1 914 1 00 1 0 1 0 1 0 1 0 1 1 1 1 1	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (bf) 63 646 96 635 83 604 74 583 40 579 80 513 01 488 96 487 72 473 57 452 64 460 60 383 40 273 ckling = 108389 It tReturnsWithM Axial Force (bf) 03 244 96 233 80 111 01 86 96 86 02 83	558 520" Surface 20" Surface Dogleg (*/100f 187 553 583 583 583 583 583 51 140 551 140 138 551 140 554 549 549 549 549 540 554 540 554 555 555 555 555 555 555	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,02 0,00 0,02 0,00 0,02 0,00 0,02 0,00 0,02 0,00	0.0 0.0 0.0 0.0 0.0 0.0 1.9 10.3 12.3 61.3 85.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Temperature (°F) 50,00 48,05 44,05 44,05 44,05 44,05 35,00 35,05 38,02 47,18 62,20 62,20 	1090,90 1636,36 1636,37 Pressum Internal 2250,05 2286,60 2390,48 2460,71 2473,38 2696,75 2782,01 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2782,10 2780,35 2780,28 3590,28 Pressum Internal Internal 0,00 0,00 319,92 422,28	e (psi) e (psi) External 3 14 22 23 46 55 55 64 44 99 92 144 144 144 22 23 46 55 55 64 55 55 64 55 55 64 55 55 55 55 55 55 55 55 55 5
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 01 1 0 1 24 1 95 1 143 1 152 1 304 1 362 1 363 1 422 1 363 1 422 1 914 1 914 1 95 1 00 1 914 1 95 1 00 1 00 1 24 1 362 1 363 1 422 1 609 1 914 1 914 1 95 1 00 1 00 1 24 1 362 1 363 1 422 1 364 1 914 1 95 1 364 1 95 1 914 1 92 1 94 1 94	60 13 40 -119 5500 -119 5500 -119 5500 -119 5500 -119 5500 -119 5500 -119 5500 -119 503 -119 513 513 513 513 513 513 513 513	358     358     20" Surface         Dogleg         (*/1008         S9         (*/1008         S9         (*/1008         S9         S9         S9	0,00 0,00	0,0 0,0 0,0 (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 7 Emperature (°F) 50,00 46,05 44,05 44,05 44,05 44,05 44,05 35,05 35,05 35,05 35,05 35,05 35,05 36,02 47,18 62,20 62,20 7 7 Emperature (°F) 50,000 50,0000 50,0000 50,0000 50,00000000	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,01 2782,10 2869,37 2869,37 2869,46 3143,50 3590,28 28 28 28 28 28 28 28 28 28 28 28 28 2	108 181 181 181 External 3 14 22 23 46 55 55 64 46 55 55 64 144 144 144 144 144 144 144 144 144
String Section Additional Pick asing Load S String	1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 914 1 00 1 24 1 143 1 152 1 143 1 152 1 362 1 362 1 362 1 422 1 629 1 914 1 914 1 914 1 914 1 914 1 01 1 24 1 304 1 24 1 362 1 362 1 24 1 362 1 363 1 24 1 364 1 362 1 362 1 362 1 362 1 362 1 362 1 422 1 363 1 422 1 362 1 422 1 362 1 422 1 362 1 422 1 362 1 422 1 442 1	60 13 40 -119 40 -119 ssureTest #1 - Axial Force (bf) 03 646 96 635 83 604 74 583 40 579 80 513 98 487 98 487 98 487 1488 96 487 102 473 57 452 64 460 60 383 40 273 264 460 60 383 40 273 264 460 60 383 40 273 264 67 40 273 40 275 40 275 40 275 4	358 352 354 20" Surface Dogleg (*/100f 069 187 262 353 383 3083 124 701 484 286 383 151 140 138 16 1 140Drop #1 - Dogleg (*/100f 954 959 36 377 388 377 388 271	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,07 0,08 0,07 0,08 0,00	0.0 0.0 0.0 0.0 0.0 0.0 1.9 10.3 12.3 61.3 85.3 85.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,20 62,20 (°F) 49,00 46,05 44,05 43,70 35,06 35,05 38,02 38,02 38,02 38,02 47,18 62,20 62,20 Temperature (°F) 50,00 37,54 35,05 33,05 33,05 33,05 33,05 33,05	1090,90 1636,36 1636,37 1636,37 1636,37 1636,37 1636,37 1636,37 2286,60 2390,48 2460,71 2473,38 2696,75 2780,59 2782,10 2869,46 3143,50 3590,28 3590,28 3590,28 2782,10 2869,46 3143,50 3590,28 3590,28 2722,28 422,28 422,28 422,28 422,10 424,12 424,12 424,12 550,67	External 33 14 22 23 46 55 55 55 64 55 64 92 144 144 144

le: Conventional	- U	Comont #1 00	" Surface Conin	-	Date/Time. IV	1arch 01, 2018	02.00.0711	
Casing Load Sum String	MD MD	Axial Force	Dogleg	] Torque	Friction Force	Temperature	Pressure	(mai)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	0,03	899282	0,00	0,0	0,0	50,00	2250,05	
1	24,96	888400	0,00	0,0	0,0	49,00	2294,68	3
1	304,80	766295	0,00	0,0	0,0	37,39	2795,45	46
1	362,01	741337 740914	0,00	0,0	0,0	35,00	2897,82 2899,55	55
	362,96 363,02	740914	0,00 0,00	0,0 0,0	0,0 0,0	35,05 35,05	2899,55	55 55
1	422,57	714907	0,00	0,0	0,0	38,02	3006,21	68
i	422,64	714880	0.00	0.0	0.0	38,02	3006,31	68
1	609,60	633295	0,00	0,0	0,0	47,18	3340,91	108
1	914,40	500295	0,00	0,0	0,0	62,20	3886,36	181
1	914,40	500291	0,00	0,0	0,0	62,20	3886,37	181
asing Load Sum	nmary - OverPu	ıll #1 - 20'' Surf	face Casing					
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	0,03 24,96	364790 353908	0,00 0.00	0,0 0,0	0,0 0,0	50,00 49,00	0,05	3
1	24,96 304,80	353908 231803	0,00	0,0	0,0	49,00 37,39	38,31 467,53	46
1	362,01	206844	0,00	0,0	0,0	35,00	555,27	
1	362,96	206421	0,00	0,0	0,0	35,05	556,75	56
1	363,02	206395	0,00	0,0	0,0	35,05	556,85	5
1	422,57	180414	0,00	0,0	0,0	38,02	648,17	64
1	422,64	180388	0,00	0,0	0,0	38,02	648,27	64
1	609,60	98803	0,00	0,0	0,0	47,18	935,06	93
1	914,40 914,40	-34197 -34201	0,00	0,0 0,0	0,0	62,20 62,20	1402,60 1402,61	14( 14(
asing Load Sum String		$q \square 0   e \# 1 - 20$						
Section	MD (m)	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
Section 1	(m)	(lbf)		(ft-lbf)	(lbf/ft)	(°F) —	Internal	
Section 1	(m) 0,03 24,96		Dogleg (°/100ft) 0,00 0,00	(ft-lbf) 0,0 0,0		(°F) 50,00 49,00		Éxternal
Section 1 1 1	(m) 0,03 24,96 304,80	(lbf) 449124 439720 334197	Dogleg (°/100ft) 0,00 0,00 0,00	(ft-Ibf) 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0	(°F) 50,00 49,00 37,39	Internal 0,05 38,31 467,53	External
Section 1 1 1 1	(m) 0,03 24,96 304,80 362,01	(lbf) 449124 439720 334197 312628	Dogleg (°/100ft) 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00	Internal 0,05 38,31 467,53 555,27	Éxternal
Section 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96	(lbf) 449124 439720 334197 312628 312262	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	<u>(°F)</u> 50,00 49,00 37,39 35,00 35,05	Internal 0,05 38,31 467,53 555,27 556,75	Éxternal 46 55
Section 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02	(lbf) 449124 439720 334197 312628 312262 312262 312239	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,05 35,05	Internal 0,05 38,31 467,53 555,27 556,75 556,85	Éxternal 46 55 55
Section 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,96 362,96 363,02 422,57	(lbf) 449124 439720 334197 312628 312262 312262 312239 289787	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,05 35,05 35,05 38,02	Internal 0,05 38,31 467,53 555,27 556,75 556,85 648,17	Éxternal 46 55 55 56 56
Section 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02	(lbf) 449124 439720 334197 312628 312262 312239 289787 289764	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,05 35,05 35,05 35,05 35,05 35,05 35,05 35,02 38,02	Internal 0,05 38,31 467,53 555,27 556,75 556,85 648,17 648,27	Éxternal 46 55 55 56 64 64
Section 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 363,02 422,57 422,64 609,60 914,40	(lbf) 449124 439720 334197 312628 312262 312262 312239 289764 219259 104320	Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lb.f/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 38,02 47,18 62,20	Internal 0,05 38,31 467,53 555,27 556,85 648,17 648,27 935,06 1402,60	Éxternal 44 55 55 56 64 64 93 141
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60	(lbf) 449124 439720 334197 312628 312262 312239 289787 289764 219259	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,05 35,05 38,02 38,02 47,18	Internal 0,05 38,31 467,53 555,27 556,75 556,85 648,17 648,27 935,06	e (psi) External 46 55 55 64 64 93 140 140
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 4609,60 914,40 914,40 914,40	(lbf) 449124 439720 334197 312628 312262 312239 289764 219259 104320 104317 Conditions - 13	Dogleg ('/1008) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lb//th) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20	Internal 0,05 38,31 467,53 556,75 556,75 556,85 648,17 648,27 935,06 1402,60 1402,61	Éxternal
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 914,40	(ibf) 449124 439720 334197 312628 312262 312239 289787 289784 219259 104320 104317 Conditions - 13 Axial Force	Dogleg ('/100it) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 62,20	Internal 0,05 38,31 467,53 556,75 556,85 648,17 648,27 935,06 1402,60 1402,61	External 3 44 56 56 64 64 93 144 140
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,67 422,64 609,60 914,40 914,40 914,40 mary - Initial C MD (m)	(lbf) 449124 439720 334197 312628 312262 312239 289784 219259 104320 104317 Conditions - 13 Axial Force (lbf)	Dogleg ('/100t) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 62,20	Internal 0,05 38,31 467,53 556,75 556,75 556,85 648,17 648,27 935,06 1402,60 1402,61 Pressure Internal	Éxternal 3 46 55 56 64 64 93 140 140
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 914,40	(ibf) 449124 439720 334197 312628 312262 312239 289787 289784 219259 104320 104317 Conditions - 13 Axial Force	Dogleg ('/100it) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 62,20	Internal 0,05 38,31 467,53 556,75 556,85 648,17 648,27 935,06 1402,60 1402,61	External 3 46 56 56 64 64 93 140 140
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 914,40 914,40 0,03 24,96 304,80	(lbf) 449124 439720 334197 312628 312262 312262 312262 312262 312262 312262 312262 312262 312262 312262 312262 312262 312262 312262 312262 312262 31267 289764 219259 104320 104317 Conditions - 13 Axial Force (lbf) 409896	Dogleg ('/100R) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	(R-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 (°F) (°F) 50,00 49,00 37,39	Internal 0,05 38,31 467,53 556,75 556,85 648,17 648,27 935,06 1402,60 1402,61 Pressure Internal 0,05 44,68 545,46	2 External 46 55 56 64 84 93 140 140 140 140 2 (psi) External 4 54
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 914,40 914,40 0,03 24,96 304,80 362,01	(ibf) 449124 439720 334197 312628 312262 312239 289787 289784 219259 104320 104317 04317 04317 04317 04317 04317 04317 04317 04320 1044005 1045005 1045005	Dogleg ('/100R)         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00	(fk-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 50,00 49,00 37,39 35,00	Internal 0,05 38,31 467,53 556,75 556,85 648,17 648,27 935,06 1402,61 1402,61 Pressure Internal 0,05 44,68 545,46 647,82	External 44 55 56 66 90 91 144 140 External External 54 66 66 66 66 56 57 54 66 66 66 56 56 56 56 56 56 56 56 56 56
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,67 422,64 609,60 914,40 90,60 914,40 90,60 914,40 914,40 90,60 914,40 90,60 914,40 90,60 914,40 90,60 90,60 914,40 90,60 90,60 914,40 90,60	(ibf) 449124 439720 334197 312628 312262 312239 289784 219259 104320 104317 Conditions - 13 Axial Force (ibf) 409896 404005 337904 324392 265904	Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 (°F) 50,00 49,00 37,39 35,00 47,18	Internal 0,05 38,31 467,53 556,75 556,75 556,655 648,17 648,27 935,06 1402,60 1402,60 1402,61 Pressure Internal 0,05 44,68 545,46 647,82 1090,91	External 44 55 56 64 92 144 144 144 External 2 54 64 100
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,92 422,57 422,64 609,60 914,40 914,40 914,40 0,03 24,96 304,80 362,01 609,60 914,40	(ibf) 449124 439720 334197 312628 312262 312262 312262 312262 312262 312262 312262 312262 104320 104320 104317 Conditions - 13 Axial Force (ibf) 409896 404005 337904 337904 324392 265904 19302	Dogleg (*/100it)         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 50,00 49,00 37,39 35,00 47,18 62,22	Internal 0,05 38,31 467,53 556,52 556,75 556,75 556,75 556,75 556,75 1402,61 1402,60 1402,61 9 9 9 9 9 9 1402,61 1402,61 0,05 44,68 0,05 44,68 647,82 1090,91 163,37	External 44 55 56 66 66 99 99 90 90 90 90 90 90 90 90 90 90 90
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 100 114,40 100 114,40 114,40 114,46 11	(b) 449124 439720 334197 312628 312262 312289 312887 3	Dogleg ('/100k) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,05 38,02 38,02 47,18 62,20 62,20 62,20 (°F) 50,00 49,00 37,39 35,00 47,18 62,22 262,22	Internal 0,05 38,31 467,53 555,77 556,75 556,85 648,17 648,27 935,06 1402,60 1402,61 Pressure Internal 0,05 44,68 545,45 645,454 647,82 1090,91 1636,37 1636,48	External 44 55 56 64 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 914,40 0,03 24,96 304,80 362,01 609,60 914,40 914,40 914,40 914,40 914,40 914,40	(ibf) 449124 439720 334197 312628 312262 312289 289764 219259 104320 104317 Conditions - 13 Axial Force (ibf) 409896 404005 337904 324392 265904 193902 193982 193982	Dogleg ('/100it)         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 (°F) (°F) (°F) 50,00 49,00 49,00 49,00 10,000 10,00	Internal 0,05 38,31 467,53 556,75 556,85 648,17 648,27 935,06 1402,60 1402,60 1402,61 0 0,05 44,68 545,46 647,82 1090,81 1636,37 1636,48 2181,82	External 2 44 55 56 64 64 9 9 9 9 9 9 9 9 9 9 9 9 9
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,64 422,64 409,60 914,40 914,40 914,40 (m) 0,03 24,96 304,80 914,40 914,46 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,466 916,	(bb) 449124 439720 334197 312628 312262 312262 312262 312262 312262 312262 312269 104320 104317 Axial Force (bb) 409896 404005 337904 193897 121904 49904	Dogleg ('/100R)         0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 36,05 36,05 38,02 47,18 62,20 62,20 7,18 62,20 62,20 7,39 36,00 49,00 37,39 35,00 49,00 37,39 50,00 49,00 62,20 62,20 62,22 62,22 62,22 62,22 62,22 62,22 62,20 92,20	Internal 0,05 38,31 467,53 5556,75 556,85 556,85 1402,60 1402,60 1402,61 Pressure Internal 0,05 44,68 545,46 647,82 1090,91 1636,87 1636,48 2181,82 2727,27	Éxternal     Éxternal     Éxternal     Éxternal     Éxternal     Éxternal     Éxternal     Éxternal     External     External     2     Éxternal     2     Éxternal     2     Éxternal     2     External     2     External     2     External     2     External     2
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 914,40 0,03 24,96 304,80 362,01 609,60 914,40 914,40 914,40 914,40 914,40 914,40	(ibf) 449124 439720 334197 312628 312262 312289 289764 219259 104320 104317 Conditions - 13 Axial Force (ibf) 409896 404005 337904 324392 265904 193902 193982 193982	Dogleg ('/100it)         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00           0,00         0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 (°F) (°F) (°F) 50,00 49,00 49,00 49,00 10,000 10,00	Internal 0,05 38,31 467,53 556,75 556,85 648,17 648,27 935,06 1402,60 1402,60 1402,61 0 0,05 44,68 545,46 647,82 1090,81 1636,37 1636,48 2181,82	External 2 44 55 56 64 64 93 144 144 144 External 64 100 165 165 165 218 277 322
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,67 422,67 422,67 422,67 422,67 914,40 914,40 914,40 914,40 304,80 304,80 304,80 914,46 1219,20 1524,00 1799,97 1800,03 1828,80	(lbf) 449124 439720 334197 312628 312262 312289 289764 219259 104320 104317 104317 Conditions - 13 Axial Force (lbf) 409896 404005 337904 193902 265904 193902 1939887 121904 49904 -15293 -15293 -22096	Dogleg ('/100k) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 35,05 38,02 38,02 47,18 62,20 62,20 62,20 (°F) 50,00 47,18 62,22 (°F) 50,00 47,18 62,22 77,16 92,20 105,80 105,80 105,80	Internal 0,05 38,31 467,53 555,527 556,75 556,85 648,17 648,27 935,06 1402,60 1402,60 1402,61 0,05 44,68 545,46 647,82 1090,91 1636,37 1636,48 2181,82 2727,27	External 5 5 5 5 5 5 5 5 5 5 6 6 4 9 3 2 1 4 1 4 5 4 5 4 5 5 5 5 5 5 5 5 5 5 5 5
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 304,80 362,01 362,92 422,57 422,64 609,60 914,40 914,40 914,40 0,03 24,96 304,80 304,80 304,80 304,80 304,80 304,80 124,95	(ib) 449124 439720 334197 312628 312262 312262 312262 312262 312262 312262 312262 312262 312262 104320 104317 Conditions - 13 Axial Force (ib) 409896 404005 337904 324392 265904 193987 121904 49904 -15283 -15283	Dogleg ('/100R)         0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,05 36,05 38,02 38,02 47,18 62,20 62,20 50,00 49,00 49,00 49,00 49,00 49,00 49,00 49,00 49,00 50,05 50,00 49,00 47,18 62,22 62,22 62,22 77,18 62,22 62,22 77,18 62,22 62,22 77,18 62,22 62,22 77,18 62,22 77,18 62,22 77,18 62,22 77,18 62,22 77,16 50,00 47,18 62,22 77,16 50,000 50,000 50,0	Internal 0,05 38,31 467,53 556,75 556,75 556,75 556,85 648,17 648,27 935,06 1402,60 1402,61  Pressure Internal 0,05 44,68 545,46 647,82 1090,91 1636,37 1636,48 2181,82 2727,27 3221,14 3221,24	External 2 44 55 56 66 68 99 144 144 144 2 External 6 6 10 16 10 16 11 277 322 322

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Conventional Well Design

	Conventional De	0		0/0!! Links was c -!!	ta Casina	Date/Time. N	1arch 01, 2018	02.00.00 FIM 1	age. 0 01 2
Cas	sing Load Summ String	MD MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(nsi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	724315	0.00	0,0	0,0	50,00	4650,04	0,0
	1	24,96	718424	0.00	0.0	0.0	49,00	4686.60	44,1
	1	304,80	652322	0,00	0.0	0,0	37,39	5096,75	545,4
	1	362,01	638811	0.00	0,0	0,0	35.00	5180,58	647,1
	1	609,60	580322	0,00	0,0	0,0	47,18	5543,51	1090,9
	1	914,40	508320	0,00	0,0	0,0	62,22	5990,27	1636,3
	1	914,46	508306	0,00	0,0	0,0	62,22	5990,36	1636,4
	1	1066,80	472322	0,02	0,2	0,0	69,68	6213,63	1909,0
	1	1219,20	436322	0,15	5,1	0,0	77,16	6437,01	2181,8
0	1	1371,60	400322	0,29	13,2	0,0	84,68	6660,39	2454,5
1	1	1524,00	364322	0,42	23,4	0,0	92,20	6883,76	2727,2
2	1	1676,40	328322	0,56	35,5	0,0	99,72	7107,14	3000,0
3	1	1799,97	299126	0,66	46,4	0,0	105,80	7288,26	3221,1
4	1	1800,03	283031	0,00	0,0	0,0	105,80	7288,35	3148,3
5	1	1828,80	275364	0,00	0,0	0,0	107,14	7330,52	3211,9
6	1	2133,60	191793	0,00	0,0	0,0	122,18	7777,27	3950,3
7	1	2219,86	166913	0,00	0,0	0,0	126,40	7903,71	4212,0
3 🗋									
9 A	dditional Pickup to	Prevent Buckli	ng = 122249 lbf						
_									
Cas	sing Load Summ								
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	379298	0,00	0,0	0,0	50,00	0,00	0,0
	1	24,96	373407	0,00	0,0	0,0	50,00	0,00	44,1
	1	304,80	307305	0,00	0,0	0,0	37,54	1,49	545,4
	1	362,01	293794	0,00	0,0	0,0	35,00	7,52	647,8
	1	0.0 0.00	235305	0.00	0.0	0.0	47 19	483 34	1090

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	1	0,03	379298	0,00	0,0	0,0	50,00	0,00	0,05
2	1	24,96	373407	0,00	0,0	0,0	50,00	0,00	44,68
3	1	304,80	307305	0,00	0,0	0,0	37,54	1,49	545,46
4	1	362,01	293794	0,00	0,0	0,0	35,00	7,52	647,82
5	1	609,60	235305	0,00	0,0	0,0	47,19	483,34	1090,91
6	1	914,40	163303	0,00	0,0	0,0	62,19	1132,72	1636,38
7	1	914,46	163289	0,00	0,0	0,0	62,19	1132,85	1636,49
8	1	1219,20	91305	0,00	0,0	0,0	77,19	1782,04	2181,82
9	1	1524,00	19305	0,00	0,0	0,0	92,19	2431,39	2727,28
10	1	1799,97	-45892	0,00	0,0	0,0	105,77	3019,33	3221,14
11	1	1800,03	-23534	0,00	0,0	0,0	105,77	3019,46	3148,36
12	1	1828,80	-30025	0,00	0,0	0,0	107,19	3080,75	3211,96
13	1	2133,60	-99005	0,00	0,0	0,0	122,19	3730,10	3950,36
14	1	2219,86	-119889	0,00	0,0	0,0	126,44	3913,89	4212,09

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	966653	0,00	0,0	0,0	50,00	4650,06	0,0
	1	24,96	960762	0,00	0,0	0,0	49,00	4694,68	44,6
	1	304,80	894661	0,00	0,0	0,0	37,39	5195,46	545,4
	1	362,01	881149	0,00	0,0	0,0	35,00	5297,82	647,8
	1	609,60	822661	0,00	0,0	0,0	47,18	5740,91	1090,9
	1	914,40	750659	0,00	0,0	0,0	62,22	6286,37	1636,3
	1	914,46	750644	0,00	0,0	0,0	62,22	6286,48	1636,4
	1	1219,20	678661	0,00	0,0	0,0	77,16	6831,81	2181,8
	1	1524,00	606661	0,00	0,0	0,0	92,20	7377,27	2727,2
	1	1799,97	541464	0,00	0,0	0,0	105,80	7871,14	3221,14
	1	1800,03	541464	0,00	0,0	0,0	105,80	7871,24	3221,2
2	1	1828,80	534661	0,00	0,0	0,0	107,14	7922,72	3282,5
	1	2133,60	462661	0,00	0,0	0,0	122,18	8468,18	3967,7
	1	2219.86	442275	0.00	0.0	0.0	126.40	8622.57	4200.0

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	0,03	491863	0,00	0,0	0,0	50,00	0,05	0,0
2	1	24,96	485972	0,00	0,0	0,0	49,00	44,68	44,68
3	1	304,80	419870	0,00	0,0	0,0	37,39	545,45	545,45
4	1	362,01	406358	0,00	0,0	0,0	35,00	647,81	647,8
5	1	609,60	347870	0,00	0,0	0,0	47,18	1090,90	1090,90
6	1	914,40	275868	0,00	0,0	0,0	62,22	1636,38	1636,38
7	1	914,46	275853	0,00	0,0	0,0	62,22	1636,49	1636,49
B	1	1219,20	203870	0,00	0,0	0,0	77,16	2181,82	2181,82
9	1	1524,00	131870	0,00	0,0	0,0	92,20	2727,27	2727,27
10	1	1799,97	66673	0,00	0,0	0,0	105,80	3221,13	3221,13
11	1	1800,03	66673	0,00	0,0	0,0	105,80	3221,24	3221,24
12	1	1828,80	59870	0,00	0,0	0,0	107,14	3272,72	3272,72
13	1	2133,60	-12130	0.00	0,0	0,0	122,18	3818,18	3818,18
14	1	2219,86	-32516	0.00	0,0	0,0	126,40	3972.56	3972,56

	mmary - Runnir							
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	
Section	(m) 1 0.03	(lbf) 497951	(°/100ft) 0.00	(ft-lbf) 0.0	(lbf/ft) 0.0	(°F) 50.00	Internal 0.05	External
	1 24.96	492987	0.00	0.0	0,0	49.00	44.68	4
	1 304,80	437285	0,00	0.0	0,0	37,39	545,45	54
· ·	1 362,01	425899	0,00	0,0	0,0	35,00	647,81	64
•	1 609,60	376612	0,00	0,0	0,0	47,18	1090,90	109
·	1 914,40	315938	0,00	0,0	0,0	62,22	1636,38	163
	1 914,46	315926	0,00	0,0	0,0	62,22	1636,49	163
	1 1219,20 1 1524,00	255268 194596	0,00	0,0 0.0	0,0	77,16 92,20	2181,82 2727,27	218 272
	1 1799,97	139663	0.00	0,0	0,0	92,20 105,80	3221,13	322
	1 1800,03	139651	0,00	0,0	0,0	105,80	3221,24	322
	1 1828,80	133924	0.00	0.0	0,0	107,14	3272,72	327
	1 2133,60	73251	0,00	0,0	0,0	122,18	3818,18	381
-	1 2219,86	56079	0,00	0,0	0,0	126,40	3972,56	397
asing Load Su	mmary - Initial (	Conditions - 95	%" Production (	Casing				
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	
Section	(m) 1 0.03	(lbf) 403245	(°/100ft) 0.00	(ft-lbf) 0.0	(lbf/ft) 0.0	(°F) 50.00	Internal	External
	1 0,03	403245 398868	0,00	0,0	0,0	49,00	0,06 53,19	5
	1 304,80	349751	0,00	0,0	0,0	37,39	649,35	64
	1 362,01	339711	0,00	0,0	0,0	35,00	771,21	77
· ·	1 609,60	296251	0,00	0,0	0,0	47,18	1298,70	129
·	1 914,40	242751	0,00	0,0	0,0	62,22	1948,05	194
· · ·	1 1219,20	189251	0,00	0,0	0,0	77,16	2597,40	259
	1 1524,00	135751	0,00	0,0	0,0	92,20	3246,75	324
	1 1828,80	82251	0,00	0,0	0,0	107,14	3896,10	389
	1 2133,60 1 2219,86	28751 13603	0,00 0,00	0,0 0,0	0,0 0,0	122,18 126,39	4545,45 4729,24	454 472
	1 2219,92	13603	0.00	0,0	0,0	126,35	4729,37	472
	1 2438,40	-24749	0.00	0.0	0,0	137,19	5194,80	519
	1 2499,97	-35562	0,00	0,0	0,0	140,20	5325,97	532
·	1 2500,03	-35562	0,00	0,0	0,0	140,20	5326,10	532
· ·	1 2743,20	-78249	0,00	0,0	0,0	152,16	5844,15	588
	1 2906,33	-106890	0,00	0,0	0,0	160,20	6191,71	633
sing Load Su	mmary - Pressu	11-0 F	8" Production (	- asing				
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	
Section	(m) 1 0.03	(lbf) 556666	(°/100ft) 0.00	(ft-lbf) 0.0	(lbf/ft) 0.0	(°F) 50.00	Internal 5300,04	External
	1 24,96	552289	0,00	0,0	0,0	49,00	5336,60	5
	1 304.80	503172	0,00	0.0	0,0	37,39	5746,75	64
	1 362,01	493132	0,00	0,0	0,0	35,00	5830,59	77
	1 609,60	449672	0,00	0,0	0,0	47,18	6193,51	129
	1 914,40	396172	0,00	0,0	0,0	62,22	6640,26	194
	1 1219,20	342672	0,00	0,0	0,0	77,16	7087,01	259
	1 1524,00	289172	0,00	0,0	0,0	92,20	7533,77	324
	1 1828,80 1 2133,60	235672 182172	0,00	0,0 0,0	0,0	107,14 122,18	7980,51 8427,27	389
	1 2219,86	167024	0,00	0,0	0,0	122,18	8427,27 8553,72	454
	1 2219,92	167024	0.00	0.0	0,0	126,40	8553,81	472
	1 2438,40	128672	0,00	0,0	0,0	137,19	8874,02	519
	1 2499,97	117859	0,07	0,5	0,0	140,20	8964,27	532
	1 2500,03	110907	0,00	0,0	0,0	140,20	8964,36	482
	1 2743,20	70876	0,00	0,0	0,0	152,16	9320,77	520
	1 2906,33	50698	0,00	0,0	0,0	160,20	9559,90	537

asing Load Sumr	Design mary - LostRe	turne\A/ithMudC	rop #1 _ 0 5/8" I	Production C		arch 01, 2010	02.00.001 10	Page: 8 of
String	MD MD		Dogleg	Torque	Friction Force	Temperature	Pressure	(mai)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	0,03	367427	0.00	0.0	0.0	50,00	0,00	C
1	24,96	363050	0,00	0,0	0,0	50,00	0,00	53
1	304,80	313933	0,00	0,0	0,0	37,54	0,00	649
1	362,01	303893	0,00	0,0	0,0	35,00	0,00	771
1	609,60	260433	0,00	0,0	0,0	47,19	125,70	1298
1	914,40	206933	0,00	0,0	0,0	62,19	773,98	1948
1	1219,20	153433	0,00	0,0	0,0	77,19	1423,33	2597
1	1524,00	99933	0,00	0,0	0,0	92,19	2072,68	3246
1	1828,80	46433	0,00	0,0	0,0	107,19	2722,03	3896
1	2133,60	-7067	0,00	0,0	0,0	122,19	3371,38	4545
]	2219,86	-22215	0,00	0,0	0,0	126,44	3555,17	4729
1	2219,92	-22215	0,00	0,0	0,0	126,45	3555,30	4729
]	2438,40	-60567	0,00	0,0	0,0	137,19	4020,73	5194
4	2499,97	-71380 -54375	0,00	0,0 0,0	0,0	140,23	4151,90 4152,03	5325 4827
	2500,03 2743,20	-54375 -88884	0,00	0,0	0,0	140,23 152,20	4152,03	4827
	2906.33	-105314	0,00	0,0	0,0	160.23	5017,63	5203
asing Load Sumr String	marγ - Green MD	Cement #1 - 9 { Axial Force	5/8" Production ( Dogleg	Casing Torque	Friction Force	Temperature	Pressure	(nsi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	0.03	706476	0.00	0.0	0.0	50.00	5300,06	(
1	24,96	702098	0,00	0,0	0,0	49,00	5353,19	53
1	304,80	652981	0,00	0,0	0,0	37,39	5949,35	649
1	362,01	642941	0,00	0,0	0,0	35,00	6071,21	77
1	609,60	599481	0,00	0,0	0,0	47,18	6598,70	1298
1	914,40	545981	0,00	0,0	0,0	62,22	7248,05	1948
1	1219,20	492481	0,00	0,0	0,0	77,16	7897,40	2597
1	1524,00	438981	0,00	0,0	0,0	92,20	8546,75	3246
1	1828,80	385481	0,00	0,0	0,0	107,14	9196,10	3896
11	2133,60	331981	0,00	0,0	0,0	122,18	9845,45	454
1	2219,86	316833	0,00	0,0	0,0	126,39	10029,24	4729
]	2219,92	316833	0,00	0,0	0,0	126,40	10029,37	4729
	2438,40 2499,97	278481 267669	0,00 0.00	0,0 0,0	0,0 0,0	137,19	10494,80	5194
1				0,0	0,0	140,20	10625,96	5325
	2500,03 2743,20	267669 224981	0,00 0.00	0,0	0,0	140,20 152,16	10626,10 11144,15	5320 588
1	2906.33	196341	0,00	0,0	0,0	160.20	11491.71	633
, , , , , , , , , , , , , , , , , , ,	2000,00	100041	0,00	0,0	0,0	100,20		000
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
	MD (m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)	(lbf/ft)	(°F) —	Internal	External
String	MD (m) 0,03	Axial Force (lbf) 463866	Dogleg (°/100ft) 0,00	Torque (ft-lbf) 0,0	(lbf/ft) 0,0	(°F) 50,00	Internal 0,06	(
String	MD (m) 0,03 24,96	Axial Force (lbf) 463866 459489	Dogleg (°/100ft) 0,00 0,00	Torque (ft-lbf) 0,0 0,0	(lbf/ft) 0,0 0,0	(°F) 50,00 49,00	Internal 0,06 53,19	5
String	MD (m) 0,03 24,96 304,80	Axial Force (lbf) 463866 459489 410372	Dogleg (°/100ft) 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0	(°F) 50,00 49,00 37,39	Internal 0,06 53,19 649,35	( 53 649
String	MD (m) 0,03 24,96 304,80 362,01	Axial Force (lbf) 463866 459489 410372 400332	Dogleg (°/100ft) 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00	Internal 0,06 53,19 649,35 771,21	5: 64! 77
String	MD (m) 24,96 304,80 362,01 609,60	Axial Force (lbf) 463866 459489 410372 400332 356872	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 47,18	Internal 0,06 53,19 649,35 771,21 1298,70	( 53 649 77 1298
String	MD (m) 24,96 304,80 362,01 609,60 914,40	Axial Force (lbf) 463866 459489 410372 400332 356872 303372	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 47,18 62,22	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05	( 53 645 77 <sup>,</sup> 1296 1948
String	MD (m) 24,96 304,80 362,01 609,60 914,40 1219,20	Axial Force (lbf) 463866 459489 410372 400332 356872 303372 249872	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40	5: 649 77 <sup>7</sup> 1298 1948 2597
String	MD (m) 24,96 304,80 362,01 609,60 914,40 1219,20 1524,00	Axial Force (lbf) 463866 459489 410372 400332 356872 303372 249872 196372	Dogleg (°/100#) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75	5: 64! 77 129 194 259 324
String	MD (m) 24,96 304,80 362,01 609,60 914,40 1219,20 1524,00 1828,80	Axial Force (lbf) 463866 459489 410372 400332 356872 303372 249872 196372 142872	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09	5: 64! 77 129 194 259 324 389
String	MD (m) 24,96 304,80 362,01 609,60 914,40 1219,20 1524,00 1828,80 2133,60	Axial Force (lbf) 463866 459489 410372 400332 366872 303372 249872 196372 142872 89371	Dogleg ('/100R) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45	5 64 77 129 194 259 324 389 454
String	MD (m) 24,96 304,80 362,01 609,60 914,40 1219,20 1524,00 1828,80 2133,60 2219,86	Axial Force (lbf) 463866 459489 410372 400332 356872 303372 249872 196372 196372 142872 89371 74223	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24	5 64 77 129 194 259 324 329 324 454 454 472
String	MD (m) 24.96 304,80 362,01 609,60 914,40 1219,20 1524,00 1828,80 2133,60 2219,86 2219,86	Axial Force (lbf) 463866 459489 410372 400332 356872 303372 249872 196372 142872 89371 74223 74223	Dogleg (*/100 h) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/th) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39 126,40	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,27	5: 644 77' 1294 1944 259' 3244 3894 4544 472' 472'
	MD (m) 24,96 304,80 362,01 609,60 914,40 1219,20 1524,00 1828,80 2133,60 2219,82 2219,82 2219,82 2219,83,40	Axial Force (bb) 463866 459489 410372 400332 366872 303372 249872 196372 142872 89371 74223 74223 35871	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/th) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39 126,40 137,19	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,37 5194,80	( 55 64% 771 12% 1944 25% 3244 38% 4545 4725 4725 4725
String	MD (m) 24.96 304.80 362.01 609.60 914.40 1219.20 1524.00 1628.80 2219.86 2219.86 2219.92 2498.97	Axial Force (lbf) 463866 459499 410372 400332 356872 303372 249872 196372 142872 89371 74223 74223 35871 25059	Dogleg (*/100 h) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf)         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0	(lbf/#) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39 126,40 137,19 140,20	Internal 0,06 53,19 649,35 7771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,24 4729,37 5194,80 5325,97	( 5: 644 77' 129( 259) 324( 389) 454( 472) 472( 472) 5192 532(
String	MD (m) 24,96 304,80 362,01 609,60 914,40 1219,20 1524,00 1828,80 2133,60 2219,82 2219,82 2219,82 2219,83,40	Axial Force (bb) 463866 459489 410372 400332 366872 303372 249872 196372 142872 89371 74223 74223 35871	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/th) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39 126,40 137,19	Internal 0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,37 5194,80	( 644 77' 1294 1944 2597 3244 3894 4544 4722 4722

Section         (m)           1         0,03           1         24,96           1         304,80           1         304,80           1         304,80           1         362,01           1         609,60           1         914,40           1         1219,20           1         1524,00           1         1219,20           1         1524,00           1         12219,86           2         1           2         1           219,82         1           2438,40         4           4         2499,97           5         1           5         1           6         1           7         1           2906,33           Casing Load Summary - Initial Col	Axial Force (lbf) 455851 452300 412451 404305 369046 369046 326841 282236 238831 195426 195426 195426 195426 199727 109616 99840 65211 41980	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf)         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0           0,0         0,0	Friction Force (lbf/ft)         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0	Temperature (°F) 50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39 126,40 137,19 140,20 152,16 152,16 152,16 152,16 158,90 158,91 150,22	Pressure Internal 0,06 53,19 649,35 771,21 1298,70 1348,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,37 5194,80 5325,97 5326,10 5324,415 6191,71	External 5 64 777 129 194 259 324 389 454 472 472 519 532 532 532 544 619
1 0.03 1 24,96 1 304,80 1 362,01 1 609,60 1 914,40 1 1219,20 1 1219,20 1 1224,96 1 2219,96 1 2219,96 1 2219,96 1 2219,96 1 2439,87 1 2499,97 1 2499,97 1 2499,97 1 2499,97 1 2499,97 1 2906,03 1 2906,33 1 2906,51 1 2906,51	455851 452300 412451 404305 366046 325641 282236 152021 139736 139726 139726 139727 108616 99849 99840 65211 41980 45211 41980 45211 41980 5211 41980 5211 41980 5211 41980 5211 41980 5211 510 512 512 512 512 512 512 512 512 512 512	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0           0.0         0.0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	50,00 49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39 126,40 137,19 140,20 152,16 152,16 160,20	0,06 53,19 649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,24 4729,37 5194,80 5325,97 5326,10 5844,15 6191,71	5 84 77 129 265 324 389 454 472 472 519 532 532 552 554 619 (psi) External 613 613
1 24 96 1 304,80 1 362,01 1 609,60 1 894,40 1 1219,20 1 1224,90 1 1224,90 1 2219,92 1 2219,92 1 2219,92 1 2438,40 1 2499,97 5 1 2219,92 1 249,97 5 1 2200,03 1 2906,33 2 1 2906,33 1 2906,53 1 2906,54 1 2906,55 1	452300 412451 404305 386946 325641 282236 238831 196426 152021 139726 139727 108616 99849 99849 99849 99849 99849 99849 41980 65211 41980 65211 41980 65211 41980 727357 -27357 -30125 -30125 -30125 -30125	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	49,00 37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,40 140,20 140,20 140,20 140,20 160,20 Temperature (°F) 158,90 158,91 158,91 158,91	53, 19 649, 35 771, 21 1298, 70 2597, 40 3246, 75 3896, 09 4545, 45 4729, 37 5194, 80 5325, 97 5326, 10 5824, 15 6191, 71 Pressure Internal 6135, 65 6135, 91 6191, 70	5 64 77 129 194 259 324 389 454 472 472 472 472 532 532 584 619 (psi) External 613 613
1 304.80 1 392.01 1 994.40 1 914.40 1 1219.20 1 1524.00 1 1219.86 1 2133.60 1 219.86 1 2219.86 1 2219.86 1 2219.92 1 249.97 3 1 249.97 3 1 249.97 3 1 249.97 3 1 249.97 3 1 249.97 3 1 249.63 1 2906.33 2 1 2880.15 1 2906.33 1 2906.34 1 2906.35 1 2906.55 1 2906.55	412451 404305 3369046 325641 1282236 239831 152021 139736 139727 108616 99849 99849 99849 99849 99849 99849 99849 99849 99849 99849 - 27357 - 27357 - 27357 - 30125 - 30125 - 30125	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	37,39 35,00 47,18 62,22 77,16 92,20 107,14 122,18 126,39 126,40 137,19 140,20 152,16 160,20	649,35 771,21 1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,24 4729,37 5194,80 5325,97 5326,10 5844,15 6191,71	64 77 129 194 2565 324 389 454 472 472 532 552 552 552 564 619 (psi) External 613 613
1         362.01           1         609.60           1         914.40           1         1219.20           1         1524.00           1         1524.00           1         1524.00           1         1524.00           1         1524.00           1         1524.00           1         1524.00           1         219.82           1         249.97           1         2499.97           1         2500.03           1         2499.97           1         2906.33           2         1           2906.33         1           2906.53         1           2906.53         1           1         2906.53           1         2906.53           1         2906.54           1         3048.00	404305 369046 325641 282236 156221 139727 108676 99849 99840 65211 41980 65211 41980 65211 41980 65211 41980 72757 -27357 -27357 -30125 -30125 -30125	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	47,18 62,22 77,16 92,20 107,14 122,18 126,40 137,19 140,20 140,20 140,20 152,16 160,20 Temperature (°F) 158,90 158,91 158,91 158,91	771,21 1298,70 1348,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,37 5194,80 5325,97 5326,10 5544,15 6191,71 Pressure Internal 6135,65 6135,91 6191,70	(psi) (psi)(
1 609,60 1 914,40 1 1219,20 1 1524,00 1 1524,00 1 1219,20 1 1219,86 1 2219,92 1 2439,40 1 2499,97 1 2499,97 1 2499,97 1 2499,97 1 2499,97 1 2499,97 2 1 2499,37 2 1 2496,33 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	36946 325641 282236 238831 195426 152021 139727 108616 99849 99849 99849 99849 65211 41980 65211 41980 65211 41980 65211 41980 77" If Axial Force (lbf) -27357 -27357 -30125 -30125 -30145	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	47,18 62,22 77,16 92,20 107,14 122,18 126,40 137,19 140,20 140,20 140,20 152,16 160,20 Temperature (°F) 158,90 158,91 158,91 158,91	1298,70 1948,05 2597,40 3246,75 3896,09 4545,45 4729,24 4729,24 4729,27 5194,80 5325,97 5326,10 5844,15 6191,71 Internal 6135,65 6135,91 6191,70	(psi) (ps
1         914.40           1         1219.20           1         1524.00           1         1524.00           1         1528.00           1         213.60           1         2219.92           1         2439.97           1         2499.97           1         2600.03           1         279.92           1         2409.97           1         2500.03           1         2704.320           2         1           2006.33         1           2006.33         1           1         2906.63           1         2906.63           1         2906.63           1         2906.63           1         2906.63	282256 239831 195426 152021 139726 139727 109616 99849 99849 99849 99840 65211 41980 Axial Force (lbf) -27357 -30125 -30125 -30125 -30145	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	62,22 77,16 92,20 107,14 122,18 126,39 126,40 137,19 140,20 140,20 152,16 152,16 160,20	2597,40 3246,75 3896,09 4545,45 4729,37 5194,80 5325,97 5326,10 5824,15 6191,71 Pressure Internal 6135,65 6135,91 6191,70	(psi) (psi)
1         1524,00           1         1828,80           1         2133,60           1         2219,86           1         2438,40           1         2438,40           1         2438,40           1         2499,97           1         2438,40           2         1           2438,40         1           2438,40         1           2438,40         1           2438,40         1           2906,33         1           2906,33         1           2906,63         1           1         2906,63           1         2906,63           1         2906,61           1         2906,61           1         2906,61	238831 196426 152021 139736 139777 108616 99849 99849 99849 99849 99849 99849 99849 99849 41980 65211 41980 -27357 -27357 -30125 -30125 -30125 -30125	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	92,20 107,14 122,18 126,39 126,40 137,19 140,20 140,20 152,16 160,20	3246,75 3896,09 4545,45 4729,24 4729,24 4729,37 5194,80 5325,97 5326,10 5844,15 6191,71 Internal 6135,65 6135,91 6191,70	324 389 454 472 519 532 532 584 619 (psi) External 613 613
1         1282,80           1         213,80           1         219,92           1         2219,92           1         2439,87           1         2439,97           1         2439,97           1         2439,97           1         2439,97           1         2439,97           1         2439,97           1         2439,97           1         250,03           1         2906,33           2         1           2306,33         1           2906,63         1           1         2906,63           1         2906,53           1         2906,53           1         2906,53           1         2906,53	195426 152021 139736 139727 109616 99849 99840 65211 41980 Axial Force (lbf) -27357 -27357 -30125 -30125 -30125 -30141 -44995	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 (ft-lbf) 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lb//ft) 0,0	107,14 122,18 126,39 126,40 137,19 140,20 140,20 152,16 160,20 Temperature (°F) 158,90 158,91 158,91 158,91	3896,09 4545,45 4729,24 4729,37 5194,80 5325,97 5326,10 5844,15 6191,71 Pressure Internal 6135,65 6135,91 6191,70	(psi) (psi)(
Casing Load Summary - Initial Con String MD Section (m) Section 1 2906,33 1 2906,33	152021 139736 139727 108616 99849 99849 99849 65211 41980 65211 41980 65211 41980 65211 41980 727357 -27357 -27357 -30125 -30125 -30125 -30141 -44957	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 (ft-lbf) 0,0 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0	122,18 126,39 126,40 137,19 140,20 152,16 160,20 Temperature (°F) 158,91 158,91 158,91	4545,45 4729,24 4729,37 5194,80 5325,97 5326,10 5844,15 6191,71 Internal 6135,65 6135,91 6191,70	454 472 519 532 584 619 (psi) External 613 613
1         2219.86           1         2219.92           1         2438.40           1         2499.97           1         2409.97           1         2500.03           1         2743.20           2         1           2006.33         1           2006.33         1           2006.33         1           2006.33         1           2006.33         1           2006.33         1           2006.31         1           3048.00         1	139736 139727 108616 99849 99840 65211 41980 Axial Force (lbf) -27357 -27373 -30125 -30125 -30141 -44995	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 (ft-lbf) 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0	126.39 126.40 137.19 140.20 140.20 152.16 160.20 Temperature (°F) 158.91 158.91 158.91	4729,24 4729,37 5194,80 5325,97 5326,10 5844,15 6191,71 Pressure Internal 6135,65 6135,91 6191,70	472 472 519 532 532 584 619 (psi) External 613 613
2 1 2219,92 1 2438,40 1 2439,97 5 1 2500,03 1 2500,03 1 2906,33 2 1 2906,33 2 2906,33 2 2906,33 2 2906,33 2 2906,33 1 2906,33 1 2906,33 1 2906,33 1 2906,33 1 2906,33 1 2906,33 1 2906,39 1 2906,59 1 290	139727 108616 99849 99849 99840 65211 41980 Axial Force (lbf) -27357 -30125 -30125 -30125 -30141 -44995	0,00 0,00 0,00 0,00 0,00 0,00 Production Liner Dogleg (*/100t) 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 0,0 0,0 (ft-lbf) 0,0 0,0 0,0	0.0 0.0 0.0 0.0 0.0 0.0 Friction Force (lb//ft) 0.0 0.0	126.40 137,19 140,20 140,20 152,16 160,20 Temperature (°F) 158,90 158,91 158,91	4729,37 5194,80 5325,97 5326,10 5844,15 6191,71 Pressure Internal 6135,65 6135,91 6191,70	472 519 532 584 619 (psi) External 613 613
a 1 2438,40 1 2499,97 5 1 2500,03 6 1 2743,20 7 1 2906,33 Casing Load Summary - Initial Cor String MD Section (m) 1 2880,02 1 2880,02 1 2906,51 1 2906,51 1 3048,00	108616 99849 99840 65211 41980 Axial Force (lbf) -27357 -27373 -30125 -30125 -30125 -30125	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 (ft-lbf) 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	137,19 140,20 140,20 152,16 160,20 Temperature (°F) 158,91 158,91 158,91	5194,80 5325,97 5326,10 5844,15 6191,71 Internal 6135,65 6135,91 6191,70	519 532 584 619 (psi) External 613 613
1         2499,97           1         2500,03           1         2500,03           1         2743,20           7         1           2306,33         1           Casing Load Summary - Initial Col String MD Section (m)         1           1         2880,02           1         2890,15           1         2906,53           1         2906,53           1         2906,53           1         2906,51           1         3048,00	99849 99840 65211 41980 Axial Force (lbf) -27357 -27357 -30125 -30125 -30125 -30142	0,00 0,00 0,00 0,00 0,00 Production Liner Dogleg (*/100ft) 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 (ft-lbf) 0,0 0,0	0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	140,20 140,20 152,16 160,20 Temperature (°F) 158,91 158,91 158,91 158,91	5325,97 5326,10 5844,15 6191,71 Pressure Internal 6135,65 6135,91 6191,70	532 532 584 619 (psi) External 613 613
Casing Load Summary - Initial Con String MD Section (m) 1 2880,02 1 2880,02 1 2880,05 1 2906,51 1 2906,51 1 3048,00	65211 41980 Axial Force (Ib) -27357 -27373 -30125 -30125 -30141 -44995	0,00 0,00 Production Liner Dogleg ('/100ft) 0,00 0,00 0,00	0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0	0,0 0,0 Friction Force (lbf/t) 0,0 0,0	152,16 160,20 Temperature (°F) 158,90 158,91 160,22	5844,15 6191,71 Pressure / Internal 6135,65 6135,91 6191,70	584 619 (psi) External 613 613
7 1 2906,33 Casing Load Summary - Initial Cor String MD Section (m) 1 2880,02 1 2880,15 1 2906,33 1 2906,33 1 2906,51 1 3048,00	41980 nditions - 7" F Axial Force (lbf) -27357 -27373 -30125 -30125 -30125 -30141 -44995	0,00 Production Liner Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00	0,0 Torque (ft-lbf) 0,0 0,0 0,0	0,0 Friction Force (lbf/ft) 0,0	160,20 Temperature	6191,71 Pressure Internal 6135,91 6135,91 6191,70	619 (psi) External 613 613
Casing Load Summary - Initial Cor String MD Section (m) 1 2880,02 1 2880,15 1 2906,33 1 2906,51 1 3048,00	nditions - 7" F Axial Force (lbf) -27357 -27373 -30125 -30125 -30141 -44995	Production Liner Dogleg (°/100ft) 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0	Temperature (°F) 158,90 158,91 160,22	Pressure Internal 6135,91 6191,70	(psi) External 613 613
String         MD           Section         (m)           1         2880,02           1         2880,15           1         2906,633           1         2906,59           1         2906,51           1         2906,51           1         3048,00	Axial Force (lbf) -27357 -27373 -30125 -30125 -30141 -44995	Dogleg (°/100ft) 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0	(lbf/ft) 0,0 0,0	(°F) 158,90 158,91 160,22	Internal 6135,65 6135,91 6191,70	External 613 613
String         MD           Section         (m)           1         2880,02           1         2880,15           1         2906,633           1         2906,59           1         2906,51           1         3048,00	Axial Force (lbf) -27357 -27373 -30125 -30125 -30141 -44995	Dogleg (°/100ft) 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,0 0,0 0,0	(lbf/ft) 0,0 0,0	(°F) 158,90 158,91 160,22	Internal 6135,65 6135,91 6191,70	External 613 613
1 2880,02 1 2880,15 1 2906,33 1 2906,39 1 2906,51 1 3048,00	-27357 -27373 -30125 -30125 -30141 -44995	0,00 0,00 0,00 0,00	0,0 0,0 0,0	0,0 0,0	158,90 158,91 160,22	6135,65 6135,91 6191,70	613 613
1 2880,15 1 2906,33 1 2906,59 1 2906,51 1 3048,00	-27373 -30125 -30125 -30141 -44995	0,00 0,00 0,00	0,0 0,0	0,0	158,91 160,22	6135,91 6191,70	613
1 2906,33 1 2906,39 1 2906,51 1 3048,00	-30125 -30125 -30141 -44995	0,00 0,00	0,0		160,22	6191,70	013
1 2906,39 1 2906,51 1 3048,00	-30125 -30141 -44995	0,00		0,0			
1 2906,51 1 3048,00	-30141 -44995			0.0	160,22	6191,83	619
			0.0	0,0	160,23	6192,09	619
1 3296,96	-71137	0,00	0,0	0,0 0,0	167,20	6493,50	652
Casing Load Summary - Pressure String MD	Test #1 - 7" F Axial Force	Production Liner Dogleg	Torque	Friction Force	Temperature	Pressure	(nsi)
Section (m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1 2880,02	29575	0,00	0,0	0,0	158,90	9388,80	613
1 2880,15	29560	0,00	0,0	0,0	158,91	9388,97	613
1 2906,33 1 2906,39	27015 45410	0,00 0,00	0,0 0,0	0,0 0,0	160,22 160,22	9426,15 9426,24	617 537
1 2906,59	45396	0,00	0,0	0,0	160,22	9426,24	537
1 3048,00	32994	0,00	0,0	0,0	167,20	9627,27	551
1 3296,96	11106	0,00	0,0	0,0	179,40	9980,74	585
Casing Load Summary - LostRetu String MD	rnsWithMudD Axial Force	Drop #1 - 7" Pro Dogleg	duction Liner	Friction Force	Temperature	Pressure	(nsi)
Section (m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1 2880,02	-47963	0,00	0,0	0,0	158,93	4961,58	613
1 2880,15	-47978	0,00	0,0	0,0	158,94	4961,85	613
1 2906,33	-50588	0,00	0,0	0,0	160,23	5017,63	619
1 2906,39	-31760	0,00	0,0	0,0	160,23	5017,76	537
1 2906,51	-31771	0,00	0,0	0,0	160,24	5018,02	537
1 3048,00 1 3296,96	-42392 -61287	0,00 0,00	0,0 0,0	0,0 0,0	167,20 179,45	5319,43 5849,84	551 585
. 5266,00	0.237	0,00	0,0	0,0			
Casing Load Summary - GreenCe	ment #1 _ 7"	Production Line	r				
String MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
Section (m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1 2880,02	127229	0,00	0,0	0,0	158,90	11435,65	613
1 2880,15	127213	0,00	0,0	0,0	158,91	11435,91	613
	124461	0,00	0,0 0,0	0,0	160,22	11491,70	619
1 2906,33			0.0	0.0	160,22 160,23	11491,83 11492,09	619
1 2906,33 1 2906,39 1 2906,51	124461 124445	0,00	0,0	0,0			619

Section 1 1 1 1 1 1 1 1	(m) 2880,02 2880,15 2906,33 2906,39	(lbf) 28331	(°/100ft) 0,00	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1 1 1 1	2880,15 2906,33							04
	2906,33		0,00	0,0 0,0	0,0 0,0	158,90 158,91	6135,65 6135,91	61 61
1 1 1		28315 25562	0,00	0,0	0,0	160,22	6191,70	61
1 1 1		25562	0,00	0,0	0.0	160,22	6191,83	61
	2906,51	25546	0,00	0,0	0,0	160,23	6192,09	61
1	3048,00	10693	0,00	0,0	0,0	167,20	6493,50	64
sing Lood Summe	3296,96	-15449	0,00	0,0	0,0	179,40	7023,91	70
	rv - Runnin	aHole #1 - 7" F	Production Liner					
String Section	MD (m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)	Friction Force (lbf/ft)	Temperature (°F)	Pressure ( Internal	psi) Externa
1	2880,02	60656	0,00	0,0	0,0	158,90	6135,65	61
1	2880,15	60646	0,00	0,0	0,0	158,91	6135,91	61
1	2906,33	58417	0,00	0,0	0,0	160,22	6191,70	61
1	2906,39	58411	0,00	0,0	0,0	160,22	6191,83	61
1	2906,51	58401	0,00	0,0	0,0	160,23	6192,09	619
1	3048,00 3296,96	46356 25159	0,00 0,00	0,0 0,0	0,0 0,0	167,20 179,40	6493,50 7023,91	649 702
sing Load Summa String	ry - Tubing MD	Leak #1 - 7" Pr Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	2880,02	-134731	0,00	0,0	0,0	158,90	0,07	613
1	2880,15	-134744	0,00	0,0	0,0	158,91	0,33	613
1	2906,33	-136964 -136963	0,00 0,00	0,0 0,0	0,0	160,22	56,11	61
1	2906,39 2906,51	-136963	0,00	0,0	0,0 0,0	160,22 160,23	56,24 56,50	61 61
i	3048,00	-148951	0,00	0,0	0,0	167,20	357,91	63
1	3296,96	-168257	0,00	0,0	0,0	179,40	888,32	673
1	2880,02 2880,15 2906,33 2906,39	-111632 -111650 -114697 -105282	0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0	158,90 158,91 160,22 160,22	1319,88 1319,92 1328,51 1328,53	613 613 617 576
1	2906,51 3048,00	-105152 -83890	0,00 0,00	0,0 0,0	0,0 0,0	160,23 167,20	1328,57 1374,97	41: 43:
1	3296,96	-111048	0,00	0,0	0,0	179,40	1456,64	46
fety Factor Summa	arv - Initial (	Conditions - 20	" Surface Casir	a				
String Section	MD (m)	Yield Strength (psi)	VME Stress (psi)	Triaxial	Abs Envelope	olute Safety Factors Burst	Collapse	Axial
1	0,03 24,96	80000,0 80000,0	7230,9 6935,6	D 11,064 11,535	N/A N/A	100+ 100+	100+ 100+	1 <sup>-</sup> 1 <sup>-</sup>
1	304,80	80000,0	3822,6	20,928	N/A	57,042	100+	2.
1	362,01	80000,0	3287,5	24,335	N/A	48,026	100+	25
1	362,96	80000,0	3279,0	24,397	N/A	47,898	100+	25
1	363,02	80000,0	3278,5	24,401	N/A	47,899	100+	25
1	422,57	80000,0	2796,5	28,608	N/A	61,312	100+	32
1	422,64	80000,0	2796,0	28,613	N/A	61,329	100+	32
	609,60 762,00	80000,0 80000,0	1363,0 800,0	58,696 100+	N/A N/A	100+ 100+	26,489 12,353	M CM 58
1	762,00 914,40	80000,0	2884,6	27,734	N/A	100+	12,353	CM 2
1	914,40	80000,0	2884,0	27,732	N/A	100+	5,657	CM 25
	5,.0			21,132			0,001	
Burst and Axial Flags Default = Pipe Body, L	= Connection	Leak, B = Connect	ion Burst, F = Con	nection Fracture	e, J = Connection .	lump-out, Y = Coni	nection Yield, C = C	onnectio
Axial Flags						• •		
Default = Tension, M =	Compression							
Triaxial Flags			na D = 0::::::::::::::::::::::::::::::::::	a a fab : f t	- Negative Dev. "			
Default = Inner Wall an Envelope Flags	a Positive Ber	laing OR No Bend	ng, D = Outer wall	sarety factor, N	= Negative Bendir	g		

# File: Conventional Design

Date/Time: March 01, 2018 02:58:38 PM Page: 11 of 24

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	1	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	80000,0	36118,9	2,215	N/A	1,976	100+	4,786
2	1	24,96	80000,0	36104,2	2,216	N/A	1,977	100+	4,868
3	1	95,83	80000,0	36078,3	N 2,217	N/A	1,981	100+	5,085
4	1	304,80	80000,0	36177,8	N 2,211	N/A	1,994	100+	5,593
5	1	362,01	80000,0	36243,4	N 2,207	N/A	1,997	100+	5,750
6	1	362,96	80000,0	36243,4	N 2,207	N/A	1,998	100+	5,753
7	1	363,02	80000,0	36105,3	2,216	N/A	1,998	100+	6,531
B	1	422,57	80000,0	36226,5	2,208	N/A	1,995	100+	6,837
9	1	422,64	80000,0	36938,6	2,166	N/A	1,957	100+	6,717
10	1	609,60	80000,0	36421,4	2,197	N/A	2,000	100+	8,071
11	1	914,40	80000,0	35588,1	2,248	N/A	2,073	100+	11,322
12	1	914,40	80000,0	35588,1	2,248	N/A	2,073	100+	11,322
13									
	Burst and Axial Flags								
	Default = Pipe Body,	L = Connection	Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	imp-out, Y = Coni	nection Yield, C = 0	Connection
16									
	Axial Flags								
	Default = Tension, M	= Compressior	1						
19									
	Triaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ing, D = Outer wall	safety factor, N =	Negative Bending			
22									
	Envelope Flags								
	EB = Envelope Burst.								

S	afety Factor Sumn	hary - LostR	eturnsWithMud	Drop #1 - 20"	Surface Casing	g			
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	80000,0	6338,1	D 12,622	N/A	100+	100+	12,630
2	1	24,96	80000,0	6439,8	12,423	N/A	100+	41,858	13,218
3	1	143,74	80000,0	7163,9	11,167	N/A	100+	8,404	16,980
4	1	304,80		5156,7	15,514	N/A	100+	9,548	27,648
5	1	362,01	80000,0	4446,9	17,990	N/A	100+	10,033	35,589
6	1	362,96	80000,0	4434,9	18,039	N/A	100+	10,041	35,763
7	1	363,02		4371,4	18,301	N/A	100+	10,042	36,956
8	1	422,57	80000,0	3793,6	21,088	N/A	100+	10,604	47,804
9	1	422,64	80000,0	3259,8	24,542	N/A	100+	15,822	41,749
10	1	609,60		1779,3	44,961	N/A	100+	14,560	M 100+
11	1	762,00		800,0	100+	N/A	100+	13,671	CM 64,525
12	1	914,40		800,0	100+	N/A	100+	12,883	CM 35,508
13	1	914,40	80000,0	800,0	100+	N/A	100+	12,883	CM 35,507
14									
15	Burst and Axial Flags								
16	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Co	nnection Fracture	e, J = Connection J	ump-out, Y = Con	nection Yield, C = C	Connection
17									
18	Axial Flags								
19	Default = Tension, M	= Compression	n						
20									
21	Triaxial Flags								
22	Default = Inner Wall a	ina Positive Be	enaing OR No Bend	ling, D = Outer Wa	il sarety factor, N	= Negative Bending	3		
23	Envelope Flore								
24	Envelope Flags	50 - 5							
25	EB = Envelope Burst	, EC = Envelop	e Collapse, N/A = n	io iso connection					

Conventional Well Design

	: Conventional De	0	O	01 0		Date/Time: Mar	ch 01, 2018 C	2:58:39 PM Pa	age: 12 of 24
58	fety Factor Summ			VME Stress	ng	A h 1			
	String	MD	Yield Strength				ute Safety Factors		<u> </u>
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	80000,0	36376,8	2,199	N/A	1,976	100+	3,43
	1	24,96	80000,0	36441,2	2,195	N/A	1,970	100+	3,48
	1	304,80	80000,0	37336,4	2,143	N/A	1,909	100+	4,03
	1	362,01	80000,0	37557,4	2,130	N/A	1,898	100+	4,171
	1	362,96	80000,0	37561,3	2,130	N/A	1,897	100+	4,174
3	1	363,02	80000,0	37561,2	2,130	N/A	1,897	100+	4,174
·	1	422,57	80000,0	37233,7	2,149	N/A	1,914	100+	4,326
3	1	422,64	80000,0	37233,4	2,149	N/A	1,914	100+	4,326
)	1	609,60	80000,0	36230,6	2,208	N/A	1,968	100+	4,883
0	1	914,40	80000,0	33275,1	N 2,404	N/A	2,147	100+	6,18
1	1	914,40	80000,0	33275,1	N 2,404	N/A	2,147	100+	6,18
2									
3	Burst and Axial Flags	;							
4	Default = Pipe Body,	L = Connection	Leak, B = Connec	tion Burst, F = Con	nection Fracture	J = Connection Ju	Imp-out, Y = Coni	nection Yield, C = 0	Connection
5	• •			· · · · · · · · · · · · · · · · · · ·			• •		
	Axial Flags								
	Default = Tension. M	= Compression	1						
8	,	•							
	Triaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N =	Negative Bending			
21				ing, D Cator trai	ourory ruoron, n	riogaaro Bonanig			

22 Envelope Flags 23 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Section 1	(m)		VME Stress		Absor	ute Safety Factors		
1		(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	0,03	80000,0	9442,8	D 8,472	N/A	100+	100+	8,47
1	24,96	80000,0	9199,3	D 8,696	N/A	100+	100+	8,73
1	304,80	80000,0	6467,8	D 12,369	N/A	100+	54,002	13,34
1	362,01	80000,0	5909,5	D 13,538	N/A	100+	45,472	14,95
1	362,96	80000,0	5900,0	D 13,559	N/A	100+	45,350	14,98
1	363,02	80000,0	5899,4	D 13,561	N/A	100+	45,343	14,98
1	422,57	80000,0	5318,3	D 15,043	N/A	100+	38,955	17,14
1	422,64	80000,0	5317,7	D 15,044	N/A	100+	38,949	17,14
1	609,60	80000,0	3492,6	D 22,906	N/A	100+	27,003	31,29
1	914,40	80000,0	800.0	D 100+	N/A	100+	18,002	CM 90.41
1	914,40	80000.0	800.0	D 100+	N/A	100+	18,002	CM 90,40
Burst and Axial Flags		· · · · · ·	÷				· · · · · ·	
Default = Pipe Body, L =	= Connection	Leak. B = Connec	tion Burst. F = Cor	nection Fracture.	J = Connection Ju	mp-out. Y = Conr	nection Yield. C = 0	Connection
• •		,	,			•		

18

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

19 20 21 22 23

Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Safety Factor Summary - RunningHole #1 - 20" Surface Casing String MD Yield Strength VME Stress Absolute Safety Factors Collapse 100+ 100+ 53,967 45,329 45,327 45,320 38,941 38,935 27,002 18,002 18,002 Triaxial D 6,881 D 7,005 D 8,774 D 9,250 D 9,260 D 9,260 D 9,817 D 12,102 D 19,498 D 19,499 ld Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 AE Stress (psi) 11625,8 11420,6 9118,3 8647,7 86539,8 8639,3 8149,4 8148,9 6610,6 4102,9 4102,9 Section Envelope Axia 
 Section
 (m)
 (psi)
 (psi)

 1
 1
 0.03
 8000.0
 11825.8

 2
 1
 24.96
 80000.0
 11420.6

 3
 1
 304.80
 80000.0
 9118.3

 4
 1
 362.01
 80000.0
 8639.8

 6
 1
 363.02
 80000.0
 8639.3

 7
 1
 422.57
 80000.0
 8148.9

 9
 1
 609.60
 80000.0
 8148.9

 9
 1
 609.60
 80000.0
 4102.9

 11
 914.40
 80000.0
 4102.9

 12
 1
 914.40
 80000.0
 4102.9

 13
 Burst and Axial Flags
 1
 914.40
 80000.0
 4102.9

 14
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Contestion
 1
 914.40
 80000.0
 4102.9

 15
 Axial Flags
 1
 914.40
 80000.0
 4102.9
 1

 16
 Axial Flags
 1 (m) Burst N/A 0,03 24,96 304,80 362,01 362,96 363,02 422,57 422,64 609,60 914,40 914,40 N/A N/A N/A N/A N/A N/A N/A Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

Conventional Well Design

WELLCAT 5000.1.13.1

6,885 7,033 9,253 9,892 9,903 9,904 10,671 10,672 14,104 29,643 29,644

	String	MD	Yield Strength	VME Stress			ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	19737,1	D 5,573	N/A	100+	100+	5,53
	1	24,96	110000,0	19498,1	D 5,642	N/A	100+	100+	5,6
	1	290,63	110000,0	16951,7	D 6,489	N/A	100+	71,487	C 6,6
	1	304,80	110000,0	16816,0	D 6,541	N/A	100+	68,176	C 6,7
	1	362,01	110000,0	16267,7	D 6,762	N/A	100+	57,440	C 7,0
	1	609,60	110000,0	13894,5	D 7,917	N/A	100+	34,193	C 8,5
	1	914,40	110000,0	10973,0	D 10,025	N/A	100+	22,846	C 11,7
	1	914,46	110000,0	10972,4	D 10,025	N/A	100+	22,845	C 11,7
	1	1219,20	110000,0	8051,6	D 13,662	N/A	100+	17,163	C 18,7
0	1	1524,00	110000,0	5130,2	D 21,442	N/A	100+	13,745	C 45,7
1	1	1799,97	110000,0	2484,7	D 44,271	N/A	100+	11,642	10
2	1	1800,03	110000,0	2484,9	D 44,267	N/A	100+	11,641	100
3	1	1828,80	110000,0	2288,0	48,076	N/A	100+	11,028	CM 10
4	1	2069,90	110000.0	1367,3	80,448	N/A	100+	7,651	CM 28.8
5	1	2133.60	110000.0	2040,1	53,920	N/A	100+	6,506	CM 24.2
6	1	2219.86	110000,0	3038,3	36,205	N/A	100+	5,410	CM 19,9
7									
8	Burst and Axial Flags	· · · · · ·		· · · · · ·	· · · · ·			· · · · ·	
	Defende Dine Deele	= Connection	Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
	Default = Pipe Body, L		•		·		• •		
9	Default = Pipe Body, L								
9 0	Axial Flags								
9 0 1 2	,	Compression							
9 0 1 2	Axial Flags	Compression	ı						
9 1 2 3	Axial Flags	Compression	I						
9 1 2 3 4	Axial Flags Default = Tension, M =			ing. D = Outer wall	safetv factor. N =	Negative Bending			
9 1 2 3 4	Axial Flags Default = Tension, M = Triaxial Flags			ing, D = Outer wall	safety factor, N =	Negative Bending			
9 0 1 2 3 4 5 6	Axial Flags Default = Tension, M = Triaxial Flags			ing, D = Outer wall	safety factor, N =	Negative Bending			
9 1 2 3 4 5 6 7	Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall an	d Positive Be	nding OR No Benc		safety factor, N =	Negative Bending			
19 20 21 22 23	Axial Flags Default = Tension, M =	Compression	I						

	String	MD	Yield Strength	VME Stress	Absolute Safety Factors					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial	
1	1	0,03	110000,0	62075,6	1,772	N/A	1,591	100+	3,154	
2	1	24,96	110000,0	61957,3	1,775	N/A	1,594	100+	3,180	
3	1	304,80	110000,0	60665,3	1,813	N/A	1,625	100+	3,502	
4	1	362,01	110000,0	60409,5	1,821	N/A	1,632	100+	3,576	
5	1	609,60	110000,0	59336,7	1,854	N/A	1,661	100+	3,937	
6	1	914,40	110000,0	58095,4	1,893	N/A	1,699	100+	4,494	
7	1	914,46	110000,0	58095,2	1,893	N/A	1,699	100+	4,494	
8	1	1219,20	110000,0	56986,0	N 1,930	N/A	1,739	100+	5,127	
9	1	1524,00	110000,0	56062,4	N 1,962	N/A	1,780	100+	5,860	
10	1	1799,97	110000,0	55379,3	N 1,986	N/A	1,819	100+	C 6,729	
11	1	1800,03	110000,0	56239,3	1,956	N/A	1,787	100+	C 8,070	
12	1	1828,80	110000,0	55991,1	1,965	N/A	1,796	100+	C 8,294	
13	1	2133,60	110000,0	52487,2	2,096	N/A	1,933	100+	C 11,909	
14	1	2219,86	110000,0	50745,0	N 2,168	N/A	2,004	100+	C 13,683	
15										
16	Burst and Axial Flage									
17	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Cor	nnection Fracture,	J = Connection J	ump-out, Y = Coni	nection Yield, C = (	Connection	
18										
19	Axial Flags									
20	Default = Tension, M	= Compression	ı							
21										
22	Triaxial Flags									
23	Default = Inner Wall a	and Positive Be	nding OR No Bend	ling, D = Outer wal	l safety factor, N =	Negative Bending	g			
24										
	Envelope Flags									
26	EB = Envelope Burst	. EC = Envelop	e Collapse, N/A = n	o ISO Connection						

Safe	ety Factor Summ	nary - LostR	eturnsWithMud	Drop #1 - 13 3/	8" Intermediat	e Casing			
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	3	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	18264,1	D 6,023	N/A	100+	100+	6,02
	1	24,96	110000,0	18333,5	6,000	N/A	100+	63,850	6,11
	1	152,40	110000,0	18980,0	5,796	N/A	100+	10,477	C 6,65
	1	304,80	110000,0	20320,3	5,413	N/A	100+	5,261	C 7,43
	1	362,01	110000,0	20900,9	5,263	N/A	100+	4,469	C 7,77
	1	387,52	110000,0	21180,0	5, 194	N/A	100+	4,187	C 7,93
	1	609,60	110000,0	18368,3	5,989	N/A	100+	4,451	C 9,70
	1	914,40	110000,0	14515,6	7,578	N/A	100+	4,868	C 13,98
	1	914,46	110000,0	14514,8	7,578	N/A	100+	4,868	C 13,98
)	1	1219,20	110000,0	10677,9	10,302	N/A	100+	5,365	C 25,0
	1	1524,00	110000,0	6879,2	15,990	N/A	100+	5,970	C 10
2	1	1799,97	110000,0	3579,3	30,733	N/A	100+	6,643	CM 49,6
5	1	1800,03	110000,0	3351,5	32,821	N/A	100+	7,985	CM 96,8
	1	1828,80	110000,0	3170,2	34,699	N/A	100+	7,832	CM 75,9
5	1	1981,20	110000,0	2688,8	40,910	N/A	100+	6,746	CM 34,9
;	1	2133,60	110000,0	3007,7	36,572	N/A	100+	5,685	CM 23,0
	1	2219,86	110000,0	3997,3	27,519	N/A	100+	4,812	CM 19,0

 19
 Burst and Axial Flags

 20
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 21
 Axial Flags

 23
 Default = Tension, M = Compression

 24
 Triaxial Flags

 25
 Triaxial Flags

 26
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 27
 28

 28
 Envelope Flags

 29
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Safety Factor Summary - GreenCement #1 - 13 3/8" Intermediate Casing

	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03		63852,5	1,723	N/A	1,591	100+	2,36
	1	24,96		63795,2	1,724	N/A	1,591	100+	2,37
	1	304,80		63210,6	1,740	N/A	1,591	100+	2,58
	1	362,01		63104,5	1,743	N/A	1,591	100+	2,59
	1	457,20		62938,1	1,748	N/A	1,591	100+	2,66
i –	1	609,60		62698,3	1,754	N/A	1,591	100+	2,77
	1	914,40		62318,8	1,765	N/A	1,591	100+	3,04
	1	914,46		62318,7	1,765	N/A	1,591	100+	3,04
	1	1219,20		62074,8	1,772	N/A	1,591	100+	3,36
0	1	1524,00		61967,6	1,775	N/A	1,591	100+	3,76
1	1	1799,97		61989,3	1,775	N/A	1,591	100+	4,21
2	1	1800,03		61989,1	1,775	N/A	1,591	100+	4,2
3	1	1828,80		61864,7	1,778	N/A	1,594	100+	4,27
4	1	2133,60		60094,9	1,830	N/A	1,644	100+	4,93
5	1	2219,86	110000,0	59074,1	1,862	N/A	1,673	100+	5,16
6									
	Burst and Axial Flags								
	Default = Pipe Body,	L = Connection	n Leak, B = Conne	ction Burst, F = Cor	nnection Fracture,	J = Connection Ju	ump-out, Y = Con	nection Yield, C = (	Connection
9									
	Axial Flags								
1	Default = Tension, M	= Compression	n						
2									
3	Triaxial Flags								
4 5	Default = Inner Wall a	ina Positive Be	enaing OR No Ben	ding, D = Outer wall	sarety factor, N =	Negative Bending			
	Envelope Flags								
6	EB = Envelope Burst								

# File: Conventional Design Safety Factor Summary - OverPull #1 - 13 3/8" Inte

# Date/Time: March 01, 2018 02:58:39 PM Page: 15 of 24

FIR	3. Conventional De												
S	afety Factor Sumn	nary - Overf	Pull #1 - 13 3/8'	' Intermediate C	Casing								
	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	3					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial				
1	1	0,03	110000,0	23683,9	D 4,645	N/A	100+	100+	4,644				
2	1	24,96	110000,0	23444,8	D 4,692	N/A	100+	100+	4,701				
3	1	304,80		20762,7	D 5,298	N/A	100+	67,873	5,441				
4	1	362,01	110000,0	20214,5	D 5,442	N/A	100+	57,196	5,622				
5	1	609,60	110000,0	17841,3	D 6,165	N/A	100+	34,072	C 6,566				
6	1	914,40	110000,0	14919,8	D 7,373	N/A	100+	22,786	C 8,279				
7	1	914,46	110000,0	14919,2	D 7,373	N/A	100+	22,784	C 8,280				
8	1	1219,20	110000,0	11998,4	D 9,168	N/A	100+	17,130	C 11,203				
9	1	1524,00	110000,0	9076,9	D 12,119	N/A	100+	13,728	C 17,320				
10	1	1799,97	110000,0	6431,5	D 17,103	N/A	100+	11,635	C 34,257				
11	1	1800,03	110000,0	6431,6	D 17,103	N/A	100+	11,635	C 34,257				
12	1	1828,80	110000,0	6155,5	D 17,870	N/A	100+	11,453	C 38,149				
13	1	2133,60	110000,0	3234,1	D 34,013	N/A	100+	9,822	100+				
14	1	2165,79	110000,0	2925,4	D 37,601	N/A	100+	9,676	CM 100+				
15	1	2219,86	110000,0	2406,8	D 45,703	N/A	100+	9,440	CM 70,119				
16													
17	Buret and Avial Elage	c											

 16
 16

 7
 Burst and Axial Flags

 18
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 19
 20

 20
 Axial Flags

 21
 Default = Tension, M = Compression

 22
 3

 23
 Triaxial Flags

 24
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 26
 Envelope Flags

 27
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors				
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial		
	1	0,03	110000,0	23977,0	D 4,588	N/A	100+	100+	4,58		
	1	24,96	110000,0	23782,6	D 4,625	N/A	100+	100+	4,63		
	1	304,80	110000,0	21601,3	D 5,092	N/A	100+	67,799	5,22		
	1	362,01	110000,0	21155,4	D 5,200	N/A	100+	57,128	5,36		
	1	609,60	110000,0	19225,3	D 5,722	N/A	100+	34,021	6,06		
	1	762,00	110000,0	18037,3	D 6,098	N/A	100+	27,259	C 6,59		
	1	914,40	110000,0	16849,2	D 6,528	N/A	100+	22,748	C 7,22		
	1	914,46	110000,0	16848,7	D 6,529	N/A	100+	22,747	C 7,23		
	1	1219,20	110000,0	14473,3	D 7,600	N/A	100+	17,102	C 8,94		
0	1	1524,00	110000,0	12097,3	D 9,093	N/A	100+	13,708	C 11,73		
1	1	1799,97	110000,0	9946,0	D 11,060	N/A	100+	11,621	C 16,35		
2	1	1800,03	110000,0	9945,6	D 11,060	N/A	100+	11,621	C 16,35		
3	1	1828,80	110000,0	9721,3	D 11,315	N/A	100+	11,439	C 17,05		
4	1	2133,60	110000,0	7345,3	D 14,976	N/A	100+	9,815	C 31,18		
5	1	2219,86	110000,0	6672,8	D 16,485	N/A	100+	9,435	C 40,72		
6											
7	Burst and Axial Flags										
	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Coni	nection Yield, C = 0	Connection		
9											
	Axial Flags										
1	Default = Tension, M	= Compressio	n								
2											
	Triaxial Flags										
4   5	Default = Inner Wall a	nd Positive Be	ending OR No Bend	ing, D = Outer wall	safety factor, N =	Negative Bending					
5											
6	Envelope Flags										

Conventional Well Design

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	25937,8	D 4,241	N/A	100+	100+	4,24
	1	24,96	110000,0	25709,4	D 4,279	N/A	100+	100+	4,2
	1	304,80	110000,0	23146,2	D 4,752	N/A	100+	100+	4,89
	1	362,01	110000,0	22622,3	D 4,862	N/A	100+	85,324	5,03
	1	609,60	110000,0	20354,3	D 5,404	N/A	100+	51,190	5,77
	1	914,40	110000,0	17562,4	D 6,263	N/A	100+	34,529	7,04
	1	1219,20	109696,8	14770,4	D 7,427	N/A	100+	26,138	9,01
	1	1524,00	109198,9	11978,6	D 9,116	N/A	100+	21,069	12,51
	1	1828,80	108704,3	9186,7	D 11,833	N/A	100+	17,680	C 20,55
0	1	2133,60	108206,6	6394,7	D 16,921	N/A	100+	15,252	C 58,54
1	1	2219,86	108067,0	5604,2	D 19,283	N/A	100+	14,684	C 100
2	1	2219,92	108067,0	5604,3	D 19,283	N/A	100+	14,684	C 100
3	1	2438,40	107709,6	3602,8	D 29,896	N/A	100+	13,373	CM 67,69
4	1	2499,97	107610,1	3038,5	D 35,416	N/A	100+	13,038	CM 47,06
5	1	2500,03	107610,0	3038,7	D 35,414	N/A	100+	13,037	CM 47,06
6	1	2743,20	107214,1	1099,1	97,545	N/A	100+	11,160	CM 21,31
7	1	2756,37	107192,4	1071,9	100+	N/A	100+	11,074	CM 20,69
8	1	2906,33	106948,1	1344,9	79,519	N/A	100+	9,253	M 15,56
9									

Axial Flags
Default = Tension, M = Compression
Triaxial Flags
Triaxial Flags
Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
Bender Bender Bending
Bender Bende

	String	MD	Yield Strength	VME Stress			ute Safety Factors					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial			
	1	0,03	110000,0	50430,6	2,181	N/A	2,057	100+	3,07			
	1	24,96	110000,0	50243,0	2,189	N/A	2,063	100+	3,09			
	1	304,80	110000,0	48156,7	2,284	N/A	2,138	100+	3,40			
	1	362,01	110000,0	47734,5	2,304	N/A	2,154	100+	3,47			
	1	609,60	110000,0	45925,7	2,395	N/A	2,227	100+	3,80			
	1	914,40	110000,0	43744,5	2,515	N/A	2,323	100+	4,3			
	1	1219,20	109696,8	41620,9	2,636	N/A	2,421	100+	4,98			
	1	1524,00	109198,9	39564,2	2,760	N/A	2,524	100+	5,8			
_	1	1828,80	108704,3	37585,2	2,892	N/A	2,637	100+	7,13			
0	1	2133,60	108206,6	35697,1	3,031	N/A	2,762	100+	9,24			
1	1	2219,86	108067,0	35181,2	3,072	N/A	2,800	100+	10,0			
2	1	2219,92	108067,0	35180,9	3,072	N/A	2,800	100+	10,0			
3	1	2438,40	107709,6	33915,7	N 3,176	N/A	2,901	100+	12,98			
4	1	2499,97	107610,1	33580,9	N 3,204	N/A	2,931	100+	13,93			
5	1	2500,03	107610,0	38492,9	2,796	N/A	2,577	100+	15,09			
6	1	2743,20	107214,1	38691,2	2,771	N/A	2,580	100+	C 23,5			
7	1	2906,33	106948,1	39597,2	N 2,701	N/A	2,533	100+	C 32,8			
8												
	Burst and Axial Flags											
	Default = Pipe Body, I	. = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	imp-out, Y = Con	nection Yield, C = C	Connection			
1	Autol Flama											
	Axial Flags		_									
	Default = Tension, M =	Compression	1									
4 5	Triaxial Flags											
	Default = Inner Wall a	ad Bocitivo Bo	nding OP No Bong	ling D = Outor wall	cofety factor N -	Nogativo Bonding						
6 7	Deraun - miner wan a	iu Positive Be	anding OR No Bend	ing, D – Outer wall	salety ractor, N =	wegauve bending						
	Envelope Flags											

File:	Conventional De	sign				Date/Time: Mar	ch 01, 2018 (	02:58:39 PM Pa	age: 17 of 24
Safe	ety Factor Summ	ary - LostR	eturnsWithMud	Drop #1 - 9 5/8	" Production C	Casing			
	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	23634,2	D 4,654	N/A	100+	100+	4,657
2	1	24,96	110000,0	23639,8	4,653	N/A	100+	100+	4,713
3	1	304,80	110000,0	24382,7	4,511	N/A	100+	11,547	5,451
4	1	362,01	110000,0	24682,1	4,457	N/A	100+	9,745	5,631
5	1	609,60	110000,0	25498,3	4,314	N/A	100+	6,392	6,570
6	1	914,40	110000,0	23007,5	4,781	N/A	100+	6,082	8,269
7	1	1219,20	109695,8	20583,8	5,329	N/A	100+	5,797	11,122
8	1	1524,00	109199,3	18265,4	5,978	N/A	100+	5,534	16,998
9	1	1676,40	108951,0	17159,3	6,349	N/A	100+	5,411	C 23,157
10	1	1828,80	108702,7	16098,2	6,752	N/A	100+	5,294	C 36,415
11	1	2133,60	108206,1	14151,5	7,646	N/A	100+	5,069	100+
12	1	2219,86	108065,6	13653,7	7,915	N/A	100+	4,998	CM 75,666
13	1	2219,92	108065,5	13653,8	7,915	N/A	100+	4,998	CM 75,666
14	1	2438,40	107709,5	12528,8	8,597	N/A	100+	4,828	CM 27,662
15	1	2499,97	107609,2	12252,1	8,783	N/A	100+	4,783	CM 23,450
16	1	2500,03	107609,1	7515,9	14,318	N/A	100+	6,866	CM 30,783
17	1	2743,20	107213,0	5218,9	20,543	N/A	100+	7,389	M 18,764
18	1	2906,33	106947,2	3302,1	32,388	N/A	100+	8,456	M 15,796
19									
20 B	urst and Axial Flags								
21 D	efault = Pipe Body, I	= Connection	Leak, B = Connec	tion Burst, F = Cor	nnection Fracture	, J = Connection Ju	mp-out, Y = Con	nection Yield, C =	Connection
22	• •						•		

 22
 Axial Flags

 24
 Default = Tension, M = Compression

 25
 Triaxial Flags

 26
 Triaxial Flags

 27
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 28
 Envelope Flags

 30
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

String	MD	Yield Strength	VME Stress			ute Safety Factors	:				
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial			
1	0,03	110000,0	53722,1	2,048	N/A	2,057	100+	2,42			
1	24,96	110000,0	53626,4	2,051	N/A	2,057	100+	2,43			
1	304,80	110000,0	52608,4	2,091	N/A	2,057	100+	2,62			
1	362,01	110000,0	52413,3	2,099	N/A	2,057	100+	2,66			
1	609,60	110000,0	51621,7	2,131	N/A	2,057	100+	2,85			
1	914,40	110000,0	50769,6	2,167	N/A	2,057	100+	3,13			
1	1219,20	109696,8	50058,9	2,191	N/A	2,051	100+	3,46			
1	1524,00	109198,9	49495,5	2,206	N/A	2,042	100+	3,87			
1	1828,80	108704,3	49084,9	2,215	N/A	2,032	100+	4,38			
1	2133,60	108206,6	48830,7	2,216	N/A	2,023	100+	5,07			
1	2219,86	108067,0	48787,4	2,215	N/A	2,020	100+	5,30			
2 1	2219,92	108067,0	48787,5	2,215	N/A	2,020	100+	5,30			
5 1	2438,40	107709,6	48735,3	2,210	N/A	2,014	100+	6,01			
1	2499,97	107610,1	48735,4	2,208	N/A	2,012	100+	6,25			
<u> </u>	2500,03	107610,0	48735,4	2,208	N/A	2,012	100+	6,25			
1	2743,20	107214,1	48408,1	2,215	N/A	2,020	100+	7,41			
1	2906,33	106948,1	47503,4	2,251	N/A	2,056	100+	8,47			
Burst and Axial Flag	IS .		,								
Default = Pipe Body,		n Leak, B = Connec	tion Burst, F = Con	nection Fracture	J = Connection Ju	mp-out, Y = Con	nection Yield, C = (	Connection			
Axial Flags											
Default = Tension, №	I = Compression	ו									
Triaxial Flags											
	and Positive Re	nding OR No Beng	ling D = Outer wall	eafety factor N =	Negative Bending						
Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending											

Conventional Well Design

File	File: Conventional Design         Date/Time: March 01, 2018         02:58:39 PM         Page: 18										
Sa	fety Factor Summ	ary - OverF		Production Cas	ing						
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	\$			
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial		
1	1	0,03	110000,0	29837,1	D 3,687	N/A	100+	100+	3,689		
2	1	24,96	110000,0	29608,7	D 3,715	N/A	100+	100+	3,724		
3	1	304,80	110000,0	27045,5	D 4,067	N/A	100+	99,526	4,170		
4	1	362,01	110000,0	26521,6	D 4,148	N/A	100+	84,025	4,274		
5	1	609,60	110000,0	24253,6	D 4,535	N/A	100+	50,457	4,795		
6	1	914,40	110000,0	21461,7	D 5,125	N/A	100+	34,071	5,640		
7	1	1219,20	109696,8	18669,8	D 5,876	N/A	100+	25,815	6,829		
8	1	1524,00	109198,9	15877,8	D 6,877	N/A	100+	20,826	8,650		
9	1	1828,80	108704,3	13085,9	D 8,307	N/A	100+	17,490	11,836		
10	1	2133,60	108206,6	10294,0	D 10,512	N/A	100+	15,098	18,834		
11	1	2219,86	108067,0	9503,4	D 11,371	N/A	100+	14,539	C 22,647		
12	1	2219,92	108067,0	9503,6	D 11,371	N/A	100+	14,539	C 22,647		
13	1	2438,40	107709,6	7502,1	D 14,357	N/A	100+	13,298	C 46,706		
14	1	2499,97	107610,1	6937,8	D 15,511	N/A	100+	12,987	C 66,796		
15	1	2500,03	107610,0	6937,9	D 15,510	N/A	100+	12,986	C 66,796		
16	1	2743,20	107214,1	4710,2	D 22,762	N/A	100+	11,859	CM 94,602		
17	1	2906,33	106948,1	3215,5	D 33,260	N/A	100+	11,179	CM 35,954		
18		,	,	,	, , , , , , , , , , , , , , , , , , , ,						

 18
 19
 Burst and Axial Flags

 20
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 21
 Axial Flags

 22
 Axial Flags

 23
 Default = Tension, M = Compression

 24
 E

 25
 Triaxial Flags

 26
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 27
 28

 28
 Envelope Flags

 29
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

### Safety Factor Summary - RunningHole #1 - 9 5/8" Production Casing

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	29321,6	D 3,752	N/A	100+	100+	3,754
2	1	24,96	110000,0	29146,3	D 3,774	N/A	100+	100+	3,783
3	1	304,80	110000,0	27179,2	D 4,047	N/A	100+	99,470	4,149
4	1	362,01	110000,0	26777,2	D 4,108	N/A	100+	83,937	4,232
5	1	609,60	110000,0	25036,7	D 4,394	N/A	100+	50,303	4,637
6	1	914,40	110000,0	22894,1	D 4,805	N/A	100+	33,894	5,255
7	1	1219,20	109696,8	20751,5	D 5,286	N/A	100+	25,632	6,046
8	1	1524,00	109198,9	18608,9	D 5,868	N/A	100+	20,644	7,112
9	1	1828,80	108704,3	16466,4	D 6,602	N/A	100+	17,312	8,653
10	1	2133,60	108206,6	14323,8	D 7,554	N/A	100+	14,927	11,072
11	1	2219,86	108067,0	13717,4	D 7,878	N/A	100+	14,369	12,030
12	1	2219,92	108067,0	13716,9	D 7,878	N/A	100+	14,369	12,031
13	1	2438,40	107709,6	12181,2	D 8,842	N/A	100+	13,133	15,426
14	1	2499,97	107610,1	11748,4	D 9,160	N/A	100+	12,823	16,765
15	1	2500,03	107610,0	11748,0	D 9,160	N/A	100+	12,823	16,766
16	1	2630,00	107398,2	10834,4	D 9,913	N/A	100+	12,216	C 20,540
17	1	2743,20	107214,1	10038,7	D 10,680	N/A	100+	11,734	C 25,574
18	1	2906,33	106948,1	8891,9	D 12,028	N/A	100+	11,104	C 39,628
19									
20	Burst and Axial Flag								
21	Default = Pipe Body,	L = Connection	Leak, B = Connec	tion Burst, F = Cor	nnection Fracture,	J = Connection Ju	Imp-out, Y = Con	nection Yield, C = 0	Connection
22									
23	Axial Flags								
24	Default = Tension, M	= compression	1						
25	Trianial Flams								
26	Triaxial Flags Default = Inner Wall a	and Desitive Re	nding OD No Bong		anfahrfanter Nu	Nonativo Dondina			
27 28	Default = inner wall a	and Positive Be	naing OR No Bend	ling, D = Outer wal	sarety factor, N =	Negative Bending	J		
28 29	Envelope Flags								
30	EB = Envelope Burst	EC = Envelop	Collanse N/A = n	o ISO Connection					
,0	EB - Envelope Buist	., <b></b> _ <b>_</b>		o loo oonneetton					

Conventional Well Design

### File: Conventional Design

: Conventional D	esign				Date/Time: Mar	ch 01, 2018 C	2:58:40 PM Pa	age: 19 of 24
fety Factor Sumr	mary - Initial	Conditions - 7"	Production Line	<u>er</u>				
String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	\$	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1						100+		M 36,461
1						100+		M 36,440
1						100+		M 33,097
1								M 33,097
1								M 33,079
1								M 22,112
1	3147,00	106555,8	1065,6	100+	N/A	100+	11,559	M 17,935
1	3296,96	106312,5	1200,4	88,567	N/A	100+	9,973	M 13,933
Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Conr	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
Default = Tension, IV	= Compression	1						
					•• ·· •			
Default = Inner Wall a	and Positive Be	naing OR No Bena	ing, D = Outer wall s	sarety factor, N =	Negative Bending			
Faultana Flama								
EB = Envelope Burst	t, EC = Envelop	e Collapse, N/A = n	o iso connection					
	Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	String         MD           Section         (m)           1         2880,02           1         2880,15           1         2906,39           1         2906,39           1         2906,639           1         2906,61           1         3048,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3147,00           1         3296,96           Burst and Axial Flags         Default = Pipe Body, L = Connection           Axial Flags         Default = Tension, M = Compression           Triaxial Flags         Default = Inner Wall and Positive Be           Envelope Flags         Envelope Flags	Initial Conditions - 7"           String         MD         Yield Strength (psi)           1         2890,02         106991,0           1         2890,15         106991,0           1         2890,15         106991,0           1         2906,33         106947,4           1         2906,53         106947,3           1         2906,51         1069947,1           1         3048,00         106716,3           1         3147,00         10655,8           1         3296,96         106312,5           Burst and Axial Flags         10652,8         106312,5           Default = Pipe Body, L = Connection Leak, B = Con	fety Factor Summary - Initial Conditions - 7" Production Line           String         MD         Yield Strength         VME Stress           Section         (m)         (psi)         (psi)         (psi)           1         2880,02         106991,0         3199,5           1         2890,15         106990,8         3199,5           1         2806,53         106947,3         2979,7           1         2906,53         106947,3         2979,7           1         2906,51         106947,3         2979,7           1         2906,63         106947,3         2979,7           1         2906,63         106947,3         2979,7           1         3048,00         106716,3         1813,3           1         3147,00         106555,8         1065,6           1         3296,96         106312,5         1200,4           Burst and Axial Flags         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Equal = Tension, M = Compression           Triaxial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall	fety Factor Summary - Initial Conditions - 7" Production Liner           String MD Yield Strength VME Stress           Section         (m)         (psi)         Triaxial           1         2880,02         106991,0         3199,5         D 33,440           1         2880,02         106991,0         3199,5         D 33,440           1         2880,02         106991,0         3199,5         D 33,440           1         2800,03         106947,4         2979,7         35,890           1         2906,33         106947,3         2979,8         35,890           1         2906,51         106947,1         2978,5         35,907           1         3048,00         106716,3         1813,3         56,863           1         3048,00         106716,3         1813,3         56,8657           Burst and Axial Flags         106312,5         1200,4         88,567           Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture,           Axial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N =           Envelope Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N =	fety Factor Summary - Initial Conditions - 7" Production Liner           String MD Yield Strength VME Stress         Absol           Section         (m)         (psi)         (psi)         Triaxial         Envelope           1         2880,02         106991,0         3199,5         D 33,440         N/A           1         2880,15         106990,8         3199,1         D 33,454         N/A           1         2906,39         106947,3         2979,8         35,893         N/A           1         2906,51         106947,1         2979,5         35,907         N/A           1         2906,51         106947,1         2979,5         35,907         N/A           1         2906,51         106947,1         2979,5         35,907         N/A           1         3048,00         106716,3         1813,3         58,853         N/A           1         3147,00         106555,8         1005,6         100+         N/A           1         3296,96         106312,5         1200,4         88,567         N/A           Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Ju         Axial Flags         Default = Inner Wall and Positive Bending OR No Bendi	fety Factor Summary - Initial Conditions - 7" Production Liner           String MD Yield Strength VME Stress         Absolute Safety Factor:           Section         (m)         (ps)         (psi)         Triaxial         Envelope         Burst         100+           1         2880.02         106991.0         3199.5         D 33,454         N/A         100+           1         2880.02         106991.0         3199.5         D 33,454         N/A         100+           1         2806.33         106947.4         2979.7         35,993         N/A         100+           1         2906.53         106947.1         2978.5         35,907         N/A         100+           1         2906.51         106947.1         2978.5         35,907         N/A         100+           1         3048.00         106716.3         1813.3         58,853         N/A         100+           1         3048.00         106576.5         10656.6         100+         N/A         100+           1         3147.00         106555.8         1065.6         100+         N/A         100+           Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Con	Initial Conditions - 7" Production Liner           String MD Yield Strength VME Stress         Absolute Safety Factors           Section         (m)         (psi)         (psi)         Triaxial         Envelope         Burst         Collapse           1         2880,02         106991,0         3199,5         D 33,440         N/A         100+         13,330           1         2880,015         106990,8         3199,5         D 33,444         N/A         100+         13,330           1         2806,03         106947,4         2979,7         35,880         N/A         100+         13,321           1         2906,33         106947,3         2979,6         35,890         N/A         100+         13,131           1         2906,51         106947,1         2979,5         35,907         N/A         100+         13,131           1         3048,00         106716,3         1813,3         58,863         N/A         100+         12,159           1         3147,00         106555,8         1065,6         100+         N/A         100+         9,973           Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = C

String	MD	Yield Strength	VME Stress	Absolute Safety Factors				
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	2880,02	106991,0	26504,0	4,037	N/A	3,725	100+	33,72
1	2880,15	106990,8	26504,2	4,037	N/A	3,725	100+	33,74
1	2906,33	106947,4	26528,9	4,031	N/A	3,723	100+	36,90
1	2906,39	106947,3	33155,5	3,226	N/A	2,991	100+	21,95
1	2906,51	106947,1	33156,2	3,226	N/A	2,991	100+	21,96
1	3048,00	106716,3	33841,7	3,153	N/A	2,942	100+	30,154
1	3192,99	106479,6	34586,7	3,079	N/A	2,894	100+	48,019
1	3296,96	106312,5	34455,5	N 3,085	N/A	2,915	100+	89,23

 8
 1
 3296,96
 106312,5
 34455,5
 N 3,085
 N/A
 2,915
 100+
 89,2

 10
 Burst and Axial Flags
 11
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 12
 Axial Flags

 14
 Default = Tension, M = Compression

 15
 16

 16
 Triaxial Flags

 17
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 18
 Envelope Flags

 20
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Sa	afety Factor Sumn	nary - LostR	eturnsWithMud	Drop #1 - 7" P	roduction Line	r			
	String	MD	Yield Strength	VME Stress		Abso	olute Safety Factor	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	2880,02	106990,0	10897,3	9,818	N/A	100+	5,828	M 20,796
2	1	2880,15	106989,8	10896,7	9,819	N/A	100+	5,828	M 20,790
3	1	2906,33	106947,1	10789,2	9,912	N/A	100+	5,804	M 19,709
4	1	2906,39	106947,0	4388,9	24,368	N/A	100+	10,497	M 31,394
5	1	2906,51	106946,8	4386,9	24,378	N/A	100+	10,498	M 31,383
6	1	3048,00	106716,3	2355,6	45,303	N/A	100+	11,890	M 23,469
7	1	3147,00	106555,1	1065,6	100+	N/A	100+	13,108	M 19,940
8	1	3296,96	106310,8	1063,1	DN 100+	N/A	100+	13,901	M 16,171
9									
10	Burst and Axial Flag	S							
11	Default = Pipe Body,	L = Connection	Leak, B = Conned	tion Burst, F = Co	nnection Fracture	, J = Connection J	ump-out, Y = Col	nnection Yield, C =	Connection
12	• • •								
13	Axial Flags								
14	Default = Tension, M	= Compression	า						
15									

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

afety Factor Sur String	MD I	Yield Strength	VME Stress	0.	Absol	ute Safety Factors	•	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	2880,02	106991,0	42962,4	2,490	N/A	2,286	100+	7,84
1	2880,15	106990.8	42962.3	2,490	N/A	2,286	100+	7,84
1	2906,33	106947,4	42925,1	2,491	N/A	2,287	100+	8.0
1	2906,39	106947,3	42925,0	2,491	N/A	2,287	100+	8,0
1	2906,51	106947,1	42924,9	2,491	N/A	2,287	100+	8,0
1	3048.00	106716.3	42743.9	2,497	N/A	2,293	100+	9,0
i	3296,96	106312,5	41859,8	2,540	N/A	2,337	100+	11,8
i		106312,5	41859,8		N/A		100+	11,8
1 Burst and Axial FI	3296,96 ags		,	2,540		2,337		
	3296,96 ags		,	2,540		2,337	100+ nection Yield, C = C	
Default = Pipe Boo	3296,96 ags		,	2,540		2,337		
Default = Pipe Boo Axial Flags	3296,96 ags ly, L = Connectior	n Leak, B = Connec	,	2,540		2,337		
Default = Pipe Boo Axial Flags Default = Tension,	3296,96 ags ly, L = Connectior	n Leak, B = Connec	,	2,540		2,337		11,87 Connection
Default = Pipe Boo Axial Flags Default = Tension,	3296,96 ags ly, L = Connectior	n Leak, B = Connec	,	2,540		2,337		
Default = Pipe Boo Axial Flags Default = Tension, Triaxial Flags	3296,96 ags ly, L = Connectior M = Compressior	n Leak, B = Connec	tion Burst, F = Con	2,540 nection Fracture	, J = Connection Ju	2,337 mp-out, Y = Con		
Default = Pipe Boo Axial Flags Default = Tension, Triaxial Flags	3296,96 ags ly, L = Connectior M = Compressior	n Leak, B = Connec	,	2,540 nection Fracture	, J = Connection Ju	2,337 mp-out, Y = Con		
Default = Pipe Boo Axial Flags Default = Tension, Triaxial Flags	3296,96 ags ly, L = Connectior M = Compressior	n Leak, B = Connec	tion Burst, F = Con	2,540 nection Fracture	, J = Connection Ju	2,337 mp-out, Y = Con		

	String	MD	Yield Strength	VME Stress	Absolute Safety Factors					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial	
	1	2880,02	106991,0	9176,2	D 11,660	N/A	100+	13,198	35,208	
2	1	2880,15	106990,8	9174,8	D 11,661	N/A	100+	13,198	35,228	
3	1	2906,33	106947,4	8935,1	D 11,969	N/A	100+	13,088	39,005	
<b>۱</b>	1	2906,39	106947,3	8935,3	D 11,969	N/A	100+	13,088	39,005	
5	1	2906,51	106947,1	8933,8	D 11,971	N/A	100+	13,087	39,029	
3	1	3048,00	106716,3	7641,1	D 13,966	N/A	100+	12,527	93,044	
7	1	3296,96	106312,5	5365,8	D 19,813	N/A	100+	11,594	M 64,15	
3		í I			· · · ·			· · · · · ·		

 Burst and Axial Flags
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection Derault = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jur
 Avial Flags
 Default = Tension, M = Compression
 Au
 To Triaxial Flags
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
 Converse Flags

17 18 Envelope Flags 19 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Sa	afety Factor Sum	nmary - Runni	ingHole #1 - 7'	' Production Lir	ner						
	String	MD	Yield Strength	VME Stress		Absolute Safety Factors					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial		
1	1	2880,02	106991,0	12645,6	D 8,461	N/A	100+	13,039	16,445		
2	1	2880,15	106990,8	12644,7	D 8,461	N/A	100+	13,039	16,447		
3	1	2906,33	106947,4	12461,3	D 8,582	N/A	100+	12,929	17,068		
4	1	2906,39	106947,3	12460,8	D 8,583	N/A	100+	12,928	17,070		
5	1	2906,51	106947,1	12460,0	D 8,583	N/A	100+	12,928	17,073		
6	1	3048,00	106716,3	11468,6	D 9,305	N/A	100+	12,366	21,462		
7	1	3296,96	106312,5	9724,1	D 10,933	N/A	100+	11,492	39,395		
0											

 9
 Burst and Axial Flags
 1000 Flag. 100 Flag.

Conventional Well Design

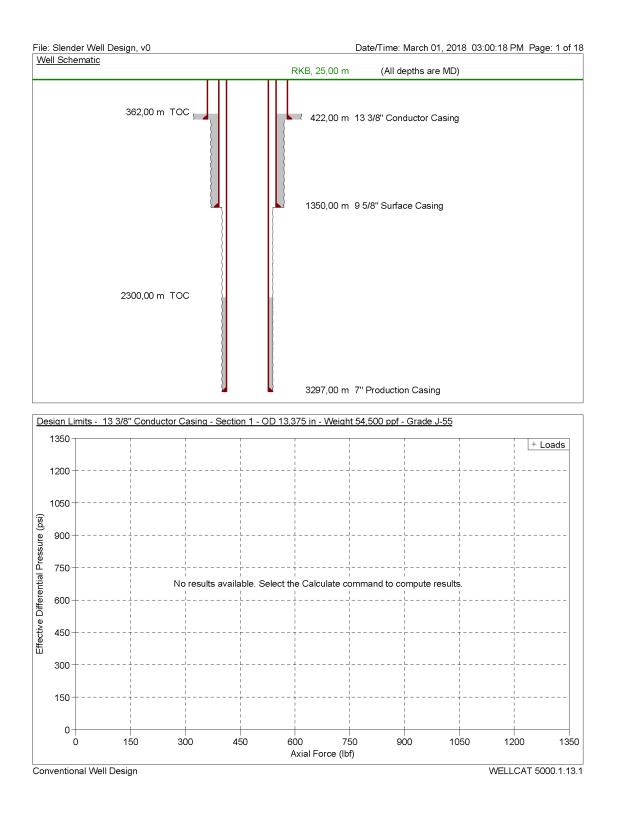
afety Factor Sumn			Production Line						
String	MD	Yield Strength	VME Stress			bsolute Safety Fa			
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Co	lapse	Axial
1	2880,02 2880,15	106991,0 106990,8	51736,9 51735,8	2,068 2,068	N/. N/.			1,725 1,725	M 7 M 7
1	2906,33	106947,4	51517,0	2,076	N/.			1,728	M 7
1	2906,39	106947,3	51516,7	2,076	N/			1,728	M 7
1	2906,51	106947,1	51515,6	2,076	N/			1,728	M 7
1	3048,00 3296,96	106716,3 106312,5	50350,2 48410,3	2,119 2,196	N/. N/.			1,743 1,770	M 6 M 5
Burat and Avial Flags				2,100					
Burst and Axial Flags Default = Pipe Body,		Leak, B = Connec	ction Burst, F = Co	nnection Fracture	, J = Connectio	n Jump-out, Y =	Connectio	n Yield, C	= Connection
Axial Flags Default = Tension, M	- Compression								
	- compression								
Triaxial Flags Default = Inner Wall a	and Positive Be	nding OR No Bend	ding, D = Outer wa	I safety factor,N ≕	Negative Ben	ding			
Envelope Flags									
EB = Envelope Burst	, EC = Envelope	e Collapse, N/A = r	no ISO Connection						
afety Factor Sumn String	MD MD	edPerfs #1 - 7 Yield Strength	" Production Lir VME Stress	ler	A	bsolute Safety Fa	ctors		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Co	lapse	Axial
1	2880,02	106991,0	40802,1	2,622	N/	A 10	0+	2,123	M
1	2880,15	106990,8	40803,6	2,622	N/.			2,123	M
1	2906,33 2906,39	106947,4 106947,3	40972,3 37512,4	2,610 2,851	N/. N/.			2,110 2,298	M I M I
1	2906,59	106947,3	22895,0	4,671	N/.			2,298	M
1	3048,00	106716,3	24718,2	4,317	N/			3,376	M 1
1	3296,96	106312,5	26540,8	4,006	N/			3,089	M
Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags	and Positive Be	nding OR No Bend	-	I safety factor, N =	- Negative Ben	ding			
Default = Tension, M Triaxial Flags Default = Inner Wall a	and Positive Be	nding OR No Bend	-	l safety factor, N =	- Negative Ben	ding			
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Dvement Summar	and Positive Be , EC = Envelope y - Initial Co	nding OR No Bend e Collapse, N/A = r nditions - 20'' \$	no ISO Connection			-			
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Devement Summar	and Positive Be , EC = Envelope y - Initial Co (m)	nding OR No Bend e Collapse, N/A = r nditions - 20" S Hooke's	Do ISO Connection Surface Casing Bucklin	g Ballo	bon	Thermal	Total		Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst overnent Summar	and Positive Be , EC = Envelope ry - Initial Co (m) Base	nding OR No Bend e Collapse, N/A = r nditions - 20" S Hooke's Law (m)	no ISO Connection		bon	-	Total (m)	0,000	
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst ovement Summar MD ( Top	and Positive Be , EC = Envelope ry - Initial Co (m) Base	nding OR No Bend e Collapse, N/A = r nditions - 20" S Hooke's Law (m)	Burface Casing Bucklin (m)	g Ballo (m	- pon	Thermal (m)			
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst ovement Summar 0,03	and Positive Be γ - Initial Co m) Base 363 γ - Pressure	nding OR No Bend e Collapse, N/A = r nditions - 20" S Hooke's January Law (m) Law (m)	Burface Casing Bucklin 0,000 Surface Casing	g Bali 0,000 (m	pon ) 0.000	Thermal (m) 0,000	(m)	0,000	Length (m)
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst overnent Summar 0,03 overnent Summar MD (	and Positive Be , EC = Envelope γ - Initial Co m) Base 363 γ - Pressure m)	nding OR No Bend e Collapse, N/A = r nditions - 20" ( Hooke's Law (m) 3,00	Surface Casing Bucklin (m) 0.000 Surface Casing Bucklin	g Ballo 0,000 g Ballo	son ) 0,000	Thermal (m) 0,000	(m) Total	0,000	Length (m)
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst werment Summar 0,03	and Positive Be , EC = Envelope γ - Initial Co m) Base γ - Pressure m) Base	nding OR No Bend collapse, N/A = r nditions - 20" ( Hooke's Law (m) 3,00 Test #1 - 20" ( Hooke's Law (m)	Burface Casing Bucklin 0,000 Surface Casing	g Bali 0,000 (m	son ) 0,000	Thermal (m) 0,000	(m)	0,000	Length (m) Buckled Length (m)
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst <u>MD (</u> Top 0,03 EVerment Summar MD ( Top 1	and Positive Be , EC = Envelope γ - Initial Co m) Base γ - Pressure m) Base	nding OR No Bend collapse, N/A = r nditions - 20" ( Hooke's Law (m) 3,00 Test #1 - 20" ( Hooke's Law (m)	Surface Casing Bucklin (m) 0,000 Surface Casing Bucklin (m)	g Balld (m 0,000 g Balld (m	xon ) 0,000	Thermal (m) 0,000 Thermal (m)	(m) Total	0,000	Length (m) Buckled Length (m)
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst by ement Summar MD ( Top 0,03 by ement Summar MD ( Top 0,03 by ement Summar	and Positive Be , EC = Envelope (m) Base γ - Pressure (m) Base 363 γ - Pressure γ - CostRetu	nding OR No Bend Collapse, N/A = r nditions - 20" S Hooke's Law (m) Test #1 - 20" S Hooke's Law (m) Hooke's Law (m) Hooke's	Durface Casing Bucklin 0,000 Surface Casing Bucklin 0,000 (m) 0 0	g Ballo 0,000 g Ballo -0,001 face Casing	xon )) 0,000 xoon ) -0,113	Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m)	0,000	Length (m) Buckled Length (m) 2
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Determine Summar MD ( Top 0,03 Determine Summar 0,03 Determine Summar 0,03	and Positive Be , EC = Envelope <u>γ - Initial Co</u> m) Base <u>γ - Pressure</u> m) Base 36: <u>γ - Sase</u> 36: γ - LostRetu m)	nding OR No Bend a Collapse, N/A = r nditions - 20" S Hooke's Law (m) 3,00 Test #1 - 20" S Hooke's Law (m) 3,00	Durface Casing Bucklin 0,000 Surface Casing Bucklin 0,115 0p #1 - 20" Su Bucklin	g Ballo 0,000 g Ballo -0,001 <u>face Casing</u> Ballo	500n )) 0,000 500n )) -0,113 500n	Thermal (m) 0,000 Thermal (m) 0,000 Thermal	(m) Total (m) Total	0,000	Length (m) Buckled Length (m) 2 Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst by ement Summar MD ( Top 0,03 by ement Summar MD ( Top 0,03 by ement Summar	and Positive Be , EC = Envelope γ - Initial Co m) Base γ - Pressure m) Base γ - LostRetu m) Base	nding OR No Bend e Collapse, N/A = r nditions - 20'' S Hooke's Law (m) Test #1 - 20'' S Hooke's Law (m) A00	Durface Casing Bucklin 0,000 Surface Casing Bucklin 0,000 (m) 0 0	g Ballo 0,000 g Ballo -0,001 face Casing	500n )) 0,000 500n )) -0,113 500n	Thermal (m) 0,000 Thermal (m) 0,000	(m) Total (m)	0,000	Length (m Buckled Length (m 2 Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst ovement Summar MD ( Top 0,03 ovement Summar MD ( Top 0,03	and Positive Be , EC = Envelope γ - Initial Co m) Base γ - Pressure m) Base γ - LostRetu m) Base	nding OR No Bend e Collapse, N/A = r nditions - 20'' S Hooke's Law (m) Test #1 - 20'' S Hooke's Law (m) A00	Durface Casing Burface Casing (m) 0.000 Burface Casing Bucklin (m) 0,115 0p #1 - 20" Sul Bucklin (m) (m)	g Ballo 0,000 g Ballo -0,001 face Casing g Ballo (m	xon ) 0,000 xon ) -0,113 xon )	Thermal (m) 0,000 Thermal (m) 0,000 Thermal	(m) Total (m) Total	0,000	Length (m) Buckled Length (m) 21
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst ovement Summar MD ( Top 0,03 ovement Summar MD ( Top 0,03	and Positive Be , EC = Envelope γ - Initial Co m) Base γ - Pressure m) Base 363 γ - LostRetu m) Base 363 γ - LostRetu	nding OR No Bend a Collapse, N/A = r nditions - 20" ( Hooke's Law (m) 3,00 Test #1 - 20" ( Hooke's Law (m) 3,00 rnsWithMudDr. Hooke's Law (m) 3,00	Disconsection Surface Casing Bucklin 0,000 Surface Casing Bucklin Bucklin (m) 0,115 op #1 - 20'' Sul Bucklin (m) 0,001	g Balic 0,000 g Balic -0,001 face Casing g Balic g Balic (m 0,000	xon ) 0,000 xon ) -0,113 xon ) 0,010	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,001	(m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) 2 Buckled Length (m)
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Systement Summar MD ( Top 0,03 Systement Summar Systement Summar Systement Summar Systement Summar Systement Summar	and Positive Be , EC = Envelope $\gamma$ - Initial Co m) Base $\gamma$ - Pressure m) Base $\gamma$ - LostRetu m) Base $\gamma$ - CostRetu m) $\gamma$ - GreenCe m)	nding OR No Bend Collapse, N/A = r nditions - 20" S Hooke's Law (m) Test #1 - 20" S Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m)	o ISO Connection Surface Casing Bucklin 0,000 Surface Casing Bucklin 0,115 0p #1 - 20'' Sur Bucklin 0,011 Surface Casing Bucklin Buckl	g Ballo 0,000 g Ballo -0,001 face Casing g Ballo g Ballo g Ballo	son ) 0,000 son ) -0,113 son ) 0,010 son	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,001 Thermal	(m) Total (m) Total (m) Total	0,000	Length (m) Buckled Length (m) 2: Buckled Length (m) Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Sevement Summar MD ( Top 0,03 Sevement Summar	and Positive Be , EC = Envelope γ - Initial Co m) Base 363 γ - Pressure m) Base γ - LostRetu m) Base γ - GreenCe m) Base	nding OR No Bend e Collapse, N/A = r nditions - 20'' S Hooke's Law (m) 3,00 Test #1 - 20'' S Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m)	bullation in the second	g Ballo 0,000 g Ballo -0,001 face Casing g Ballo g Ballo (m 0,000 g Ballo (m	xon ) 0,000 xon ) -0,113 xon ) 0,010 xon )	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,001	(m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst ovement Summar MD ( Top 0,03 ovement Summar MD ( Top 0,03 ovement Summar MD ( 0,03	and Positive Be , EC = Envelope γ - Initial Co m) Base 363 γ - Pressure m) Base γ - LostRetu m) Base γ - GreenCe m) Base	nding OR No Bend e Collapse, N/A = r nditions - 20'' S Hooke's Law (m) 3,00 Test #1 - 20'' S Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m)	o ISO Connection Surface Casing Bucklin 0,000 Surface Casing Bucklin 0,115 0p #1 - 20'' Sur Bucklin 0,011 Surface Casing Bucklin Buckl	g Ballo 0,000 g Ballo -0,001 face Casing g Ballo g Ballo g Ballo	son ) 0,000 son ) -0,113 son ) 0,010 son	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,001 Thermal	(m) Total (m) Total (m) Total	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Systement Summar MD ( Top 0,03 Systement Summar Systement Summar Systement Summar Systement Summar MD ( Systement Summar Systement Summar S	and Positive Be , EC = Envelope $\gamma$ - Initial Co m) Base $\gamma$ - Pressure m) Base $\gamma$ - LostRetu m) Base $\gamma$ - GreenCe m) Base $\gamma$ - GreenCe m) Base $\gamma$ - GreenCe	nding OR No Bend a Collapse, N/A = r nditions - 20" S Hooke's Law (m) Test #1 - 20" S Hooke's Law (m) A,00 rnsWithMudDrr Hooke's Law (m) A,00 ment #1 - 20" Hooke's Law (m) A,00	o ISO Connection Surface Casing Bucklin 0,000 Surface Casing Bucklin 0,115 0p #1 - 20'' Sur Bucklin 0,011 Surface Casing (m) 0,011 Surface Casing (m) 0,078	g Ballo 0,000 g Ballo -0,001 face Casing g Ballo g Ballo (m 0,000 g Ballo (m	xon ) 0,000 xon ) -0,113 xon ) 0,010 xon )	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,001	(m) Total (m) Total (m) Total	0,000	Length (m) Buckled Length (m) 2: Buckled Length (m) Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst <u>MD</u> ( Top 0,03 <u>Devement Summar</u> <u>MD</u> ( Top 0,03 <u>Devement Summar</u> <u>MD</u> ( Top 0,03 <u>Devement Summar</u> <u>MD</u> ( Top 0,03 <u>Devement Summar</u> <u>MD</u> ( <u>Top 0,03</u> <u>Devement Summar</u>	and Positive Be , EC = Envelope (	nding OR No Bend a Collapse, N/A = r nditions - 20" S Hooke's Law (m) Test #1 - 20" Suffa Hooke's Law (m) Hooke's Law (m) Hooke's Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Law (m) Hooke's Hooke'	o ISO Connection Burface Casing Bucklin 0,000 Surface Casing Bucklin (m) 0,115 0p #1 - 20" Sui Bucklin (m) 0,011 Surface Casing Bucklin (m) 0,011 Casing Bucklin (m) 0,001 Bucklin (m) 0,001 Surface Casing Bucklin (m) 0,001 Surface Casing Bucklin (m) 0,001 Surface Casing Bucklin (m) 0,001 Surface Casing Bucklin (m) Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing (m) Surface Casing Surface Casing Surf	g Ballo (m 0,000 g Ballo -0,001 face Casing g Ballo g Ballo g Ballo (m 0,000	son ) 0,000 son ) -0,113 son ) 0,010 son ) 0,000	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,001	(m) Total (m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) 21 Buckled Length (m) Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst ovement Summar MD ( Top 0,03 Ovement Summar MD ( 0,03 Ovement Summar ND ( 0,03 Ovement Summar ND ( 0,03 Ovement Summar ND ( 0,03 Ovement Summar ND ( 0,03 Ovement Summar ND ( 0,03 Ovement Summar	and Positive Be y - Initial Co (m) Base $\gamma - Pressure$ (m) Base $\gamma - LostRetu$ (m) Base $\gamma - GreenCe$ (m) Base $\gamma - GreenCe$ (m) Base $\gamma - GreenCe$ (m) $\gamma - QverPull$ (m)	nding OR No Bend e Collapse, N/A = r nditions - 20'' S Hooke's A,00 Test #1 - 20'' Surfa Hooke's A,00 rnsWithMudDr. Hooke's Hooke's A,00 	bo ISO Connection Surface Casing Bucklin 0,000 Surface Casing Bucklin (m) 0,115 Op #1 - 20" Su Bucklin 0,011 Surface Casing Bucklin (m) 0,078 Ce Casing Bucklin Bucklin Comparison	g Ballo 0,000 g Ballo -0,001 face Casing g Ballo g Ballo g Ballo g Ballo g Ballo	xon ) 0,000 xon ) -0,113 xon ) 0,010 xon ) 0,000 xon	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000 Thermal	(m) Total (m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m) Buckled
Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Determine Summar MD ( Top 0,03 Determent Summar	and Positive Be , EC = Envelope $\gamma$ - Initial Co (m) Base $\gamma$ - Pressure (m) Base $\gamma$ - LostRetu (m) Base $\gamma$ - CostRetu (m) Base $\gamma$ - GreenCe (m) Base $\gamma$ - OverPull (m) Base	nding OR No Bend a Collapse, N/A = r nditions - 20" S Hooke's Law (m) A,00 Test #1 - 20" Surfa Hooke's Law (m) A,00 ment #1 - 20" Hooke's Law (m) A,00	o ISO Connection Burface Casing Bucklin 0,000 Surface Casing Bucklin (m) 0,115 0p #1 - 20" Sui Bucklin (m) 0,011 Surface Casing Bucklin (m) 0,011 Casing Bucklin (m) 0,001 Bucklin (m) 0,001 Surface Casing Bucklin (m) 0,001 Surface Casing Bucklin (m) 0,001 Surface Casing Bucklin (m) 0,001 Surface Casing Bucklin (m) Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing Surface Casing (m) Surface Casing Surface Casing Surf	g Ballo (m 0,000 g Ballo -0,001 face Casing g Ballo g Ballo g Ballo (m 0,000	xon ) 0,000 xon ) -0,113 xon ) 0,010 xon ) 0,000 xon	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,001	(m) Total (m) Total (m) Total (m)	0,000	Length (m) Buckled Length (m) 25 Buckled Length (m) Buckled

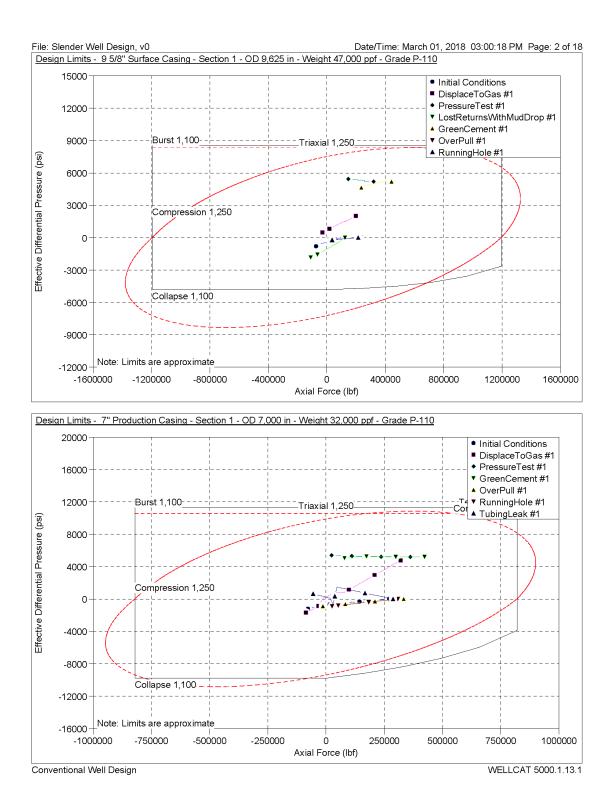
				Date/Time	: March 01, 2018	02:58:40 PM	Page: 22 of 24
	RunningHole #						
MD (m)	Bees						Buckled Length (m)
1	Dase				(11)	(11)	Lengur (m)
	Initial Conditio			Palloon	Thormol	Total	Buckled
MD (III)	Base		(m)				Length (m)
0,03	1800,00	0,000	0,000	0,000	0,000	0,000	0,00
	Description	44 40 0/0 <sup>11</sup> lata	unadiata Casima				
	Pressure l'est a			Balloon	Thermal	Total	Buckled
	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
0,03	1800,00	0,908	-0,004	-0,905	0,000	0,000	754,56
immori (	LoctDotume	ithMudDron #1	12 2/8" Internet-1	ioto Cocina			
	LostReturnsW				Thermal	Total	Buckled
	Base						Length (m)
0,03	1800,00	-0,089	0,000	0,088	0,001	0,000	0,00
	GreenCement			D	71	<b>T</b> + 1	<b>D</b> 11 1
MD (m)	Base						Buckled Length (m)
0,03	1800,00	0,643	0,000	0,000	0,000	0,643	0,00
	OverPull #1 -			Dellasa	These	Tatal	Buckled
MD (m)	Base						Length (m)
0,03	1800,00	0,178	0,000	0,000	0,000	0,178*	0,00
placement c	lue to pickup (+) o	r slackoff (-)					
ummary -	RunningHole #						
MD (m)	Passa	Hooke's		Balloon	Thermal	Total	Buckled
	Dase	Law (m)	(11)	(m)	(11)	(11)	Length (m)
			No results available for	this load case			
			No results available for	this load case			
				this load case			
	Initial Conditio	ns - 95/8" Prod	uction Casing		Thermal	Total	
ummary - MD (m)	Base	ns - 95/8" Prod Hooke's Law (m)	uction Casing Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
		ns - 9 5/8" Prod Hooke's	uction Casing Buckling	Balloon			Buckled Length (m)
MD (m) 0,03	Base 2500,00	n <u>s - 9 5/8'' Prod</u> Hooke's Law (m) 0,000	uction Casing Buckling (m) 0,000	Balloon (m)	(m)	(m)	Buckled Length (m)
MD (m) 0,03 ummary -	Base 2500,00	ns - 9 5/8" Prod Hooke's Law (m) 0,000 #1 - 9 5/8" Prod	uction Casing Buckling (m) 0,000	Balloon (m) 0,000	(m) 0,000	(m) 0,000	Buckled Length (m) 0,0
MD (m) 0,03 ummary - MD (m)	Base 2500,00 PressureTest a Base	ns - 9 5/8" Prod Hooke's Law (m) 0,000 #1 - 9 5/8" Prod Hooke's Law (m)	uction Casing Buckling (m) 0,000 uction Casing Buckling (m)	Balloon (m) 0,000 Balloon (m)	(m) 0,000	(m) 0,000	Buckled Length (m) 0,00 Buckled Length (m)
MD (m) 0,03 ummary -	Base 2500,00 PressureTest a	ns - 9 5/8" Prod Hooke's Law (m) 0,000 #1 - 9 5/8" Prod Hooke's	uction Casing Buckling (m) 0,000 uction Casing Buckling	Balloon (m) 0,000	(m) 0,000	(m) 0,000  	Buckled Length (m) 0,00 Buckled Length (m)
MD (m) 0,03 Ummary - MD (m) 0,03	Base 2500,00 PressureTest a Base 2500,00	ns - 9 5/8" Prod Hooke's Law (m) 0,000 #1 - 9 5/8" Prod Hooke's Law (m) 0,822	uction Casing Buckling (m) 0,000 uction Casing Buckling (m) 0,000	Balloon (m) 0,000 Balloon (m) -0,822	(m) 0,000	(m) 0,000	Buckled Length (m) 0,00 Buckled Length (m)
<u>MD (m)</u> 0,03 <u>MD (m)</u> 0,03 0,03 μmmarγ -	Base 2500,00 PressureTest a Base 2500,00	ns - 9 5/8" Prod Hooke's Law (m) 0,000 #1 - 9 5/8" Prod Hooke's Law (m) 0,822 0,822	uction Casing Buckling (m) 0,000 uction Casing Buckling (m) 0,000 9 5/8" Productior	Balloon (m) 0,000 Balloon (m) -0,822	(m) 0,000 Thermal (m) 0,000	(m) 0,000 Total (m) 0,000	Buckled Length (m) 0,00 Buckled Length (m) 71,83
MD (m) 0,03 Ummary - MD (m) 0,03	Base 2500,00 PressureTest 3 Base 2500,00 LostReturnsW Base	ns - 9 5/8" Prod Hooke's Law (m) 0,000 #1 - 9 5/8" Prod Hooke's Law (m) 0,822 ithMudDrop #1 - Hooke's Law (m)	uction Casing Buckling (m) 0,000 uction Casing Buckling (m) 0,000 9 5/8" Productior Buckling (m)	Balloon (m) 0,000 Balloon (m) -0,822 <u>a Casing</u> Balloon (m)	(m) 0,000 Thermal (m) 0,000 Thermal (m)	(m) 0,000 Total (m) 0,000 Total (m)	Buckled Length (m) 0,00 Buckled Length (m) 71,83 Buckled Length (m)
<u>MD (m)</u> 0,03 <u>MD (m)</u> 0,03 0,03 μmmarγ -	Base 2500,00 PressureTest 3 Base 2500,00 LostReturnsW	ns - 9 5/8" Prod Hooke's Law (m) 0,000 #1 - 9 5/8" Prod Hooke's Law (m) 0,822 thMudDrop #1 - Hooke's	uction Casing Buckling (m) 0,000 uction Casing Buckling (m) 0,000 9 5/8" Productior	Balloon (m) 0,000 Balloon (m) -0,822	(m) 0,000 Thermal (m) 0,000	(m) 0,000 Total (m) 0,000	Buckled Length (m) 0,0( Buckled Length (m) 71,83 Buckled
	Ummary - MD (m) 0,03 Ummary - MD (m) 0,03 Ummary - MD (m) 0,03 Ummary - MD (m) 0,03 Ummary - MD (m) 0,03	ummary - RunningHole # MD (m) Base Ummary - Initial Conditio MD (m) Base 0,03 1800,00 Ummary - PressureTest ; MD (m) Base 0,03 1800,00 Ummary - LostReturnsWV MD (m) Base 0,03 1800,00 Ummary - GreenCement MD (m) Base 0,03 1800,00 Ummary - OverPull #1 - MD (m) Base 0,03 1800,00 Ummary - OverPull #1 - MD (m) Base 0,03 1800,00 Ummary - OverPull #1 - MD (m) 0,03 1800,00 Ummary - NerPull #1 - MD (m) Base 0,03 1800,00 Ummary - OverPull #1 - MD (m) Base 0,03 1800,00 Ummary - OverPull #1 - MD (m) Base 0,03 1800,00 Ummary - OverPull #1 - MD (m) Base 0,03 1800,00	MD (m)         Hooke's           Base         Law (m)           ummary -         Initial Conditions -         13 3/8" Inte           MD (m)         Base         Law (m)           0.03         1800,00         0,000           ummary -         PressureTest #1 -         13 3/8" Inte           MD (m)         Hooke's         Law (m)           0.03         1800,00         0,000           ummary -         PressureTest #1 -         13 3/8" Inte           MD (m)         Hooke's         Law (m)           0.03         1800,00         0,908           ummary -         LostReturnsWithMudDrop #1 -           MD (m)         Hooke's         Law (m)           0.03         1800,00         -0,089           ummary -         GreenCement #1 -         13 3/8" Intermect           MD (m)         Hooke's         Law (m)           0.03         1800,00         0,643           ummary -         OverPull #1 -         13 3/8" Intermect           MD (m)         Hooke's         Law (m)           0.03         1800,00         0,178           placement due to pickup (+) or stackoff (-)         ummary -           ummary -         RunningHole #1 - <td>ummary - RunningHole #1 - 20" Surface Casing         MD (m)       Hooke's       Buckling         Base       Law (m)       (m)         No results available for         MD (m)       Hooke's       Buckling         MD (m)       Hooke's       Buckling         MD (m)       Hooke's       Buckling         0.03       1800.00       0.000       0.000         ummary - PressureTest #1 - 13 3/8" Intermediate Casing       Hooke's       Buckling         MD (m)       Base       Law (m)       (m)         0.03       1800.00       0,908       -0,004         ummary - LostReturnsVVithMudDrop #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling         0.03       1800.00       -0.099       0,000       0,000         ummary - CereenCement #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling         0.03       1800.00       0,643       0,000       0,643       0,000         ummary - OverPull #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling       0,000         0.03       1800.00       0,178       0,000       0,000       0,643       0,000         ummary - OverPull #1 - 13 3/8" Intermediate Casing</td> <td>ummary - RunningHole #1 - 20" Surface Casing         MD (m)       Hooke's       Buckling       Balloon         MD (m)       Base       Law (m)       (m)       (m)         No results available for this load case         MD (m)       Hooke's       Buckling       Balloon         MD (m)       Hooke's       Buckling       Balloon         MD (m)       Hooke's       Buckling       Balloon         0,03       1800,00       0,000       0,000       0,000         ummary - PressureTest #1 - 13 3/8" Intermediate Casing       Hooke's       Buckling       Balloon         MD (m)       Base       Law (m)       (m)       (m)       0,000         0,03       1800,00       0,908       -0,004       -0,905         ummary - LostReturnsWithMudDrop #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling       Balloon         ummary - GreenCement #1 - 13 3/8" Intermediate Casing       MD (m)       GreenCement #1 - 13 3/8" Intermediate Casing         MD (m)       Hooke's       Buckling       Balloon         0,03       1800,00       0,043       0,000       0,000         0,03       1800,00       0,643       0,000       0,000         0,03</td> <td>ummary - RunningHole #1 - 20" Surface Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal           Base         Law (m)         (m)         (m)         (m)         (m)           No results available for this load case        </td> <td>ummary -         RunningHole #1 - 20" Surface Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal         Total           MD (m)         Rese         Law (m)         (m)         (m)         (m)         (m)           No results available for this load case         No results available for this load case         Immary - Initial Conditions - 13 3/8" Intermediate Casing         Immary - Initial Conditions - 13 3/8" Intermediate Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal         Total           0.03         1800,00         0,000         0,000         0,000         0,000         0,000           ummary -         PressureTest #1 - 13 3/8" Intermediate Casing         Intermediate Casing         Immary - Intermediate Casing         Immary - Intermediate Casing         Immary - Intermediate Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal         Total           0,03         1900,00         0,009         -0,009         0,000         0,000         0,000           ummary -         Loske's         Buckling         Balloon         Thermal         Total           0,03         1900,00         0,043         0,000         0,000         0,000         0,000</td>	ummary - RunningHole #1 - 20" Surface Casing         MD (m)       Hooke's       Buckling         Base       Law (m)       (m)         No results available for         MD (m)       Hooke's       Buckling         MD (m)       Hooke's       Buckling         MD (m)       Hooke's       Buckling         0.03       1800.00       0.000       0.000         ummary - PressureTest #1 - 13 3/8" Intermediate Casing       Hooke's       Buckling         MD (m)       Base       Law (m)       (m)         0.03       1800.00       0,908       -0,004         ummary - LostReturnsVVithMudDrop #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling         0.03       1800.00       -0.099       0,000       0,000         ummary - CereenCement #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling         0.03       1800.00       0,643       0,000       0,643       0,000         ummary - OverPull #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling       0,000         0.03       1800.00       0,178       0,000       0,000       0,643       0,000         ummary - OverPull #1 - 13 3/8" Intermediate Casing	ummary - RunningHole #1 - 20" Surface Casing         MD (m)       Hooke's       Buckling       Balloon         MD (m)       Base       Law (m)       (m)       (m)         No results available for this load case         MD (m)       Hooke's       Buckling       Balloon         MD (m)       Hooke's       Buckling       Balloon         MD (m)       Hooke's       Buckling       Balloon         0,03       1800,00       0,000       0,000       0,000         ummary - PressureTest #1 - 13 3/8" Intermediate Casing       Hooke's       Buckling       Balloon         MD (m)       Base       Law (m)       (m)       (m)       0,000         0,03       1800,00       0,908       -0,004       -0,905         ummary - LostReturnsWithMudDrop #1 - 13 3/8" Intermediate Casing       MD (m)       Hooke's       Buckling       Balloon         ummary - GreenCement #1 - 13 3/8" Intermediate Casing       MD (m)       GreenCement #1 - 13 3/8" Intermediate Casing         MD (m)       Hooke's       Buckling       Balloon         0,03       1800,00       0,043       0,000       0,000         0,03       1800,00       0,643       0,000       0,000         0,03	ummary - RunningHole #1 - 20" Surface Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal           Base         Law (m)         (m)         (m)         (m)         (m)           No results available for this load case	ummary -         RunningHole #1 - 20" Surface Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal         Total           MD (m)         Rese         Law (m)         (m)         (m)         (m)         (m)           No results available for this load case         No results available for this load case         Immary - Initial Conditions - 13 3/8" Intermediate Casing         Immary - Initial Conditions - 13 3/8" Intermediate Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal         Total           0.03         1800,00         0,000         0,000         0,000         0,000         0,000           ummary -         PressureTest #1 - 13 3/8" Intermediate Casing         Intermediate Casing         Immary - Intermediate Casing         Immary - Intermediate Casing         Immary - Intermediate Casing           MD (m)         Hooke's         Buckling         Balloon         Thermal         Total           0,03         1900,00         0,009         -0,009         0,000         0,000         0,000           ummary -         Loske's         Buckling         Balloon         Thermal         Total           0,03         1900,00         0,043         0,000         0,000         0,000         0,000

File: Convent	ional Desi	gn				Date/Tim	e: March (	01, 2018	02:58:	40 PM	Page: 23 of 24
Movement S		GreenCemen									-
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)		oon n)	Thermal (m)		Total (m)		Buckled Length (m)
1	0,03	2500,00	0,65	0	0,000	0,000	(11)	0,000	(11)	0,650	0,00
Movement S	ummarv -	OverPull #1 -	9 5/8" Produ	ction Casing							
	MD (m)		Hooke's	Buckling		oon	Therma		Total		Buckled
Top 1 2	0,03	Base 2500,00	Law (m) 0,31	2 (m)	0,000	n) 0,000	(m)	0,000	(m)	0,312*	Length (m) 0,00
2 3 * Surface di	splacement	due to pickup (+)	or slackoff (-)								
Movement S	iummarγ - MD (m)	RunningHole	<u>#1 - 95/8'' Pr</u> Hooke's	oduction Cas Buckling		oon	Therma		Total		Buckled
Top		Base	Law (m)	(m)		n)	(m)		(m)		Length (m)
2 3 4 5				No results a	vailable for this lo	ad case					
Movement S	ummarv -	Initial Condition	ons - 7" Produ	uction Liner							
	MD (m)		Hooke's	Buckling		oon	Therma		Total		Buckled
Top		Base	Law (m)	(m)	(1	n)	(m)		(m)		Length (m)
2 3 4 5				No length chan	ges - Pipe is fully	cemented					
Movement S		PressureTest			D-1		The amount of		T - 4 - 1		Dualdad
Top	MD (m)	Base	Hooke's Law (m)	Buckling (m)		oon n)	Thermal (m)		Total (m)		Buckled Length (m)
2 3 4 5				No length chan	ges - Pipe is fully	cemented					
Movement S	ummary -	LostReturns\/	VithMudDrop #	±1 - 7" Produ	iction Liner						
_inovernence	MD (m)	Lositetamst	Hooke's	Buckling		oon	Therma		Total		Buckled
Top	L.	Base	Law (m)	(m)		n)	(m)		(m)		Length (m)
2 3 4 5				No length chan	ges - Pipe is fully	cemented					
Movement S	ummarv -	GreenCemen	t #1 - 7" Prod	uction l iner							
	MD (m)		Hooke's	Buckling		oon	Therma		Total		Buckled
Top 1 2		Base	Law (m)	(m)	()	n)	(m)		(m)		Length (m)
2 3 4 5				No length chan	ges - Pipe is fully	cemented					
Movement			7" Droducti-	Linor							
_iviovement S	<u>- MD (m</u>	OverPull #1 -	7" Production Hooke's	<u>n Liner</u> Buckling	Bal	oon	Therma		Total		Buckled
Top		Base	Law (m)	(m)		n)	(m)		(m)		Length (m)
2 3 4 5				No length chan	ges - Pipe is fully	cemented					

ile: Conventional Design Novement Summary - R		1 7" Droduc	tion Linor	Date/Ti	me: March 01, 20	10 U2.50.40 P	ivi Page. 24 0i
MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
-		ŗ	No length changes - F	Pipe is fully cemented	I		
Movement Summary - T	ubingLeak #1 Base	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Dase	Law (m)	(m) No length changes - F	(m) Pipe is fully cemented	(m)	(m)	Length (m)
Movement Summary - P MD (m) Top	luggedPerfs a	#1 - 7'' Produc Hooke's Law (m)	tion Liner Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
			No length changes - F				· · <b>2</b> · · · (· · )

# 5.2.2.2 Slender Well Design





Ratings         Summary - 13 38" Conductor Casing           Sector         OD (n)         Weight (pp)         Grade         Name         Orade         Burit (pp)         Collapse (pp)         Tenior (b)         Compression           3         L Connection         Last         Example         Sector         1133/82         Tenior (b)         Compression           3         L Connection Last         Example         Sector         1133/82         Tenior (b)         Compression           4         Connection Last         Example         Sector         Tenior (b)         Compression           5         L Connection Vield         Example         Sector         Tenior (b)         Compression           5         L Connection Vield         Example         Feator         Example         Ratings           6         L Connection Vield         Example         Feator         Example         Tenior (b)         Compression           6         L Connection Vield         Example         Example<					Date/Time: Ma	rch 01, 2018 0	3:00:18 PM	Page: 3 of 18
Sing         Pipe Bady         Connection         Burt (b)         Connection         Bu	Ratings Summary - 13 3/8"	Conductor Casino	1					
Section         OD (n)         Weight pp)         Grade         Name         Grade         Burt (pi)         Collapse (pc)         Tenson (b)         Compresson           b = Connection Leak         B = Connection Burst         Status         B = Connection Burst         B = Connection Burst         B = Connection Practure         Eating         B = Connection Practure         Eating         Eatin			2	Connection		Ratir	nas	
B = Connection Facture D = Connection Facture Facture D = Connection Facture D = Connection	Section OD (in)	Weight (ppf)	Grade Nam J-55	ne Grade	Burst (psi) K-55 2734,58	Collapse (psi)	Tension (lbf)	Compression (lb) 853242
B F = Connection Hardurue         Connection Numout           7 + Connection Numout         Particle Section           Ratings Summary - 9.5/8" Surface Casing           Section 100 (in Weight (p))           Section 100 (in Weight (p))           Connection Numout           Section 100 (in Weight (p))           Section 100 (in Sectin 100 (in Sectin 100 (in Section 100 (in Sectin 100 (in								
6 J = Connection Vield 2 = Connection Vield 3 = C = Connection 3 = C = Connection 3 = C = Connection Vield 4 = C = Connection Vield 5 = C = Connection Lesk 5 = C = Connection Barst 5 = C = Connection C = Sector 4 = C = C = C = C = C = C = C = C = C =	B = Connection Burst F = Connection Fracture							
B         C = Connection           Ratings Summary - 9 5/8' Surface Casing           Ratings Summary - 9 5/8' Surface Casing           Ratings Summary - 9 5/8' Surface Casing           Connection Lask           Section 1000 min to be connection burst           Section 200 min to be connection Fracture 0           B = Connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 700 min to be connection Fracture 0           Section 800 min to be connection 700 min to be connecti	J = Connection Jump-out							
Ratings Summary - 9 5/8' Surface Casing           Ratings Summary - 9 5/8' Surface Casing           Connection Lesk         Ratings           Ratings           Connection Lesk           B = Connection Lesk           B = Connection Lesk           B = Connection Lesk           Ratings Summary - 7" Production Casing           Ratings Connection Weid           Section 1           Connection Lesk           Bar Connection Lesk           Connection Weid           Connection Weid           Connection Weid           Connection Facture           Barting MD         Section Jump-out           Production Casing           Section State           Connection Facture           Data Summary - Initial Conditions - 13 3/8" Conductor Casing           Connection Vield           Connection Vield           Co								
Sing Section         Pipe Body 00 (in)         Pipe Body 47/000         Connection P-110         Burd (pi) Bit C         Collapse (pi) P-110         Tensor (b) Lefe0,78         Tensor (b) Sole4.2           1         = connection Leak         = connection Fracture 0 = Connection Statist 0 = connection Manp-out 7 = connection Manp-out 7 = connection Heat         = connection Fracture 0 = connection Manp-out 7 = connection Heat         = connection Fracture 0 = connection Heat         = connection Fracture 0 = connection Heat         = connection Heat           Sector         0 (n)         Weight (pp) 700 (n)         Grade         Burst (ps) 700 (n)         Tensor (b) Compression 700 (n)         Eatings           Sector         0 (n)         Weight (pp) 700 (n)         Grade         Burst (ps) 700 (n)         Tensor (b) Compression 700 (n)         Tensor (b) Compression 700 (n)           2         Connection Heat         = connection Fracture 700 (n)         Tensor (b) Compression 700 (n)         Tensor (b) Compression 700 (n)         Tensor (b) Compression 700 (n)           2         Connection Fracture 71 (connection	C = Connection							
Section         OD (m)         Weight (ppf)         Grade (m)         Burst (pp)         Collepse (p)         Tension (bh)         Compression (m)           1         Connection Leak B = Connection Burst D = Connection Facture D = Connection Facture C = Connection Vidid         South (m)         P = 110         Burst (p)         Collepse (p)         Tension (bh)         Compression (m)         Tension (bh)         Collepse (p)         Tension (bh)         Compression (m)         Tension (bh)         Tension (bh)         Tension (bh)         Tension (bh)         Tension (bh)	Ratings Summary - 9 5/8" S	urface Casing						
1         9.625         47.000         P-110         BTC         P-110         L 9160.78         5286.42         1492959         1492           B = Connection Back         F = Connection Facture         5         Connection Facture         5         Connection Facture         5         Connection Jump-out         7         Production Casing         Ratings         Ratings         Connection Vield         V = Connection Vield         V = Connection Vield         Connection Vield         Connection Vield         Connection Vield         V = Connection Vield         Connection Vield         Connection Vield         Connection Vield         V = Connection Vield         V = Connection Vield         Connection Vield         Connection Vield         Connection Vield         V = Connection Vield         Connection Vield         V = Connection Vield         Connection Vield         Connection Vield         Connection Vield         Connection Vield         V = Connection Vield <td< td=""><td></td><td>Pipe Body</td><td></td><td></td><td></td><td>Ratir</td><td>ngs</td><td></td></td<>		Pipe Body				Ratir	ngs	
L = Connection Busk           B = Connection Busk           J = Connection Flatture           J = Connection Strature           J = Connection Strature           Section Vield           Section Section Vield           Section Section Vield           Section Section Vield           Section Section Vield           Section Section Vield           Section Section Section Vield           Section Sect	1 9,625	Weight (ppf) 47,000		ne Grade BTC F	Burst (psi) P-110 L 9160,78	Collapse (psi) 5296,42	Tension (lbf) 1492959	Compression (lb 149295
5 F = Connection Fracture 6 J = Connection Sumport 7 Y = Connection State 8 C = Connection State 9 Section 1           Ratings Summary - 7" Production Casing Section 1           Ratings Summary - 7" Production Casing Section 1           Section 200 (n) Weight Control Casing Section 1           Section 200 (n) Weight Control Casing 32.000 P-110 BTC         Ratings Control Casing P-110 B11634.34           Connection Lesk 8 = Connection Burst 9 = Connection Summary - Initial Conditions - 13 3/8" Conductor Casing Section 1 (m) 00 56521 0.000 0.0 (b(h) 0) (	L = Connection Leak							
6 J = Connection Sumpout Y = Connection Yield C = Connection Yield Ratings Summary - 7" Production Casing Ratings Summary - 7" Production Casing Pipe Body Section 1 00 (m) Velight 970 Grade T ,000 Velight 970 Grade Section Leak 4 B = Connection Leak 4 B = Connection Leak 5 = Connection Leak 4 B = Connection Fracture 6 J = Connection Fracture 6 J = Connection Fracture 6 J = Connection Fracture 6 J = Connection Fracture 6 J = Connection Fracture 6 J = Connection Vield C = Connection V	B = Connection Burst							
Z         Connection         Connection           Ratings Summary - 7" Production Casing         String         Pipe Body         Connection         Ratings         Collapse (ps)         Tension (bb)         Compression           String         D0 (n)         Weight (pp)         Grade         Name         Collapse (ps)         Tension (bb)         Compression           B = Connection Burst         String         MD         Axial Force         Dogleg         Torque         Friction Force         Tensor (bb)	J = Connection Jump-out							
Ratings Summary - 7" Production Casing           String         Pipe Body         Connection         Ratings           String         O (in)         Weight (ph)         Grade         Burst (ps)         Collapse (ps)         Tension (bb)         Compression           2         Connection Aumo-out           2         Connection Aumo-out           String         MD         Available for the set of the set								
String         Pipe Body         Connection         Ratings           1         00 (m)         Weight (pc)         Grade         Burst (ps)         Collapse (ps)         Tension (b)           1         2         Connection Leak         B = Connection Burst         Collapse (ps)         Tension (b)         Tension (b) </td <td>C = Connection</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	C = Connection							
String         Pipe Body         Connection         Ratings           3         CD (n)         Weight (cp)         Grade         Burst (cp)         Collapse (cp)         Tension (b)           4         = Connection Leak         B = Connection Burst         E = Connection Surst         Collapse (cp)         Tension (b)           5         = Connection Surst         = Connection Surst         E = Connection Surst	Ratings Summary - 7" Prodr	uction Casing						
Section         OD (n)         Weight (pp)         Grade         Name         Grade         Birts (pi)         Collapse (pis)         Tension (bh)         Compression           1         = connection Leak         = connection Leak         = connection Fracture         = 102490         1	String	Pipe Body					ngs	
B         E         Connection Bracture           6         J = Connection Vield           B         Connection Vield           Casing Load Summary - Initial Conditions - 13 3/8" Conductor Casing           Casing Load Summary - Initial Conditions - 13 3/8" Conductor Casing           Section         (m)         Avial Force         Dogleg         Torque         Fliction Force         Temperature         Pressure (ps)           1         24.96         51162         0.00         0.0         0.0         44,00         38,30         33           3         1         304.80         1126         0.00         0.0         0.0         35,00         656.22         556           3         32.04         -9107         0.00         0.0         0.0         38,00         647.25         776           9         Additional Pickup to Prevent Buckling = 482 lbf         0.00         0.0         0.0         38,00         647.25         766           1         24.96         1753.45         0.20         6.0         0.0         483.0         36           6         1         342.197         -133/8" Conductor Casing         -         16078         647.25         766           1         1.90.3	Section OD (in) 1 7,000	Weight (ppf) 32,000		ne Grade BTC F	Burst (psi) P-110 B 11634,34	Collapse (psi) 10780,84		Compression (lb 1024904
5 F = Connection Financian 7 Y = Connection Jump-out 7 Y = Connection Jump-out 7 Y = Connection Jump-out Casing Load Summary - Initial Conditions - 13 3/8" Conductor Casing String MD Axial Force Dogleg Torque (lbfth) ('If)th 1 2 1 2,498 51182 0,000 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	L = Connection Leak					<u> </u>		
6 J = Connection Jield C = Connection Vield C = Connection Vield C = Connection Vield Section (m) Axial Force Dogleg Torque (bHb) 1 0,03 55621 0,00 0,0 0,0 550,00 0,0 0,0 0,0 0,0 0,0								
7       Y = Connection         Casing Load Summary - Initial Conditions - 13 3/8" Conductor Casing         String       MD       Axia Force       Dogleg       Torque       Friction Force       Temperature       Pressure (psi)         1       1       0,03       55521       0,00       0,0       0,0       0,00       0,05       C         2       1       24,96       51162       0,00       0,0       0,0       0,00       38,30       38         3       1       304,80       1126       0,00       0,0       0,0       35,00       655,22       556         1       362,04       -9107       0,00       0,0       0,0       38,00       647,25       716         9       Additional Pickup to Prevent Buckling = 482 lbr       0.00       0,0       0,0       38,00       647,25       716         2       1       0,03       179804       0,16       4,6       0,0       169,00       169,30,30       33         3       1       152,40       152560       0,37       15,3       0,0       47,70       183,77       223         4       1       0,34       152560       0,37       15,3       0,0       43,70<								
B         C = Connection           Casing Load Summary - Initial Conditions - 13 3/8" Conductor Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           2         1         0.03         55621         0.00         0.0         0.0         0.00								
String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           1         1         24,96         51152         0,00         0,0         43,00         38,30         36           2         1         24,96         51152         0,00         0,0         0,0         43,00         38,30         36           3         1         304,80         1128         0,00         0,0         0,0         37,39         467,53         467           4         1         361,98         -9086         0,00         0,0         0,0         35,00         556,32         556           6         1         421,97         -19824         0,00         0,0         0,0         38,00         647,25         716           Additional Pickup to Prevent Buckling = 432 lbf           Casing Load Summary - PressureTest #1 - 13 3/8" Conductor Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           2         1         24,96         175345         0,20         6,0         0,0         43,00         1638,30								
String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           1         1         2.03         55621         0.00         0.0         0.0         43.00         38.30         35           2         1         24.96         51162         0.00         0.0         0.0         43.00         38.30         36           3         1         304.80         1128         0.00         0.0         0.0         37.39         467.53         467           4         1         361.98         -9096         0.00         0.0         0.0         35.00         556.32         556           6         1         421.97         -19824         0.00         0.0         0.0         38.00         647.25         716           Additional Pickup to Prevent Buckling = 432 lbf           Casing Load Summary - PressureTest #1 - 13 3/8" Conductor Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           1         0.03         179804         0.16         4.6         0.0         0.0         43.00         1638								
Section         (m)         (bf)         ('/100ft)         (ft-lbf)         (lbf/ft)         ('Ff)         Internal         External           2         1         24.96         51162         0.00         0.0         0.0         49.00         38.30         36.30         3								
1         1         0.03         55621         0.00         0.0         0.0         50.00         0.05         C           2         1         24.96         51162         0.00         0.0         0.0         49.00         38.30         38           3         1         304.80         1126         0.00         0.0         0.0         37.39         467.53         467           4         1         381.98        9096         0.00         0.0         0.0         35.00         555.22         555           6         1         421.97        19824         0.00         0.0         0.0         38.00         647.25         716           8         Additional Pickup to Prevent Buckling = 482 lbf         5         6         1         6         1         6         0         0         1         5         6         1		tial Conditions - 1			Friction Force	emperature	Pressure	(nsi)
3         1         304,80         1126         0,00         0,0         37,39         467,53         467           4         1         361,98         -9096         0,00         0,0         0,0         35,00         555,32         555           1         421,97         -19924         0,00         0,0         0,0         38,00         647,25         716           9         Additional Pickup to Prevent Buckling = 482 lbf         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           5         1         0,03         179904         0,16         4,6         0,0         50,00         180,05         0           2         1         0,03         179904         0,16         4,6         0,0         50,00         1800,05         0           2         1         24,96         175345         0,20         6,0         0         43,70         183,77         223           3         1         152,40         152560         0,37         15,3         0,0         43,70         183,77         223           4         304,80         125310         0,57         29,6         0,0         35,00	String MD Section (m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)	(lbf/ft)	(°F)	Internal	External
4         1         361,98         -9096         0,00         0,0         0,0         35,00         555,32         555           5         1         362,04         -9107         0,00         0,0         0,0         35,00         555,32         555           8         Additional Pickup to Prevent Buckling = 482 lbf         -1133/8" Conductor Casing         -11         -1133/8" Conductor Casing           Casing Load Summary - PressureTest #1 - 133/8" Conductor Casing         Friction Force         Temperature         Pressure (psi)           5         1         5226         0.0         0.0         44,0         0.0         0.0         1         1         1         1         1         3/8" Conductor Casing           6         1         0,03         179804         0,16         4,6         0,0         50,00         1690,05         0           2         1         24,96         175345         0,20         6,0         0,0         43,70         1833,77         233,77         233,73         2067,53         444           3         364,96         15349         0,57         29,6         0,0         37,39         2067,53         444           5         1         361,98         1150	String MD Section (m)	Axial Force (lbf) 0,03 5562	Dogleg (°/100ft)	Torque (ft-lbf) 0,0	(lbf/ft) 0,0	(°F) 50,00	Internal 0,05	External 0,0
6         1         421,97         -19824         0,00         0,0         0,0         38,00         647,25         716           Additional Pickup to Prevent Buckling = 482 lbf         Casing Load Summary - PressureTest #1 - 13 3/8" Conductor Casing         Temperature         Temperature         Pressure (psi)           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (psi)           1         0,03         179804         0,16         4.6         0,0         50,00         1600,05         0           2         1         24,96         175345         0,20         6,0         0,0         43,00         1838,30         36           3         1         152,660         0,37         15,3         0,0         43,70         1838,37         203           4         1         304,80         125310         0,57         29,6         0,0         37,39         2067,53         446           5         1         362,04         110887         0,00         0,0         0,0         35,00         215,5,22         533           6         1         362,04         110887         0,00         0,0         0,0         38	String MD Section (m) 1 24	Axial Force (lbf) 0,03 5562 <sup>-</sup> 4,96 51162	Dogleg (°/100ft) 1 0,00 2 0,00	Torque (ft-lbf) 0,0 0,0	(lbf/ft) 0,0 0,0	(°F) 50,00 49,00	Internal 0,05 38,30	External 0,0 38,3
Additional Pickup to Prevent Buckling = 482 lbf           Casing Load Summary - PressureTest #1 - 13 3/8" Conductor Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (psi)           1         1         0.03         179804         0.16         4.6         0.0         50.00         1888.30         36           2         1         24.96         175345         0.20         6.0         0.0         49.00         1838.30         36           3         1         152.40         152660         0.37         15.3         0.0         43.70         1838.377         223           4         1         304.80         125310         0.577         29.6         0.0         35.00         2155.22         530           6         1         362.04         110887         0.00         0.0         0.0         35.00         2155.52         555           7         1         421.97         106364         0.00         0.0         0.0         38.00         2247.25         643           9         Additional Pickup to Prevent Buckling = 82896 lbf         5         1         32.01         (!bf)         (!flbf)<	String         MD           Section         (m)           1         0           1         2           1         304	Axial Force (lbf) 0,03 5562' 4,96 51162 4,80 1126	Dogleg (°/100ft) 2 0,00 3 0,00	Torque (ft-lbf) 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0	(°F) 50,00 49,00 37,39	Internal 0,05 38,30 467,53	External 0,0 38,3 467,5
Casing Load Summary - PressureTest #1 - 13 3/8" Conductor Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           1         0,03         179804         0,16         4.6         0,0         50.00         1800,05         0           2         1         24,96         175345         0,20         6,0         0,0         49,00         1838,30         36           3         1         152,40         152560         0,37         15,3         0,0         37,39         2067,53         446           5         1         361,98         115088         0,64         35,8         0,0         35,00         2155,22         530           6         1         362,04         110887         0,00         0,0         0,0         38,00         2247,25         643           9         Additional Pickup to Prevent Buckling = 82896 lbf         1         13 3/8" Conductor Casing         1         124,96         2247,25         643           1         0,03         33201         0,00         0,0         0,00         38,00         2247,25         643           1         24,96         <	String         MD           Section         (m)           1         2           1         30           1         36           1         36	Axial Force (lbf) 4,96 5562' 4,80 1126 1,98 -9096 2,04 -9107	Dogleg (°/100ft) 2 0,00 3 0,00 3 0,00 5 0,00 7 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00	Internal 0,05 38,30 467,53 555,22 555,32	External 0,09 38,30 467,54 555,22 555,39
String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (psi)           Section         (m)         (lbf)         ('/100t)         (k-lbf)         (lbf/t)         ('F)         Internal         External           1         24,96         179804         0,16         4,6         0,0         50,00         1890,05         C           2         1         24,96         175345         0,20         6,0         0,0         49,00         1838,30         36           3         1         15260         0,37         15,3         0,0         43,70         1838,77         223           4         361,98         115098         0,64         35,8         0,0         35,00         2155,22         530           6         1         362,04         110897         0,00         0,0         0,0         38,00         2247,25         643           9         Additional Pickup to Prevent Buckling = 82896 lbf         I         13 3/8" Conductor Casing         Internal         External           2         1         0,03         33201         0,00         0,0         0,00         0,00         0,00         38,00	String         MD           Section         (m)           1         2           1         30           1         36           1         36	Axial Force (lbf) 4,96 5562' 4,80 1126 1,98 -9096 2,04 -9107	Dogleg (°/100ft) 2 0,00 3 0,00 3 0,00 5 0,00 7 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00	Internal 0,05 38,30 467,53 555,22 555,32	External 0,09 38,30 467,54 555,22 555,39
String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (psi)           Section         (m)         (lbf)         ('/100t)         (k-lbf)         (lbf/t)         ('F)         Internal         External           1         24,96         179804         0,16         4,6         0,0         50,00         1890,05         C           2         1         24,96         175345         0,20         6,0         0,0         49,00         1838,30         36           3         1         15260         0,37         15,3         0,0         43,70         1838,77         223           4         361,98         115098         0,64         35,8         0,0         35,00         2155,22         530           6         1         362,04         110897         0,00         0,0         0,0         38,00         2247,25         643           9         Additional Pickup to Prevent Buckling = 82896 lbf         I         13 3/8" Conductor Casing         Internal         External           2         1         0,03         33201         0,00         0,0         0,00         0,00         0,00         38,00	String         MD           Section         (m)           1         2           1         30           1         36           1         36           1         42	Axial Force (lbf) 4,96 5116 4,80 1120 1,98 -9090 2,04 -9100 1,97 -19824	Dogleg (°/100ft) 2 0,00 3 0,00 3 0,00 5 0,00 7 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00	Internal 0,05 38,30 467,53 555,22 555,32	External 0,09 38,30 467,54 555,22 555,39
Section         (m)         (lbf)         (°/100 t)         (R-lbf)         (lbf/t)         (°F)         Internal         External           1         1         0.03         179804         0.16         4.6         0.0         50.00         1600.05         C           2         1         24.96         175345         0.20         6.0         0.0         49.00         1938,30         36           3         1         152.40         152560         0.37         15.3         0.0         43.70         1833,77         223           4         1         364,80         125310         0.57         29.6         0.0         37.39         2067,53         446           5         1         361,98         116088         0.64         35.8         0.0         35.00         2165,52         555           6         1         362,04         1100864         0.00         0.0         0.0         38,00         2247,25         643           9         Additional Pickup to Prevent Buckling = 32896 lbf         5         5         50.00         204,725         643           1         0.03         33201         0.00         0.0         0.0         50.00	String         MD           Section         (m)           1         2           1         30           1         36           1         36           1         42           Additional Pickup to Prevent But	Axial Force (lbf) 4,96 5116 4,80 1120 1,98 -9096 2,04 -910 1,97 -1982 uckling = 482 lbf	Dogleg (*/100R) 2 0,00 5 0,00 6 0,00 7 0,00 4 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00	Internal 0,05 38,30 467,53 555,22 555,32	External 0,09 38,30 467,54 555,22 555,39
2         1         24/96         175345         0.20         6.0         0.0         49.00         1638.30         36           3         1         152.40         152660         0.37         15.3         0.0         43.70         1833.77         223           4         1         304.80         125310         0.57         29.6         0.0         37.39         2067.53         446           5         1         361.98         115088         0.64         35.8         0.0         35.00         2155.22         530           6         1         362.04         110897         0.00         0.0         0.0         35.00         2155.52         555           7         1         421.97         106364         0.00         0.0         36.00         2247.25         643           9         Additional Pickup to Prevent Buckling = 82896 lbf         5         5         5         5         5         5         5         5         5         5         5         6         5         5         5         5         6         5         5         5         5         5         5         5         5         5         5         5         <	String MD Section (m) 1 2 1 30 1 30 1 36 1 36 1 36 1 42 Additional Pickup to Prevent Bu	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -19822 uckling = 482 lbf essureTest #1 - 1	Dogleg (*/100ft) 2 0,00 5 0,00 5 0,00 7 0,00 4 0,00 4 33/8" Conducto	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) <u>49,00</u> 37,39 35,00 35,00 38,00	Internal 0,05 38,30 467,53 555,22 555,32 647,25	External 0,02 38,34 467,5- 555,22 555,33 716,76
3         1         15240         152560         0.37         15,3         0.0         43,70         1833,77         223           4         1         304,80         125310         0.57         29,6         0,0         37,39         2067,53         446           5         1         361,99         115098         0,64         35,8         0,0         35,00         2155,22         555           6         1         362,04         110887         0,00         0,0         0,0         35,00         2155,22         555           7         1         421,97         106364         0,00         0,0         0,0         38,00         2247,25         643           9         Additional Pickup to Prevent Buckling = 32896 lbf	String MD Section (m) 1 2 1 30 1 30 1 36 1 36 1 42 Additional Pickup to Prevent Bu Casing Load Summary - Pre String MD Section (m)	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -1982 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf)	Dogleg (°/100ft) 2 0,00 2 0,00 5 0,00 5 0,00 5 0,00 6 0,00 6 0,00 6 0,00 7 0,00 6 0,00 7 0,00 7 0,00 7 0,00 7 0,00 7 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force 1 (lbf/ft)	(°F) 50,00 49,00 37,39 35,00 35,00 38,00 	Internal 0,05 38,30 467,53 555,22 555,32 647,25 Pressure Internal	External 0,00 38,30 467,5 555,23 555,33 716,70 (psi) External
4         1         304,80         125310         0.57         29,6         0,0         37,39         2067,53         444           5         1         361,98         115088         0,64         35,8         0,0         35,00         2155,32         553           6         1         362,04         110887         0,00         0,0         0,0         35,00         2155,32         555           7         1         421,97         106384         0,00         0,0         0,0         38,00         2247,25         643           9         Additional Pickup to Prevent Buckling = 82896 lbf         External         5         5         5         5         5         5         5         6         5         5         5         6         5         5         6         5         5         5         6         5	String MD Section (m) 1 2 1 30 1 30 1 36 1 36 1 36 1 42 Additional Pickup to Prevent Bu Casing Load Summary - Pre String MD Section (m)	Axial Force (lbf) 4,96 51162 4,80 1122 1,98 -9098 2,04 -9107 1,97 -1982- uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force 1 (lbf/tt) 0,0	(°F) 50,00 49,00 37,39 35,00 35,00 38,00 'emperature (°F) 50,00	Internal 0,05 38,30 467,53 565,22 555,32 647,25 Pressure Internal 1600,05	External 0,00 38,30 487,55 555,22 555,33 716,70 (psi) External 0,0
5         1         36198         115088         0.64         35.8         0.0         35.00         2155.22         530           6         1         362,04         110887         0.00         0.0         0.0         35.00         2155.32         555           7         421.97         106364         0.00         0.0         0.0         36.00         2247.25         643           9         Additional Pickup to Prevent Buckling = 82896 lbf         Casing Load Summary - LostReturnsWithMudDrop #1 - 13 3/8" Conductor Casing         Casing Load Summary - LostReturnsWithMudDrop #1 - 13 3/8" Conductor Casing           Casing Load Summary - LostReturnsWithMudDrop #1 - 0.03         Opegag         Torque         Friction Force         Temperature         Pressure (psi)           1         0.03         33201         0.00         0.0         0.0         50.00         0.00         0.0           2         1         24.96         28742         0.00         0.0         0.0         50.00         0.00         36.00         36.00         36.00         36.00         36.00         36.00         36.00         35.00         0.00         35.00         0.00         35.00         0.00         35.00         0.00         35.00         0.00         55.00	String MD Section (m) 1 2 1 30 1 30 1 36 1 36 1 36 1 42 Additional Pickup to Prevent Bu Casing Load Summary - Pre String MD Section (m)	Axial Force (lbf) 4,96 5116; 4,80 112; 4,80 112; 1,98 -909; 2,04 -910; 1,97 -1982; uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 17980; 4,96 17534;	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force 1 (lbf/ft) 0,0 0,0	(°F) 49,00 37,39 35,00 36,00 38,00 	Internal 0,05 38,30 467,53 565,22 565,32 647,25 e47,25 e47,25 e17 Pressure Internal 1600,05 1638,30	External 0,00 38,31 467,55 555,2: 555,3: 716,70 (psi) External 0,00 36,55
Zasing Load Summary - LostReturnsWithMudDrop #1 - 13 3/8" Conductor Casing         Tensor Section         Tensor Sect	String         MD           Section         (m)           1         2:           1         30:           1         36:           1         36:           1         36:           1         36:           1         42:           Additional Pickup to Prevent But           Casing Load Summary - Pre           String         MD           Section         (m)           1         2:           1         1           1         1	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -19822 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175345 2,40 152566	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00 35,00 38,00 	Internal 0,05 38,30 467,53 555,22 565,32 647,25 847,25 Internal 1600,05 1638,30 1833,77	External 0,00 38,34 467,55 555,25 555,25 555,35 7,16,70 (psi) External 0,00 36,65 223,33
B         Additional Pickup to Prevent Buckling = 82896 lbf           Casing Load Summary - LostReturnsWithMudDrop #1 - 13 3/8" Conductor Casing String MD Axial Force Dogleg Torque Friction Force Temperature (psi)         Pressure (psi)           1         0,03         33201         0,00         0,0         50,00         0,00         Conductor Casing           2         1         24,96         28742         0,00         0,0         0,00         50,00         0,00         36           3         1         304,80         -21294         0,00         0,0         0,0         35,00         0,00         467           4         1         361,98         -31616         0,00         0,0         0,0         35,00         0,00         555	String         MD           Section         (m)           1         2           1         30           1         36           1         36           1         36           1         36           1         42           Additional Pickup to Prevent But           Casing Load Summary - Pre           String         MD           Section         (m)           1         22           1         10           1         10           1         10           1         136	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099; 2,04 -9100 1,97 -1982 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175344 2,40 152560; 4,80 125310	Dogleg (*/100ft) 2 0,00 2 0,00 5 0,00 5 0,00 6 0,00 4 0,00 4 0,00 4 0,00 4 0,00 5 0,20 0 0,37 5 0,57 5 0,57	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force 1 (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 38,00 	Internal 0,05 38,30 467,53 565,22 565,32 647,25 647,25 101 1600,05 1638,30 1833,77 2067,53 2155,22	External 0,0 38,3 467,5 5655,3 555,3 555,3 716,7 (psi) External 0,0 36,5 223,3 446,7 530,5
Additional Pickup to Prevent Buckling = 82896 lbf           Casing Load Summary - LostReturnsWithMudDrop #1 - 13 3/8" Conductor Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (psi)           1         0.03         33201         0.00         0.0         0.0         0.00         50.00         0.00         2           2         1         24.96         28742         0.00         0.0         0.00         50.00         0.00         36           3         1         304.80         -21294         0.00         0.0         0.0         35.00         0.00         467           4         1         361.99         -31516         0.00         0.0         0.0         35.00         0.00         555	String         MD           Section         (m)           1         2           1         30           1         36           1         36           1         36           1         36           1         42           Additional Pickup to Prevent But           Casing Load Summary - Pre           String         MD           Section         (m)           1         1           2         1           1         1           2         1           1         1           1         30           1         36           1         36           1         36	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -1982- uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 17980- 4,96 175342 2,40 15256( 4,80 125310 1,98 115082 2,04 110883	Dogleg (°/100ft)         0,00           2         0,00           2         0,00           3         3/8" Conducto           Dogleg (°/100ft)         0,16           5         0,20           0         0,37           0         0,57           3         0,67	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 36,00 (°F) 50,00 49,00 43,70 37,39 35,00 35,00	Internal 0,05 38,30 467,53 565,22 565,32 647,25 847,25 1600,05 1638,30 1638,30 1638,377 2067,53 2,155,32	External 0,0 38,3 467,5 555,2 555,3 716,7 (psi) External 0,0 36,5 223,3 446,7 530,5 555,3
String Section         MD (m)         Axial Force (lbf)         Dogleg ('f100t)         Torque (ht-lbf)         Friction Force (lbf/t)         Temperature (°F)         Pressure (psi)           1         1         0,03         33201         0,00         0,0         0,00         0,00         0,00         20,00         3,00         0,00         0,00         3,00         0,00         4,00         4,00         1         361,98         -31516         0,00         0,00         0,00         35,00         0,00         555         1         362,04         -50749         0,00         0,0         35,00         0,00         555	String Section         MD (m)           1         1           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42           Additional Pickup to Prevent But           Casing Load Summary - Present But           String         MD           Section         (m)           1         22           1         1           1         26           1         1           1         30           1         36           1         36           1         36           1         36           1         36           1         42	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -1982- uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 17980- 4,96 175342 2,40 15256( 4,80 125310 1,98 115082 2,04 110883	Dogleg (°/100ft)         0,00           2         0,00           2         0,00           3         3/8" Conducto           Dogleg (°/100ft)         0,16           5         0,20           0         0,37           0         0,57           3         0,67	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 36,00 (°F) 50,00 49,00 43,70 37,39 35,00 35,00	Internal 0,05 38,30 467,53 565,22 565,32 647,25 847,25 1600,05 1638,30 1638,30 1638,377 2067,53 2,155,32	External 0,00 38,33 467,55 555,32 555,33 716,76 (psi) External 0,00 223,38 446,76 530,65 555,33
String Section         MD (m)         Axial Force (lbf)         Dogleg ('f100t)         Torque (ht-lbf)         Friction Force (lbf/t)         Temperature (°F)         Pressure (psi)           1         1         0,03         33201         0,00         0,0         0,00         0,00         0,00         20,00         3,00         0,00         0,00         3,00         0,00         4,00         4,00         1         361,98         -31516         0,00         0,00         0,00         35,00         0,00         555         1         362,04         -50749         0,00         0,0         35,00         0,00         555	String         MD           Section         (m)           1         2           1         30           1         36           1         36           1         36           1         36           1         36           1         36           1         42           Additional Pickup to Prevent But           Casing Load Summary - Pre           String         MD           Section         (m)           1         1           1         1           1         1           1         30           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -19822 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175345 2,40 15256( 4,80 125311 1,98 115068 2,04 110897 1,97 10636	Dogleg (°/100ft)           0.00           0.00           0.00           0.00           0.00           0.00           0.00           3 3/8" Conducto           Dogleg (°/100ft)           0.16           0.02           0.37           0.57           3 0.64	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 36,00 (°F) 50,00 49,00 43,70 37,39 35,00 35,00	Internal 0,05 38,30 467,53 565,22 565,32 647,25 847,25 1600,05 1638,30 1638,30 1638,377 2067,53 2,155,32	External 0,0¢ 38,33 467,5 555,22 555,33 716,70 (psi)
Section         (m)         (lbf)         (°/100t)         (ft-lbf)         (lbf/t)         (°F)         Internal         External           1         0,03         33201         0,00         0,0         0,0         50,00         0,00         C0           2         1         24,96         28742         0,00         0,0         50,00         0,00         36           3         1         304,80         -21294         0,00         0,0         37,54         0,00         467           4         1         361,98         -31516         0,00         0,0         35,00         0,00         556           1         362,04         -60749         0,00         0,0         35,00         0,00         556	String         MD           Section         (m)           1         2           1         30           1         36           1         36           1         36           1         36           1         36           1         36           1         42           Additional Pickup to Prevent But           Casing Load Summary - Pre           String         MD           Section         (m)           1         1           Section         (m)           1         1           1         30           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -19822 uckling = 482 lbf essureT est #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175345 2,40 15256( 4,80 125311 1,98 115086 2,04 11088 1,97 106364 uckling = 82896 lbf	Dogleg (*/100ft) 2 0,00 2 0,00 3 0,00 4 0,00 7 0,00 7 0,00 7 0,00 7 0,00 7 0,00 7 0,00 7 0,00 7 0,00 7 0,00 7 0,00 6 0,10 6 0,20 0 0,37 7 0,00 4 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 36,00 (°F) 50,00 49,00 43,70 37,39 35,00 35,00	Internal 0,05 38,30 467,53 565,22 565,32 647,25 847,25 1600,05 1638,30 1638,30 1638,377 2067,53 2,155,32	External 0,00 38,33 467,55 555,32 555,32 716,70 External 0,00 36,65 223,33 446,70 530,55,33
1         0,03         33201         0,00         0,0         50,00         0,00         0           2         1         24,96         28742         0,00         0,0         50,00         0,00         33           3         1         304,80         -21294         0,00         0,0         0,0         37,54         0,00         467           4         1         361,98         -31516         0,00         0,0         35,00         0,00         555           5         1         362,04         -50749         0,00         0,0         0,0         35,00         0,00         555	String         MD           Section         (m)           1         2:           1         30:           1         36:           1         36:           1         36:           1         36:           1         36:           1         36:           1         36:           1         42:           Additional Pickup to Prevent But           Casing Load Summary - Pre           String         MD           1         2:           1         1:           1         2:           1         1:           1         36:           1         36:           1         36:           1         36:           1         36:           1         36:           1         36:           1         36:           1         36:           1         36:           1         42:           Additional Pickup to Prevent But           Casing Load Summary - Los	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -1982- uckling = 482 lbf EssureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175344 2,40 15256; 4,80 125311 1,98 11508 2,04 11098; 1,97 10636- uckling = 82896 lbf stReturnsWithMut	Dogleg (°/100ft) 2 0,00 2 0,00 3 0,00 7 0,00 7 0,00 3 3/8" Conducto Dogleg (°/100ft) 4 0,16 5 0,20 0 0,37 0 0,57 3 0,64 4 0,00 4 0,00	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 15,3 29,6 35,8 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 36,00 38,00 	Internal 0,05 38,30 467,53 565,22 555,32 647,25 847,25 100,05 1638,30 1833,77 2067,53 2155,32 2155,32 2155,32	External 0,00 38,33 467,5- 555,2: 555,3: 716,70 (psi) External 0,00 36,55 223,37 446,55 555,3: 643,11 
4 1 361,98 -31516 0,00 0,0 0,0 35,00 0,00 555 5 1 362,04 -50749 0,00 0,0 0,0 35,00 0,00 555	String         MD           Section         1         0           1         2         1         30           1         36         1         36           1         36         1         36           1         36         1         36           Additional Pickup to Prevent But         1         42           Additional Pickup to Prevent But         1         1           Casing Load Summary - Present But         1         1           Section         1         1         2           1         1         15         1         30           1         1         36         1         36           1         1         15         1         36           1         1         36         1         36           1         36         1         36         1           1         36         1         36         1           1         36         1         36         1           1         36         1         36         1           2         Additional Pickup to Prevent But         1         36           1	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9096 2,04 -910; 1,97 -1982- uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 17980- 4,96 17534; 2,40 15256( 4,80 12531( 1,98 11508; 2,04 11088; 1,97 10636- uckling = 82896 lbf stReturnsWithMut Axial Force (lbf)	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 15,3 29,6 35,8 0,0 0,0 0,0 15,3 29,6 35,8 0,0 0,0 0,0 15,3 29,6 35,8 0,0 0,0 15,3 29,6 35,8 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 36,00 38,00 	Internal 0,05 38,30 467,53 555,22 565,32 647,25 e47,25 1600,05 1638,30 1833,77 2067,53 2155,22 2155,22 2155,22 2247,25	External 0,00 38,31 467,55 555,21 555,31 555,31 716,70 (psi) External 0,00 36,55 223,31 446,71 530,51 555,31 643,11
4 1 361,98 -31516 0,00 0,0 0,0 35,00 0,00 555 5 1 362,04 -50749 0,00 0,0 0,0 35,00 0,00 555	String         MD           Section         (m)           1         22           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42'           Additional Pickup to Prevent But           Casing Load Summary - Present But           1         2           1         2           1         2           1         2           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42'           Additional Pickup to Prevent But           Casing Load Summary - Los           String         MD           Section         (m) <td>Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099; 2,04 -9100 1,97 -1982 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175344 2,40 152560; 4,96 175344 2,40 152560; 4,96 175344 1,97 10686; 1,97 10686; uckling = 82896 lbf stReturnsWithMut Axial Force (lbf) 0,03 3320</td> <td>Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,</td> <td>Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,</td> <td>(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,</td> <td>(°F) 50,00 49,00 37,39 35,00 36,00 38,00 </td> <td>Internal 0,05 38,30 467,53 565,22 565,32 647,25 647,25 1600,05 1638,30 1833,77 2067,53 2155,22 2155,32 3157,53 2157,5</td> <td>External 0,00 38,30 467,55 5655,23 555,33 716,70 External 0,00 36,55 223,33 446,55 223,33 446,45 555,33 643,17 (psi) External 0,00</td>	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099; 2,04 -9100 1,97 -1982 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175344 2,40 152560; 4,96 175344 2,40 152560; 4,96 175344 1,97 10686; 1,97 10686; uckling = 82896 lbf stReturnsWithMut Axial Force (lbf) 0,03 3320	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 36,00 38,00 	Internal 0,05 38,30 467,53 565,22 565,32 647,25 647,25 1600,05 1638,30 1833,77 2067,53 2155,22 2155,32 3157,53 2157,5	External 0,00 38,30 467,55 5655,23 555,33 716,70 External 0,00 36,55 223,33 446,55 223,33 446,45 555,33 643,17 (psi) External 0,00
5 1 362,04 -50749 0,00 0,0 0,0 35,00 0,00 555	String         MD           Section         (m)           1         22           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42'           Additional Pickup to Prevent But           Casing Load Summary - Present But           1         2           1         2           1         2           1         2           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42'           Additional Pickup to Prevent But           Casing Load Summary - Los           String         MD           Section         (m) <td>Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -19822 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175345 2,40 15256( 4,80 125311 1,98 115088 2,04 11088 1,97 106364 uckling = 82896 lbf estReturnsWithMut Axial Force (lbf) 0,03 33207 4,96 22742</td> <td>Dogleg (°/100t) 2 0,00 5 0,00 5 0,00 5 0,00 5 0,00 5 0,00 6 0,00 4 0,00 4 0,00 4 0,00 4 0,00 5 0,20 0 0,37 5 0,64 7 0,00 4 0,00 4 0,00 4 0,00 4 0,00 5 0,20 0 0,57 5 0,64 7 0,00 5 0,000 5 0,0000 5 0,000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000000000</td> <td>Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,</td> <td>(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,</td> <td>(°F) 50,00 49,00 37,39 35,00 35,00 36,00 38,00 emperature (°F) 50,00 50,00 50,00</td> <td>Internal 0,05 38,30 467,53 565,22 565,32 647,25 447,25 447,25 847,25 160,05 1638,30 1833,77 2067,53 2155,22 2155,532 2247,25 2247,25</td> <td>External 0,00 38,33 467,55 555,23 555,33 716,70 External 0,00 36,65 223,33 446,70 530,85 555,33 643,17 (psi) External 0,00 38,33 643,87 (psi) 23,33 23,33 23,33 23,33 24,35 25,55 23,35 23,35 23,35 24,555 24,555 24,555 24,555 24,555 24,555 24,555 25,55 25,55 25,557 25,557 25,557 26,577 26,5777 26,577 26,577</td>	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -19822 uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 179804 4,96 175345 2,40 15256( 4,80 125311 1,98 115088 2,04 11088 1,97 106364 uckling = 82896 lbf estReturnsWithMut Axial Force (lbf) 0,03 33207 4,96 22742	Dogleg (°/100t) 2 0,00 5 0,00 5 0,00 5 0,00 5 0,00 5 0,00 6 0,00 4 0,00 4 0,00 4 0,00 4 0,00 5 0,20 0 0,37 5 0,64 7 0,00 4 0,00 4 0,00 4 0,00 4 0,00 5 0,20 0 0,57 5 0,64 7 0,00 5 0,000 5 0,0000 5 0,000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000000000	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/tt) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 36,00 38,00 emperature (°F) 50,00 50,00 50,00	Internal 0,05 38,30 467,53 565,22 565,32 647,25 447,25 447,25 847,25 160,05 1638,30 1833,77 2067,53 2155,22 2155,532 2247,25 2247,25	External 0,00 38,33 467,55 555,23 555,33 716,70 External 0,00 36,65 223,33 446,70 530,85 555,33 643,17 (psi) External 0,00 38,33 643,87 (psi) 23,33 23,33 23,33 23,33 24,35 25,55 23,35 23,35 23,35 24,555 24,555 24,555 24,555 24,555 24,555 24,555 25,55 25,55 25,557 25,557 25,557 26,577 26,5777 26,577 26,577
	String Section         MD (m)           1         2           1         30           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42           Additional Pickup to Prevent But           Casing Load Summary - Pre           String         MD           1         1           2         1           1         2           1         36           1         36           1         2           1         1           1         36           1         36           1         36           1         36           1         36           1         36           1         36           1         42           Additional Pickup to Prevent But           Casing Load Summary - Los           String         MD           Section         (m)           1         2	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9099 2,04 -910; 1,97 -1982- uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 17980- 4,96 17534 2,40 15256; 4,80 12531; 1,97 10636- uckling = 82896 lbf stReturnsWithMut Axial Force (lbf) 0,03 3320; 4,96 2874 4,80 -2129	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 15,3 29,6 35,8 0,0 0,0 0,0 (ft-lbf) (ft-lbf) 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 36,00 38,00 	Internal 0,05 38,30 467,53 565,22 555,32 647,25 847,25 100,05 1638,30 1833,77 2067,53 2155,22 2155,22 2155,23 2155,22 2155,23 2155,255,23 21555,23 2155,23 2155,23 2155,23 2155,23 2155,23 21	External 0,00 38,30 467,55 555,22 555,32 716,76 External 0,02 36,55 223,33 446,55 555,32 643,17 (psi) External 0,02 38,30 447,55 (psi)
	String Section         MD (m)           1         1         2           1         30         1         36           1         36         1         36           1         36         1         36           1         36         1         36           Additional Pickup to Prevent But         1         42           Additional Pickup to Prevent But         MD         Section         (m)           1         1         12         1         30           1         1         36         1         36           1         1         36         1         36           1         36         1         42           Additional Pickup to Prevent But         1         36           1         36         1         42           Additional Pickup to Prevent But         1         36           1         36         1         36           1         36         1         36           1         36         1         36	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9096 2,04 -910; 1,97 -1982- uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 17980- 4,96 17534; 2,40 15256( 4,80 12531( 1,98 11508; 2,04 11088; 1,97 10636- uckling = 82896 lbf stReturnsWithMut Axial Force (lbf) 0,03 3320; 4,96 2874; 4,96 2874; 4,96 2874; 4,96 28151; 1,98 -31516; 2,04 -5074; 1,98 -31516; 2,04 -5074; 1,98 -31516; 2,04 -5074; 1,98 -31516; 2,04 -5074; 1,96 -5074; 1,96 -5074; 1,97 -1980-1995; 1,97 -1975; 1,98 -1975;	Dogleg (°/100ħ) 2 0,00 2 0,00 3 0,00 3 3/8" Conducto Dogleg (°/100ħ) 4 0,00 4 0,00 5 0,000 5 0,0000 5 0,000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000000000	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 15,3 29,6 35,8 0,0 0,0 15,3 29,6 35,8 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 38,00 emperature (°F) 50,00 43,70 43,70 35,00 38,0	Internal 0,05 38,30 467,53 565,22 555,32 647,25 447,25 165,32 165,32 1638,30 1833,77 2067,53 2155,32 2155,53 2155,53 2247,25 2155,53 2247,25 2155,53 2247,25 2155,53 2247,25 2155,53 200,00 0,00 0,00 0,00 0,00 0,00 0,00 0	External 0,00 38,33 467,55 555,2 555,32 555,32 716,70 External 0,00 36,65 223,33 446,7 530,65 555,33 643,11 (psi) External 0,00 38,33 467,55 555,32 555,32 555,33 555,32 555,33 555,35 555,
	String Section         MD (m)           1         1         2           1         30         1         36           1         36         1         36           1         36         1         36           1         36         1         36           Additional Pickup to Prevent But         1         42           Additional Pickup to Prevent But         MD         Section         (m)           1         1         12         1         30           1         1         36         1         36           1         1         36         1         36           1         36         1         42           Additional Pickup to Prevent But         1         36           1         36         1         42           Additional Pickup to Prevent But         1         36           1         36         1         36           1         36         1         36           1         36         1         36	Axial Force (lbf) 0,03 5562: 4,96 5116; 4,80 1122 1,98 -9096 2,04 -910; 1,97 -1982- uckling = 482 lbf essureTest #1 - 1 Axial Force (lbf) 0,03 17980- 4,96 17534; 2,40 15256( 4,80 12531( 1,98 11508; 2,04 11088; 1,97 10636- uckling = 82896 lbf stReturnsWithMut Axial Force (lbf) 0,03 3320; 4,96 2874; 4,96 2874; 4,96 2874; 4,96 28151; 1,98 -31516; 2,04 -5074; 1,98 -31516; 2,04 -5074; 1,98 -31516; 2,04 -5074; 1,98 -31516; 2,04 -5074; 1,96 -5074; 1,96 -5074; 1,97 -1980-1995; 1,97 -1975; 1,98 -1975;	Dogleg (°/100ħ) 2 0,00 2 0,00 3 0,00 3 3/8" Conducto Dogleg (°/100ħ) 4 0,00 4 0,00 5 0,000 5 0,0000 5 0,000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000 5 0,0000000000	Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 15,3 29,6 35,8 0,0 0,0 15,3 29,6 35,8 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 38,00 emperature (°F) 50,00 43,70 43,70 35,00 38,0	Internal 0,05 38,30 467,53 565,22 555,32 647,25 447,25 165,32 165,32 1638,30 1833,77 2067,53 2155,32 2155,53 2155,53 2247,25 2155,53 2247,25 2155,53 2247,25 2155,53 2247,25 2155,53 200,00 0,00 0,00 0,00 0,00 0,00 0,00 0	External 0,0 38,3 467,5 555,2 555,2 555,3 716,7 (psi) External 0,0 36,6 223,3 446,7 550,5 555,3 643,1 (psi) External 0,0 38,3 447,5 555,2 20,0 1

### File: Slender Well Design, v0 Casing Load Summary - OverPull #1 - 13 3/8'' Conductor Casin

### Date/Time: March 01, 2018 03:00:19 PM Page: 4 of 18

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) –	Internal	External
1	1	0,03	85396	0,00	0,0	0,0	50,00	0,05	0,05
2	1	24,96	80937	0,00	0,0	0,0	49,00	38,30	38,30
3	1	304,80	30902	0,00	0,0	0,0	37,39	467,53	467,53
4	1	361,98	20679	0,00	0,0	0,0	35,00	555,23	555,23
5	1	362,04	20669	0,00	0,0	0,0	35,00	555,32	555,32
6	1	421,97	9951	0,00	0,0	0,0	38,00	647,25	647,25
						, ,			

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	107296	0,00	0,0	0,0	50,00	0,05	0,05
2	1	24,96	103430	0,00	0,0	0,0	49,00	38,30	38,30
3	1	304,80	60053	0,00	0,0	0,0	37,39	467,53	467,53
4	1	361,98	51192	0,00	0,0	0,0	35,00	555,23	555,23
5	1	362,04	51182	0,00	0,0	0,0	35,00	555,32	555,32
3	1	421,97	41891	0.00	0,0	0,0	38,00	647,25	647,25

Ca	sing Load Sumn	hary - Initial (	Conditions - 95	/8" Surface Cas	sing				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	1	0,03	135595	0,00	0,0	0,0	50,00	0,05	0,05
2	1	24,96	131749	0,00	0,0	0,0	49,00	40,43	40,43
3	1	304,80	88600	0,00	0,0	0,0	37,39	493,51	493,51
4	1	361,98	79784	0,00	0,0	0,0	35,00	586,07	586,07
5	1	362,04	79775	0,00	0,0	0,0	35,00	586,17	586,18
6	1	421,97	70532	0,00	0,0	0,0	37,99	683,21	713,88
7	1	422,03	70523	0,00	0,0	0,0	37,99	683,31	714,01
8	1	609,60	41600	0,00	0,0	0,0	47,18	987,01	1113,61
9	1	914,40	-5400	0,00	0,0	0,0	62,22	1480,52	1762,96
10	1	1200,00	-49440	0,00	0,0	0,0	76,20	1942,94	2371,41
11	1	1219,20	-52400	0,00	0,0	0,0	77,16	1974,02	2423,11
12	1	1349,96	-72565	0,00	0,0	0,0	83,60	2185,75	2775,25

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	0,03	198568	0,00	0,0	0,0	50,00	2002,00	0,04
2	1	24,96	194723	0,00	0,0	0,0	50,00	2010,18	35,45
3	1	304,80	151573	0,00	0,0	0,0	37,54	2101,99	432,73
4	1	361,98	142758	0,00	0,0	0,0	35,00	2120,74	513,89
5	1	362,04	134273	0,00	0,0	0,0	35,00	2120,76	586,16
6	1	421,97	124256	0,00	0,0	0,0	37,95	2140,43	671,26
7	1	422,03	128070	0,00	0,0	0,0	37,95	2140,45	583,71
8	1	609,60	95613	0,00	0,0	0,0	47,19	2201,99	864,16
9	1	914,40	43119	0,00	0,0	0,0	62,19	2301,99	1319,91
10	1	1200,00	-5512	0,00	0,0	0,0	76,24	2395,69	1746,94
11	1	1219,20	-8545	0,00	0,0	0,0	77,19	2401,99	1775,65
12	1	1349,96	-28334	0.00	0.0	0,0	83,63	2444,89	1971,17

Ca	ising Load Summa						<b>-</b>		
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	0,03	320909	0,00	0,0	0,0	50,00	5200,05	0,05
2	1	24,96	317064	0,00	0,0	0,0	49,00	5240,43	40,43
3	1	152,40	297415	0,08	0,6	0,0	43,70	5446,75	246,75
4	1	304,80	273967	0,33	4,5	0,0	37,39	5693,51	493,51
5	1	361,98	265207	0,42	6,5	0,0	35,00	5786,07	586,07
6	1	362,04	264442	0,00	0,0	0,0	35,00	5786,17	586,16
7	1	421,97	257057	0,00	0,0	0,0	37,99	5883,21	671,26
8	1	422,03	260877	0,00	0,0	0,0	37,99	5883,31	583,71
9	1	609,60	237154	0,00	0,0	0,0	47,18	6187,01	864,16
10	1	914,40	198606	0,00	0,0	0,0	62,22	6680,52	1319,91
11	1	1200,00	163025	0,00	0,0	0,0	76,20	7142,94	1746,94
12	1	1219,20	160888	0,00	0,0	0,0	77,16	7174,02	1775,65
13	1	1349,96	147201	0,00	0,0	0,0	83,60	7385,75	1971,17
14									
15	Additional Pickup to F	Prevent Buckli	ng = 35298 lbf						

Conventional Well Design

File: Slender Well Design, v0

Sting         MD         Axia Force         Dogles         Torge         Ficis Force         Torge attain         Presum (pi)           2         1         24.88         121.158         0.00         0.0         0.0         0.00 <t< th=""><th>Casir</th><th>ng Load S</th><th>Summa</th><th>arv - LostRe</th><th>turnsWithMud[</th><th>Drop #1 - 95/8</th><th>" Surface (</th><th>Casi</th><th>ina</th><th></th><th></th><th></th></t<>	Casir	ng Load S	Summa	arv - LostRe	turnsWithMud[	Drop #1 - 95/8	" Surface (	Casi	ina			
1         1         0.03         125000         0.00         0.0         0.00         50.00         0.0		String				Dogleg	Torque		Friction Force	Temperature	Pressure	(psi)
2         1         24.46         12155         0.00         0.0         0.0         37.64         0.00         37.64           4         331.84         68180         0.00         0.0         0.0         37.64         0.00         53.0         0.00         53.0           4         1.31.84         68180         0.00         0.0         0.0         37.65         0.00         67.0           7         1.422.03         48111         0.00         0.0         0.0         37.65         0.00         67.1           9         1.101.52.0         495.9         0.00         0.0         0.0         67.14         0.00         1.65.1         1.92.2           11         1.152.0         495.9         0.00         0.0         0.0         7.7         1.62.3         1.94.2           2         1         1.94.89.8         0.00         0.0         0.0         7.7         1.62.3         1.94.2           2         1         2.56*         Surface Casing         Friction Face         Temperature         Pressure         5.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00         6.00		Section		(m)	(lbf)	(°/100ft)	(ft-lbf)			(°F)		
3         1         304.80 1         7805 322.44         000 3500         0.00 0         0.00 0         0.00 0         0.00 0         0.00 3500         0.00 0         650.5           4         202.04         38895         0.00         0.00         0.00         350.0         0.00         850.0           6         1         422.05         48911         0.00         0.0         0.0         37.95         0.00         869.0           6         1         444.0         .1443.3         0.00         0.0         0.0         0.0         77.14         0.00         84.0           1         1384.84         .169878         0.00         0.0         0.0         0.0         77.14         0.00         138.7           2         1         1384.84         .169878         0.00         0.0         0.0         0.0         77.14         100.0         138.7           2         1         24.84         439524         0.00         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	1		1									0,04
4         1         351,88         6130         0.00         0.00         5350         0.00         5350           6         1         421,97         48124         0.00         0.0         0.0         35,00         0.00         5350           6         1         421,97         48124         0.00         0.0         0.0         35,00         0.00         75,8         0.00         75,8         0.00         75,8         0.00         75,8         0.00         75,8         0.00         75,8         0.00         75,4         0.00         184,4           10         1 120,00         -422561         0.00         0.0         0.0         75,4         0.00         184,4           11         1 121,02         -355269         0.00         0.0         0.0         77,19         15,23         144,23           2         1 30,48         31570         0.00         0.0         0.0         0.0         9.53         3.0         0.00         0.0         0.0         9.53         3.0         0.0         0.0         0.0         0.0         3.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0	2		1									
6         1         320.4         5885         0.00         0.0         0.0         37.6         0.00         687.0           7         1         422.3         49111         0.00         0.0         37.6         0.00         57.0         67.0	3		1									
6         1         421.97         49124         0.00         0.00         0.00         37,95         0.00         67,40           7         1         420.03         49111         0.00         0.00         0.01         37,95         0.00         67,40           8         1         1         1         1         1         0.00         0.00         0.01         77,18         0.00         183,44           11         1 <td>4</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	4		1									
7         1         422.03         49111         0.00         0.01         0.01         674.1           9         1         94.40	5		1	362,04	58959	0,00		0,0	0,0			586,16
6         1         60.00         13710         0.00         0.01         47.19         0.00         498.0           1         1         144.04        19843         0.00         0.01         0.01         77.24         0.00         198.7           2         1         1200.00        92581         0.00         0.01         0.01         77.24         0.00         198.7           2         1         134.80        108978         0.00         0.01         0.01         0.01         77.24         0.00         198.7           Casing Load Summary - GreenCement #1 - 9.5/8" Surface Casing         Torque         Findian         Findian         Findian         External           3         4489         9.89759         0.00         0.0         0.0         0.0         3.00         5.00.76         0.00           4         1         98.89759         0.00         0.0         0.0         3.00         5.00.76         0.00           5         1         98.20.4         98759         0.00         0.0         0.0         3.00         5.00.77         689.1           6         1         42.187         378907         0.00         0.0         0.0 <t< td=""><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>			1									
9         1         94.40         -4194.8         0.00         0.0         0.01         72.19         0.00         1386.7           11         1         1219.20         -95269         0.00         0.0         0.0         77.19         15.23         1942.5           Casina Load Summary - GreenCement #1 - 9.5/8" Surface Casing           String         Mo         Aut Force         Dog Tage         Tage         Findion Force         Temperature         (*b)         Findion Force         Temperature         (*b)         Findion Force         Temperature         (*b)         (*b)         Temperature         Temperature         Temperat			1									
1         1         1200.00	8		1									
11         1         12         -65288         0.00         0.0         0.0         7,19         15,23         1142,23,22           Casing Load Summary - GreenCement #1 - 9.5/8" Surface Casing Sector         Troue         Fridion Force         Temperature         Pressure (p)           Sector         1         0.00         0.00         0.0         0.00         50.00         Fridion Force         Temperature         Pressure (p)         0.00           2         1         24,96         43570         0.00         0.00         0.0         30.00         50.00         Fridian Force         Temperature         Pressure (p)         0.00           2         1         24,96         43570         0.00         0.0         0.0         30.00         530.00         530.00         0.00           4         1334,98         367559         0.00         0.0         0.0         35.00         5786.07         698.11         718.617.01         7113.6         697.01         1135.61         7134.22.03         5983.31         714.01         714.422.03         7282.8         60.00         0.0         0.0         77.16         718.617.01         7113.6         616.07         7113.6         616.70.1         714.02         22877.1			4	1200.00								
12         1         1349,96         -109878         0.00         0.0         0.0         83.63         226.23         2034,22           Casing Load Summary - Green Cement #1 - 9.5/6" Surface Casing String         MD (bf)         Atal Force (bf)         Torque (hf)         Fridion Force (bf)         Temperature (bf)         Pressure (pi)           1         0.39         443370         0.00         0.0         0.00         53.04.3         40.00           3         1         304.80         396374         0.00         0.0         0.00         35.00         5768.07         668.0           4         361.98         397559         0.00         0.0         0.0         35.00         5768.17         658.07           6         1         422.03         3722.98         0.00         0.0         0.0         37.98         5683.21         713.8           7         1         422.03         3722.98         0.00         0.0         0.0         77.92         7142.94         227.57           10         1         1200.00         256374         0.00         0.0         0.0         77.6         7742.94         227.57         227.52           2         1         0.03         224646			4	1210,00		0,00			0,0			1014,40
Casing Load Summary - GreenCernent #1 - 9 5/8" Surface Casing           String MD Avial Force Dogleg Torque (b/ft)         Friction Force Temperature (b/ft)         Pressure (c)           1         1         0.03         443570         0.00         0.0         0.0         50.00         5220.05         0.00           1         2         1         24.96         43524         0.00         0.0         40.00         520.04         44.84           2         1         34.96         387569         0.00         0.0         35.00         5786.07         485.7           1         322.04         387569         0.00         0.0         0.0         35.00         5786.07         485.7           1         422.03         378228         0.00         0.0         0.0         37.99         5683.21         71.8           1         1         100.00         2.58354         0.00         0.0         0.0         72.22         744.24         227.72           1         1         100.00         2.58374         0.00         0.0         0.0         77.6         774.24         227.72         22.242.81         1176.29           1         1         100.00			1						0.0		226.23	2034.21
String         MD         Axial Force         Dogleg         Torque (htb)         Friction Force         Temperature (br)         Pressure (br)           1         0.03         443370         (1/100)         0.0         0.0         0.0         49.00         520.05         0.00           3         1         349.60         398374         0.00         0.0         0.0         35.00         5786.07         586.15           5         1         382.04         387559         0.00         0.0         0.0         35.00         5786.07         586.21         715.817         586.21         715.817         586.21         715.95         714.0         9         1         914.40         303374         0.00         0.0         0.0         37.89         588.21         715.80           10         1         120.00         258354         0.00         0.0         0.0         77.80         774.244         237.4           11         1219.20         2258574         0.00         0.0         0.0         77.62         774.244         237.4           12         1         1349.96         236210         0.00         0.0         0.0         77.62         774.244         237.4      <						· .				,	· ·	
Section         (m)         (b)         (r/100h)         (h-b)         (b/m)         (r/F)         Internal         External           2         1         24.99         434320         0.00         0.0         0.0         40.00         520.00         0.00         40.40           3         1         334.80         398574         0.00         0.0         0.0         35.00         5786.17         688.01           4         1         381.89         387580         0.00         0.0         0.0         35.00         5786.17         688.01           7         1         422.03         337258         0.00         0.0         0.0         37.95         5983.31         1714.01           9         1         994.40         303274         0.00         0.0         0.0         77.16         7714.22         223574         0.00         0.0         0.0         77.16         7714.02         2423.1           10         1         1200.00         253574         0.00         0.0         0.0         78.60         736.67         774.22         2423.1           12         1         30.94.80         116486         0.00         0.0         0.0         36.00	Casir	ng Load S	Summa				asing					
1         1         0.03         1443370         0.00         0.00         0.00         50.000         5200.05         0.00           3         1         344.80         398374         0.00         0.0         0.0         35.00         5200.05         0.00           4         1         331.89         3987569         0.00         0.0         0.0         35.00         5786.07         686.16           6         1         422.93         377289         0.00         0.0         0.0         35.00         5786.17         686.11           7         1         422.03         377289         0.00         0.0         0.0         0.0         37.99         5983.31         714.0           8         1         699.60         343374         0.00         0.0         0.0         0.0         77.89         5983.31         714.0           1         1.199.00         226335         0.00         0.0         0.0         0.0         77.16         717.40         22.2217.27           2         1         1.349.98         236210         0.00         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0												
1         1         0.03         443370         0.00         0.0         50.00         520.05         0.00           3         1         344.80         398374         0.00         0.0         0.0         37.93         5693.51         493.5           4         1         381.88         398756         0.00         0.0         0.0         35.00         5786.07         686.0           5         1         382.04         387550         0.00         0.0         0.0         35.00         5786.17         588.21         713.80           7         1         4.403.3         378397         0.00         0.0         0.0         37.89         588.21         713.80           9         1         914.40         3032374         0.00         0.0         0.0         0.0         37.89         588.21         713.80           10         1         1200.00         258535         0.00         0.0         0.0         0.0         77.62         714.24         2277.42           12         1         1349.98         235210         0.00         0.0         0.0         0.0         77.62         7142.24         2277.42           12         1		Section		(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F) —		
3         1         304.60         396374         0.00         0.0         37.39         5693.51         443.5           6         1         361.98         397559         0.00         0.0         0.0         35.00         5786.17         568.0           7         1         422.03         378298         0.00         0.0         0.0         37.99         5683.21         713.8           9         1         69.00         0.0         0.0         0.0         37.99         5683.31         714.0           9         1         69.00         0.0         0.0         0.0         47.18         617.70         113.6           10         1         120.00         256374         0.00         0.0         0.0         77.16         7174.02         24237.4           11         1         121.90         256374         0.00         0.0         0.0         77.16         7174.02         2423.7           2         1         2.2.49         1.2.49         2.35210         0.00         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0 </td <td>1</td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>0,05</td>	1		1									0,05
4         1         361.98         397559         0.00         0.0         0.0         35.00         5786.07         588.07         588.17         588.17           6         1         421.97         378307         0.00         0.0         0.00         37.99         5883.21         713.88           7         1         442.03         3762.98         0.00         0.0         0.0         37.99         5883.31         714.0           9         1         914.40         302374         0.00         0.0         0.0         77.22         668.62         1762.94           10         1         120.00         25835         0.00         0.0         0.0         77.62         7742.94         227.72           11         1         1219.20         255374         0.00         0.00         0.0         0.0         77.62         7742.94         277.22           2         1         349.96         236210         0.00         0.00         0.0         0.0         77.62         7742.94         277.52           2         1         0.03         228491         0.00         0.0         0.0         0.0         0.0         0.0         0.0         0.0	2		1									40,43
5         1         382,04         387500         0,00         0,00         0,00         35,00         5786,17         5688,31         713,88           7         1         422,93         378299         0,00         0,0         0,0         37,99         5683,21         713,88           9         1         614,40         322374         0,00         0,0         0,0         62,22         6680,52         1782,94           10         1         1200,00         258335         0,00         0,0         0,0         7,16         7142,94         2371,4           11         1200,00         258354         0,00         0,0         0,0         7,16         7142,94         2371,4           12         1         1349,96         235210         0,00         0,0         0,0         7,16         7142,94         24237,4           12         1         24,96         224444         0,00         0,0         0,0         7,16         7142,94         24237,4           14         1         334,80         1611,442,94         0,00         0,0         0,0         0,0         0,0         0,0         0,0         0,0         0,0         0,0         0,0 <td< td=""><td>3</td><td></td><td>1</td><td></td><td></td><td>0,00</td><td></td><td></td><td>0,0</td><td></td><td></td><td></td></td<>	3		1			0,00			0,0			
6         1         421.97         378.907         0.00         0.0         37.99         5683.31         713.87           6         1         609.60         348.974         0.00         0.0         0.0         47.18         6187.01         113.67           9         1         914.40         302.374         0.00         0.0         0.0         47.18         6187.01         113.67           11         1         1200.00         258535         0.00         0.0         0.0         7.62.27         714.294         2237.1           12         1         1349.96         235210         0.00         0.0         0.0         77.16         7174.02         2242.31           12         1         1349.96         235210         0.00         0.00         0.0         738.60         7385.76         2775.27           2         1         24.96         224646         0.00         0.0         0.0         60.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00			1	361,98		0,00			0,0			586,07
7         1         422.03         378298         0.00         0.0         37.99         5683.31         714.0           9         1         914.40         302374         0.00         0.0         0.0         47.18         6187.01         1113.6*           9         1         120.00         258336         0.00         0.0         0.0         77.62         774.294         2371.4*           11         1219.20         256374         0.00         0.0         0.0         77.66         771.42.94         2371.4*           12         1         1349.96         255210         0.00         0.0         0.0         77.65         2775.2*           Casing Load Summary - OverPull #1 - 9.5/8" Surface Casing         Friction Force         Temperature         Pressure (ps)           1         0.03         228481         0.00         0.0         0.0         50.00         0.05         0.07           2         1         24.46         224946         0.00         0.0         0.0         43.50         44.33.51         44.33.51         44.33.51         44.33.51         44.33.51         44.33.51         44.33.51         44.33.51         44.35.51         44.33.51         44.33.51         45.01			1									
s         1         69.60         343374         0.00         0.0         0.0         47.18         61.87.01         1113.5           0         1         1200.00         25835         0.00         0.0         0.0         62.22         6980.52         1762.91           11         1         1219.20         258337         0.00         0.0         0.0         77.16         7144.02         2423.1           11         1         1219.20         255374         0.00         0.0         0.0         736.75         2775.21           Casing Load Summary - OverPull #1 - 9 5/8" Surface Casing           Section 1         OverPull #1 - 9 5/8" Surface Casing           Section 1         Over Pull #1 - 9 5/8" Surface Casing           Section 1         Over Pull #1 - 9 5/8" Surface Casing           Section 1         Over Pull #1 - 9 5/8" Surface Casing           Section 1         Over Pull #1 - 9 5/8" Surface Casing           Section 1         Over Pull #1 - 9 5/8" Surface Casing           Section 1         Section 1         Section 1         Section 1         Sectin 1         Sectin 1			1									
9         1         914 (a)         100 (a)         100 (a)         100 (a)         100 (a)         100 (a)         110 (a) </td <td></td> <td></td> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>			1									
10         1         1200.00         258335         0.00         0.0         0.0         76.20         7742.94         23714           12         1         1349.96         235210         0.00         0.0         0.0         77.16         7774.02         2423.1           1         1349.96         235210         0.00         0.0         0.0         83.60         7385.75         2775.21           Casing Load Summary - OverPull #1 - 9 5/8" Surface Casing         Torque         Friction Force         Temperature         Pressure (psi)           1         1         0.03         228491         0.00         0.0         0.0         49.05         0.05         0.05           2         1         24.96         224646         0.00         0.0         0.0         49.05         443.40.44           3         1304.80         181496         0.00         0.0         0.0         35.00         586.17         586.17           6         1         421.97         163429         0.00         0.0         0.0         37.99         683.21         683.2           7         1         422.03         163420         0.00         0.0         0.0         77.16         194.281			1									
11         1         1219,20         255374         0.00         0.0         0.0         77.16         7174,02         2423,17           12         1         1349,96         235210         0.00         0.00         0.0         83,60         7396,75         2775,27           Casing Load Summary - OverPull #1 - 9 5/8" Surface Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           2         1         24,96         224646         0.00         0.0         0.0         40,43         40,43           3         1         304,80         1814466         0.00         0.0         0.0         350.0         5680,07         5680,07           6         1         421,97         163429         0.00         0.0         0.0         37,99         683,31         683,3           7         1         422,03         163429         0.00         0.0         0.0         37,99         683,31         683,3           6         1         421,97         163429         0.00         0.0         0.0         7,622         1442,43         194,40         97496         0.00			1									
12         1         1349,96         235210         0.00         0.0         0.0         83,60         7386,75         2775,22           Casing Load Summary - OverPull #1 - 9 5/8" Surface Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (ps)           1         2         1         24,96         224441         0.00         0.0         0.0         44,04         External           2         1         34,96         181496         0.00         0.0         0.0         44,43         44,44 <t< td=""><td></td><td></td><td>i</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>			i									
Casing Load Summary - OverPull #1 - 9 5/8" Surface Casing           String         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         Pressure (psi)           2         1         24,96         224491         0.00         0.0         0.0         40,00         40,03         40,43         40,43           3         1         304,80         181496         0.00         0.0         0.0         35,00         566,07         566,07           6         1         421,97         163429         0.00         0.0         0.0         37,39         493,51         483,57           6         1         422,197         163429         0.00         0.0         0.0         37,99         683,31         683,37           7         1         422,03         163429         0.00         0.0         0.0         37,99         683,31         683,37           8         1         609,60         134496         0.00         0.0         0.0         76,20         194,293         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93			i									2775,25
1         1         0.03         228491         0.00         0.0         0.0         50.00         0.05         0.00           2         1         24.96         224646         0.00         0.0         0.0         49.00         40.43         40.43           3         1         304.80         181496         0.00         0.0         0.0         37.39         493.51         493.51           4         1         381.98         172681         0.00         0.0         0.0         35.00         586.07         586.07           5         1         422.03         163429         0.00         0.0         0.0         37.99         683.21         683.2           7         1         422.03         163420         0.00         0.0         0.0         37.99         683.31         683.3           8         1         609.60         134496         0.00         0.0         0.0         62.22         1480.51         1480.5           10         1         200.00         43457         0.00         0.0         0.0         77.16         1974.02         1974.02           12         1         24.96         215144         0.00         0.0												]
2         1         24.96         22466         0.00         0.0         0.0         49.00         40.43         40.43           3         1         304.80         181496         0.00         0.0         37.39         493.51         493.57           4         1         361.98         172681         0.00         0.0         0.35.00         586.07         586.17           5         1         362.04         172671         0.00         0.0         0.0         35.00         586.17         586.17           6         1         421.97         163420         0.00         0.0         0.0         37.99         683.21         683.31         683.37           8         1         609.60         134496         0.00         0.0         0.0         47.18         987.01         1970.9           9         1         914.40         87496         0.00         0.0         0.0         77.16         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.0	Casir	String	Summa	MD	Axial Force	Dogleg						
3         1         304.80         181496         0.00         0.0         0.0         37.39         443,51         443,51           4         1         361,98         172681         0.00         0.0         35.00         566,07         566,07           5         1         362,04         172671         0.00         0.0         0.0         37,99         683,21         683,21           6         1         421,97         163429         0.00         0.0         0.0         37,99         683,21         683,21           7         1         422,03         163420         0.00         0.0         0.0         47,18         987,01         987,01           9         1         914,40         87496         0.00         0.0         0.0         62,22         1440,51         1440,51           10         1200,00         43457         0.00         0.0         0.0         76,20         1942,93         1942,93           11         1349,96         20332         0.00         0.0         0.0         83,60         2185,75         2185,75           2         1         24,96         21847         0.00         0.0         0.0         37,99 </td <td><u>Casir</u></td> <td>String</td> <td>Summa</td> <td>MD (m)</td> <td>Axial Force (lbf)</td> <td>Dogleg (°/100ft)</td> <td></td> <td>0.0</td> <td>(lbf/ft)</td> <td>(°F)</td> <td>Internal</td> <td>Éxternal</td>	<u>Casir</u>	String	Summa	MD (m)	Axial Force (lbf)	Dogleg (°/100ft)		0.0	(lbf/ft)	(°F)	Internal	Éxternal
4         1         361.98         172681         0.00         0.0         0.0         35.00         566.07         566.07           5         1         362.04         172671         0.00         0.0         0.0         35.00         566.17         566.17           6         1         421.97         163429         0.00         0.0         0.0         37.99         683.21         663.3           7         1         422.03         163420         0.00         0.0         0.0         37.99         683.21         1683.3           8         1         609.60         134496         0.00         0.0         0.0         47.18         987.01         1987.01           9         1         120.00         43457         0.00         0.0         0.0         77.16         1974.02         1974.02         1974.02           12         1         120.00         43457         0.00         0.0         0.0         77.16         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02         1974.02 </td <td>1</td> <td>String</td> <td>Summa</td> <td>MD (m) 0,03</td> <td>Axial Force (lbf) 228491</td> <td>Dogleg (°/100ft) 0,00</td> <td></td> <td></td> <td>(lbf/ft) 0,0</td> <td>(°F) 50,00</td> <td>Internal 0,05</td> <td>Éxternal 0,05</td>	1	String	Summa	MD (m) 0,03	Axial Force (lbf) 228491	Dogleg (°/100ft) 0,00			(lbf/ft) 0,0	(°F) 50,00	Internal 0,05	Éxternal 0,05
5         1         382.04         172671         0.00         0.0         0.0         35.00         568.17         568.17           6         1         421.97         163429         0.00         0.0         0.0         37.99         683.21         683.21           7         1         422.03         163420         0.00         0.0         0.0         37.99         683.21         683.21           8         1         609.60         134496         0.00         0.0         0.0         47.18         987.01         987.01           9         1         144.40         87496         0.00         0.00         0.0         62.22         1480.51         1480.51           10         1 200.00         43457         0.00         0.00         0.0         77.16         1974.02         1974.02         1974.02           11         1 219.90         40496         0.00         0.00         0.0         77.16         1974.02         1974.02         1974.02           12         1 349.96         20332         0.00         0.0         0.0         77.16         1974.02         1974.02           2         1         24.96         21.144         0.00	1	String	Summa 1 1	MD (m) 0,03 24,96	Axial Force (lbf) 228491 224646	Dogleg (°/100ft) 0,00 0,00		0,0	(lbf/ft) 0,0 0,0	(°F) 50,00 49,00	Internal 0,05 40,43	Éxternal 0,05 40,43
6         1         421.97         163429         0.00         0.0         0.0         37.99         683.21         683.21           7         1         422.03         163420         0.00         0.0         0.0         37.99         683.31         683.33           8         1         609.60         134496         0.00         0.0         0.0         47.18         997.01         1987.01           9         1         914.40         87496         0.00         0.0         0.0         62.22         1480.51         1480.51           10         1         120.00         43457         0.00         0.0         0.0         77.16         1974.02         1974.02           12         1         1349.96         20332         0.00         0.0         0.0         77.16         1974.02         1974.02           12         1         1449.6         0.00         0.0         0.0         77.16         1974.02         1974.02           14         1         0.03         215144         0.00         0.0         0.0         10.0         2185.75         2185.75         2185.75           14         24.96         215144         0.00         0.0	1	String	Summa 1 1 1	MD (m) 0,03 24,96 304,80	Axial Force (lbf) 228491 224646 181496	Dogleg (°/100ft) 0,00 0,00 0,00		0,0 0,0	(lbf/ft) 0,0 0,0 0,0	(°F) 50,00 49,00 37,39	Internal 0,05 40,43 493,51	Éxternal 0,05 40,43 493,51
7         1         422.03         1634.20         0.00         0.0         0.0         37.99         683.31         683.3           8         1         609.60         134496         0.00         0.0         0.0         47.18         987.01         987.01           9         1         914.40         87496         0.00         0.0         0.0         62.22         1480.51         1440.51           10         1         1200.00         43457         0.00         0.0         0.0         77.16         1974.02         1974.02           11         1         1219.20         40496         0.00         0.0         0.0         77.16         1974.02         1974.02           12         1         1349.96         20332         0.00         0.0         0.0         77.16         1974.02         1974.02           Casing Load Summary - RunningHole #1 - 9         5/8"         Surface Casing         Friction Force         Temperature         Pressure (ps)           Section         (m)         (bh         ('/100t)         (ft-lbh)         Friction Force         Temperature         Pressure (ps)           2         1         24.96         211847         0.00         0.0	1 2 3 4	String	Summa 1 1 1 1	MD (m) 24,96 304,80 361,98	Axial Force (lbf) 228491 224646 181496 172681	Dogleg (°/100ft) 0,00 0,00 0,00 0,00		0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00	Internal 0,05 40,43 493,51 586,07	Éxternal 0,05 40,43 493,51 586,07
8         1         609,60         134496         0,00         0,0         0,0         47,18         987,01         987,01           9         1         914,40         87496         0,00         0,0         0,0         62,22         1480,51         1480,51           10         1         120,00         43457         0,00         0,0         0,0         76,20         1942,93         1942,93         1942,93           12         1         1349,96         20332         0,00         0,0         0,0         83,60         2185,75         2185,75           Casing Load Summary - RunningHole #1 - 9 5/8" Surface Casing           Torque         Friction Force         Imperature         Pressure (psi)           1         0,03         215144         0,00         0,0         0,0         30,0         30,0         343,43         40,43           2         1         24,96         211847         0,00         0,0         0,0         35,00         30,05         0,05         0,05           2         1         24,96         211847         0,00         0,0         0,0         35,00         50,00         0,05         0,05         0,05         0,05	1 2 3 4 5	String	Summa 1 1 1 1 1	MD (m) 24,96 304,80 361,98 362,04	Axial Force (lbf) 228491 224646 181496 172681 172671	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00		0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00	Internal 0,05 40,43 493,51 586,07 586,17	Éxternal 0,05 40,43 493,51 586,07 586,17
9         1         914.40         87496         0,00         0,0         0,0         62.22         1480.51         1480.51           10         1         1200.00         43457         0,00         0,0         0,0         76.20         1942.93         1942.93           11         1         1219.20         40486         0,00         0,0         0,0         77.16         1974.02         1974.02           12         1         1349.96         20332         0,00         0,0         0,0         83,60         2185.75         2185.75           Casing Load Summary - RunningHole #1 - 9 5/8" Surface Casing           Friction Force         Temperature         Pressure (psi)           Section         (bf)         ('/100t)         (ft-lbf)         (lbft)         ("D)         0,00         0,0         0,0         0,00         0,00           2         1         24.96         211847         0,00         0,0         0,0         35,00         50,00         0,05         0,00           3         1         304.80         167287         0,00         0,0         0,0         35,00         586,07         586,07           5         1	1 2 3 4 5	String	Summa 1 1 1 1 1 1	MD (m) 24,96 304,80 361,98 362,04 421,97	Axial Force (lbf) 228491 224646 181496 172681 172671 163429	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00		0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00 37,99	Internal 0,05 40,43 493,51 586,07 586,17 683,21	Éxternal 0,05 40,43 493,51 586,07
11         1         1219.20         40496         0.00         0.0         0.0         77.16         1974.02         1974.02           12         1         1349.96         20332         0.00         0.0         0.0         77.16         1974.02         1974.02           12         1         1349.96         20332         0.00         0.0         0.0         77.16         1974.02         1974.02           Casing Load Summary - RunningHole #1 - 9 5/8" Surface Casing           String MD Kave Dogleg Torque (bf)         Friction Force (bf)         Temperature (bf)         Pressure (psi)           1         0.03         215144         0.00         0.0         0.0         49.00         40.43         40.43           2         1         24.96         211847         0.00         0.0         0.0         35.00         566.07         568.07           3         1         361.98         167287         0.00         0.0         0.0         35.00         566.07         568.07           5         1         362.04         167279         0.00         0.0         0.0         37.99         683.31         683.31         683.31         683.31         683.31         683.31	1 2 3 4 5 6 7 8	String	Summa 1 1 1 1 1 1 1 1	MD (m) 24,96 304,80 361,98 362,04 421,97 422,03 609,60	Axial Force (lbf) 228491 224646 181496 172681 172671 163429 163420 134496	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00		0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 37,99 47,18	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01	Éxternal 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01
12         1         1349,96         20332         0,00         0,0         0,0         83,60         2185,75         2185,75           Casing Load Summary - RunningHole #1 - 9 5/8" Surface Casing           String Section         MD (m)         Axial Force (bf)         Dogleg ('/100t)         Torque (ft-lbf)         Friction Force (bf/ft)         Temperature ('F)         Pressure (ps)           1         1         0,03         215144         0,00         0,0         0,0         0,00         0,05         0,00           2         1         24,96         211847         0,00         0,0         0,0         40,43         40,43           4         1         361,98         167287         0,00         0,0         0,0         35,00         586,07         586,07           5         1         362,04         167279         0,00         0,0         0,0         37,99         683,21         683,23           6         1         422,03         159346         0,00         0,0         0,0         37,99         683,31         683,33         683,33         683,33         683,33         683,33         683,33         683,33         683,33         683,33         683,33         683,33         683	1 2 3 4 5 6 7 8 9	String	Summa 1 1 1 1 1 1 1 1	MD (m) 24,96 304,80 361,99 362,04 421,97 422,03 609,60 914,40	Axial Force (lbf) 228491 224646 174946 172671 163429 163429 163420 134496 87496	Dogleg (°/100#) 0,00 0,00 0,00 0,00 0,00 0,00 0,00		0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 37,99 37,99 37,99 47,18 62,22	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01 1480,51	Éxternal 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01 1480,51
Casing Load Summary - RunningHole #1 - 9 5/8" Surface Casing           String Section         MD (m)         Axial Force (bf)         Dogleg ('100ft)         Torque (ft-lbf)         Friction Force (bf/ft)         Temperature (°F)         Pressure (psi)           1         0.03         215144         0.00         0.0         0.0         50.00         0.05         0.00           2         1         24.96         211847         0.00         0.0         0.0         349.00         40.43         40.43           3         1         304.80         174846         0.00         0.0         0.0         35.00         586.07         586.07           5         1         362.04         167279         0.00         0.0         0.0         37.99         683.21         683.3           6         1         421.97         159354         0.00         0.0         37.99         683.31         683.3           7         1         422.03         159346         0.00         0.0         0.0         37.99         683.31         683.3           8         1         609.60         134544         0.00         0.0         0.0         42.2         1480.51           1         141.40 <td>1 2 3 4 5 6 7 8 9 10</td> <td>String</td> <td>1 1 1 1 1 1 1 1</td> <td>MD (m) 24,96 304,80 361,98 362,04 421,97 422,03 609,60 914,40 1200,00</td> <td>Axial Force (lbf) 228491 224646 181496 172681 172671 163429 163429 163420 134496 87496 43457</td> <td>Dogleg (*/100#) 0,00 0,00 0,00 0,00 0,00 0,00 0,00</td> <td></td> <td>0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0</td> <td>((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,</td> <td>(°F) 50,00 49,00 37,39 35,00 37,99 37,99 47,18 62,22 76,20</td> <td>Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01 1480,51 1942,83</td> <td>Éxternal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,21 683,31 987,01 1480,51 1482,93</td>	1 2 3 4 5 6 7 8 9 10	String	1 1 1 1 1 1 1 1	MD (m) 24,96 304,80 361,98 362,04 421,97 422,03 609,60 914,40 1200,00	Axial Force (lbf) 228491 224646 181496 172681 172671 163429 163429 163420 134496 87496 43457	Dogleg (*/100#) 0,00 0,00 0,00 0,00 0,00 0,00 0,00		0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 37,99 37,99 47,18 62,22 76,20	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01 1480,51 1942,83	Éxternal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,21 683,31 987,01 1480,51 1482,93
String Section         MD (m)         Axial Force (b)         Dogleg ('1100t)         Torque (ft-b)         Friction Force (b)/ft)         Temperature ('F)         Pressure (ps)           1         1         0.03         215144         0.00         0.00         0.0         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.05         0.00           2         1         24.96         211847         0.00         0.0         0.0         49.00         40.43         40.43           4         1         361.98         167287         0.00         0.0         0.0         35.00         586.07         586.07           5         1         362.04         167279         0.00         0.0         0.0         37.99         683.21         683.23           6         1         421.97         159354         0.00         0.0         0.0         37.99         683.31         683.33           8         1         609.60         134544         0.00         0.0         0.0         47.18         987.01         987.01         987.01         1480.57           9         1         914.40         94242         0.00<	1 2 3 4 5 6 7 8 9 9 10 11	String	1 1 1 1 1 1 1 1	MD (m) 24,96 304,80 361,98 362,04 421,97 422,03 609,60 914,40 1200,00 1219,20	Axial Force (bf) 228491 224646 181496 172681 172681 163429 163429 163429 434496 87496 40496	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,		0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 47,18 62,22 76,20 77,16	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 987,01 1480,51 1942,93 1974,02	External 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01 1480,51 1942,93 1974,02
String Section         MD (m)         Axial Force (b)         Dogleg ('1100t)         Torque (ft-b)         Friction Force (b)/ft)         Temperature ('F)         Pressure (ps)           1         1         0.03         215144         0.00         0.00         0.0         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.00         0.05         0.00           2         1         24.96         211847         0.00         0.0         0.0         49.00         40.43         40.43           4         1         361.98         167287         0.00         0.0         0.0         35.00         586.07         586.07           5         1         362.04         167279         0.00         0.0         0.0         37.99         683.21         683.23           6         1         421.97         159354         0.00         0.0         0.0         37.99         683.31         683.33           8         1         609.60         134544         0.00         0.0         0.0         47.18         987.01         987.01         987.01         1480.57           9         1         914.40         94242         0.00<	1 2 3 4 5 6 7 8 9 9 10 11	String	1 1 1 1 1 1 1 1	MD (m) 24,96 304,80 361,98 362,04 421,97 422,03 609,60 914,40 1200,00 1219,20	Axial Force (bf) 228491 224646 181496 172681 172681 163429 163429 163429 434496 87496 40496	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,		0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 47,18 62,22 76,20 77,16	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 987,01 1480,51 1942,93 1974,02	Éxternal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,21 683,31 987,01 1480,51 1482,93
1         1         0.03         215144         0.00         0.0         0.0         50.00         0.05         0.00           2         1         24.96         211847         0.00         0.0         0.0         49.00         40.43         40.43           3         1         304.80         174846         0.00         0.0         0.0         37.99         493.51         493.51         493.51           4         1         361.98         167287         0.00         0.0         0.0         35.00         586.07         586.07           5         1         362.04         167277         0.00         0.0         0.0         37.99         683.21         683.27           6         1         421.97         159354         0.00         0.0         0.0         37.99         683.31         683.32           7         1         422.03         159344         0.00         0.0         0.0         47.18         987.01         987.01         987.01         987.01         987.01         1987.01         1987.01         1987.01         1948.05         11         1200.00         56479         0.00         0.0         0.0         7.6         1974.02         <	1 2 3 4 5 5 6 7 8 9 10 11 12	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 0.03 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1200.00 1219.20 1349.96	Axial Force (lbf) 228491 224646 181496 172681 172671 163429 163429 163420 134496 87496 43457 40496 20332	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ñ-lbf)	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 47,18 62,22 76,20 77,16	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 987,01 1480,51 1942,93 1974,02	External 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01 1480,51 1942,93 1974,02
3         1         304,80         174846         0,00         0,0         0,0         37,39         493,51         493,51           4         1         361,98         167287         0,00         0,0         0,0         35,00         586,07         586,07           5         1         362,04         167297         0,00         0,0         0,0         35,00         586,17         586,07           6         1         421,97         159354         0,00         0,0         0,0         37,99         683,21         683,27           7         1         422,03         159346         0,00         0,0         0,0         37,99         683,31         683,33           8         1         609,60         134544         0,00         0,0         0,0         47,18         987,01         987,01         987,01         987,01         987,01         1987,01         1987,01         1987,01         1987,01         1987,01         1987,01         1987,01         1944,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,93         1942,	1 2 3 4 5 5 6 7 8 9 10 11 12	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1200.00 1219.20 1349.96 ary - Runnin MD (m)	Axial Force (bf) 228491 224646 181496 172681 172671 163429 163429 163420 134496 87496 43457 40496 20332	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 37,99 47,18 62,22 76,20 77,16 83,60 Temperature (°F)	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal	External 0,05 40,43 493,51 596,07 586,17 683,21 683,21 683,21 683,21 987,01 1490,51 1942,93 1974,02 2185,75
4         1         361,98         167287         0,00         0,0         0,0         35,00         566,07         586,07           5         1         362,04         167279         0,00         0,0         0,0         35,00         586,17         586,17           6         1         421,97         159354         0,00         0,0         0,0         37,99         683,21         683,27           7         1         422,03         159346         0,00         0,0         0,0         37,99         683,21         683,37           8         1         609,60         134544         0,00         0,0         0,0         47,18         987,01         987,01           9         1         914,40         94242         0,00         0,0         0,0         62,22         1480,51         1480,57           10         1         1200,00         56479         0,00         0,0         0,0         7,62         1942,93         1942,93           11         1         1219,20         53940         0,00         0,0         0,0         7,76         1974,02         1974,02	1 2 3 4 5 5 6 7 7 8 9 10 11 12 2 2 3 10 11 12	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1200.00 1219.20 1349.96 mD (m) 0.03	Axial Force (bf) 228491 224646 181496 172681 172681 172681 163429 163420 134496 87496 43457 40496 20332	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 37,99 37,99 47,18 62,22 76,20 77,16 83,60 Temperature (°F) 50,00	Internal 0,05 40,43 493,51 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05	External 0,05 40,43 493,51 598,07 598,17 683,21 683,21 683,21 987,01 14480,51 1942,93 2197,02 2185,75 2185,75 (psi) External 0,05
5         1         362,04         167279         0,00         0,0         0,0         35,00         586,17         566,17           6         1         421,97         159354         0,00         0,0         0,0         37,99         683,21         683,21           7         1         422,03         159346         0,00         0,0         0,0         37,99         683,31         683,32           8         1         609,60         134544         0,00         0,0         0,0         47,18         987,01         987,07           9         1         914,40         94242         0,00         0,0         0,0         62,22         1480,51         1480,57           10         1         1200,00         56479         0,00         0,0         0,0         76,20         1942,93         1942,93           11         1         1219,20         53940         0,00         0,0         0,0         77,16         1974,02         1974,02	1 2 3 4 5 6 7 8 9 10 11 12 2	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 0.03 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1200.00 1219.20 1349.96 ary - Runnin MD (m) 0.03 24.96	Axial Force (lbf) 228491 224646 181496 172671 163429 163429 163420 134496 87496 43457 40496 20332	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 37,99 47,18 62,22 76,20 77,16 83,60 Temperature (°F) 50,00 49,00	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43	External 0,05 40,43 493,51 598,07 588,17 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 22185,75 22185,75 40,43
6         1         421,97         159354         0,00         0,0         0,0         37,99         683,21         683,27           7         1         422,03         159346         0,00         0,0         0,0         37,99         683,31         683,37           8         1         609,60         134544         0,00         0,0         0,0         47,18         987,01         987,01         1987,01           9         1         914,40         94242         0,00         0,0         0,0         62,22         1480,51         1480,57           10         1         1200,00         56479         0,00         0,0         0,0         77,16         1974,02         1942,93           11         1         1219,20         53940         0,00         0,0         0,0         77,16         1974,02         1974,02	1 2 3 4 5 6 7 8 9 10 11 12 2	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 0,03 24,96 304,80 361,98 362,04 421,97 422,03 609,60 914,40 1200,00 1219,20 1349,96 ary - Runnin MD (m) 0,03 24,96 304,80	Axial Force (lbf) 228491 224646 181496 172681 172681 163429 163429 163429 163420 134496 87496 20332 20332 20332 2032 2032 2032 2032	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 36,00 35,00 37,99 37,99 47,18 62,22 76,20 77,16 83,60 Temperature (°F) 50,00 49,00 37,39	Internal 0,05 40,43 493,51 586,17 683,21 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51	External 0,05 40,43 493,51 598,07 598,17 683,21 683,21 987,01 1480,51 1942,93 1974,92 2185,75 (psi) External 0,05 40,43 493,51
7         1         422,03         159346         0,00         0,0         0,0         37,99         683,31         683,37           8         1         609,60         134544         0,00         0,0         0,0         47,18         987,01         987,01         987,01         197,07           9         1         914,40         94242         0,00         0,0         0,0         62,22         1480,51         1480,57           10         1         1200,00         56479         0,00         0,0         0,0         76,20         1942,93         1942,93           11         1         1219,20         53940         0,00         0,0         0,0         77,16         1974,02         1974,02	1 2 3 4 5 5 6 7 7 8 9 10 11 12 2 3 4	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1209.00 1219.20 1349.96 ary - Runnin MD (m) 0.03 24.96 304.80 361.98	Axial Force (lbf) 228491 224646 181496 172681 172681 172671 163429 163429 163429 163429 20332 37496 43457 40496 20332 32 34 43457 40496 20332 20332	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 47,18 62,22 76,20 77,16 83,60 Temperature (°F) 50,00 49,00 37,39 35,00	Internal 0,05 40,43 493,51 596,07 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51 586,07	External 0,05 40,43 493,51 598,07 598,17 683,21 683,31 987,01 1480,51 1942,93 1942,93 1942,93 1944,293 1974,02 2,2185,75 External 0,05 40,43 493,51 586,07
8         1         609,60         134544         0,00         0,0         0,0         47,18         987,01         987,01         987,01         99	1 2 3 4 5 5 6 7 7 8 9 10 11 12 12 12 12 12 12 3 4 4 5 5	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1200.00 1219.20 1349.96 ary - Runnin MD (m) 0.03 24.96 304.80 361.98 362.04	Axial Force (lbf) 228491 224646 181496 172681 172681 163429 163429 163429 163429 134496 433457 40496 20332 0 0 0 0 0 0 0 0 0 1 1 4496 403457 40496 20332 0 0 0 0 0 0 0 1 0 1 1 4496 40 20332 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 37,99 47,18 62,22 76,20 77,16 83,60 Temperature (°F) 50,00 49,00 37,39 50,00 37,59 50,00 37,59 50,00 37,59 50,00 37,99 50,00 37,99 50,00 77,99 50,00 77,16 83,60 50,00 50,00 50,00 77,16 50,00 50,00 50,00 77,16 50,00	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,21 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51 586,07	External 0,05 40,43 433,61 598,07 586,17 683,31 987,01 1480,51 1942,93 1974,02 2185,75 External 0,05 40,43 493,51 588,07 588,17
9         1         914,40         94242         0,00         0,0         0,0         62,22         1480,51         1480,51           10         1         1200,00         56479         0,00         0,0         0,0         76,20         1942,93         1942,93           11         1         1219,20         53940         0,00         0,0         0,0         77,16         1974,02         1974,02	1 2 3 3 4 5 5 6 8 9 9 9 9 9 9 9 9 10 11 12 2 2 3 4 4 5 5 6 6	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1200.00 1219.20 1349.96 <b>ary - Runnin</b> MD (m) (m) 0.03 24.96 304.80 361.98 362.04 421.97	Axial Force (bf) 228491 224646 181496 172681 172681 163429 163429 163429 163429 20332 20332 2032 2032 2032 2032 2032	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 37,99 47,18 62,22 76,20 77,16 83,60 77,16 83,60 36,00 37,38 35,00 35,00 35,00 37,99	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51 586,07 586,07 586,17 683,21	External 0,05 40,43 493,51 598,07 598,17 683,21 683,21 987,01 1480,51 1942,93 1974,02 2185,75 2185,75 40,43 493,51 596,07 588,17 683,21
10         1         1200,00         56479         0,00         0,0         0,0         76,20         1942,93         1942,93           11         1         1219,20         53940         0,00         0,0         0,0         77,16         1974,02         1974,02	1 2 3 4 4 5 5 6 7 7 7 8 9 9 9 10 11 1 12 2 1 1 1 1 1 1 1 1 1 1 1 1 1	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 304.80 361.98 362.04 422.93 609.60 914.40 1200.00 1219.20 1349.96 ary - Runnin MD (m) 0.03 24.96 361.98 362.04 421.97 422.03	Axial Force (lbf) 228491 224646 181496 172681 172681 172691 163429 163420 134496 87496 20332 0 0 134496 43457 40496 20332 0 0 215144 215144 215144 215144 215145 167279 169354	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 47,18 62,22 76,20 77,16 83,60 77,16 83,60 77,16 83,60 37,39 50,00 49,00 37,39 50,00 49,00 37,39 50,00 37,99	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,31	External 0,05 40,43 493,51 596,07 683,21 987,01 1480,51 1942,93 1974,02 2185,75 22185,75 40,43 493,51 596,07 586,17 683,21 683,31
<b>11</b> 1 1219,20 53940 0,00 0,0 0,0 77,16 1974,02 1974,02	1 2 3 4 4 5 5 6 6 7 8 8 9 9 10 11 12 2 11 12 12 13 3 4 5 5 6 7 7 8 8 9 10 11 12 12 12 12 13 14 15 15 15 15 15 15 15 15 15 15 15 15 15	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 0,03 24,96 304,80 362,04 421,97 422,03 609,60 914,40 1200,00 1219,20 1349,96 ary - Runnin MD (m) 0,03 24,96 304,80 361,98 362,04 421,97 422,03 609,60	Axial Force (lbf) 228491 224646 181496 172681 172681 163429 163429 163429 163429 20332 203	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 35,00 37,99 37,99 47,18 62,22 76,20 77,16 83,60 Temperature (°F) 50,00 49,00 37,39 35,00 37,99 37,99 37,99 37,99 37,99 47,18	Internal 0,05 40,43 493,51 586,17 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51 586,07 586,17 586,17 583,21 683,21 683,21 683,21 683,21	External 0,05 40,43 493,51 586,07 586,17 683,21 683,21 987,01 1480,51 1942,93 1977,02 2185,75 2(195,75 40,43 493,51 586,07 586,17 683,21 683,2
	1 2 3 4 4 5 6 6 7 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 304.80 361.98 362.04 421.97 422.03 609.60 914.40 1200.00 1219.20 1349.96 304.80 304.80 361.98 362.04 422.03 609.60 914.4.40	Axial Force (lbf) 228491 224646 181496 172681 172681 172671 163429 163429 163429 163429 20332 37496 43457 40496 20332 32 34 40496 20332 20332 34 4496 163496 167287 167287 167287 159354 159354 159354 159354	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 47,18 83,60 77,16 83,60 77,16 83,60 77,16 83,60 50,00 49,00 37,39 37,39 50,00 49,00 37,39 50,00 49,00 37,39 50,00 49,00 37,99 47,18 62,22 50,00 50,	Internal 0,05 40,43 493,51 596,07 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,21 683,21 683,21 1480,51	External 0,05 40,43 493,51 598,07 688,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 External 0,05 40,43 493,51 588,07 598,17 683,21 683,31 987,01 1480,51
	1 2 3 4 4 5 5 6 7 7 8 9 9 10 11 12 12 13 4 4 5 5 6 7 7 8 8 9 9 5 10 11 12 12 13 14 12 14 15 14 14 14 14 14 14 14 14 14 14 14 14 14	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) 0,03 24,96 304,80 361,98 362,04 421,97 422,03 609,60 914,40 1200,00 1219,20 1349,96 ary - Runnin MD (m) 0,03 24,96 304,80 361,98 362,04 421,97 422,03 609,60 914,40 1200,00	Axial Force (lbf) 228491 224646 181496 172681 172681 163429 163429 163429 163429 134496 87496 433457 40496 20332 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 47,18 62,22 76,20 77,16 83,60 49,00 37,39 50,00 49,00 37,39 50,00 49,00 37,39 47,18 60,00 49,00 37,99 47,18 62,22 76,20	Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,21 683,21 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 493,51 586,07 586,17 683,21 683,21 1480,53 1974,02 2185,75 0,05 1942,93 0,05 1942,93 0,05 1942,93 0,05 1942,93 0,05 0,05 1942,93 0,05 0,07 0,07 0	External 0,05 40,43 493,51 596,17 683,21 987,01 1480,51 1942,93 1974,02 2185,75 (psi) External 0,05 40,43 493,51 586,07 683,21 683,21 683,21 683,21 683,21 683,21 1942,93 1974,02 2185,75 40,43 40,43 40,45 1942,93 1974,02 2185,75 40,43 40,45 1942,93 1974,02 2185,75 40,45 1942,93 1974,02 2185,75 40,45 1942,93 1974,02 2185,75 40,45 1942,93 1974,02 2185,75 40,45 1942,93 1974,02 2185,75 40,45 1942,93 1974,02 2185,75 40,45 1974,02 2185,75 40,45 1974,02 2185,75 40,45 40,45 1974,02 2185,75 40,45 40,45 40,45 1974,02 2185,75 40,45 40,45 40,45 40,45 40,45 1974,02 2185,75 40,43 40,45 40,43 4
	1 2 2 3 4 4 5 6 6 7 7 8 9 9 10 11 12 2 3 3 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	String Section	1 1 1 1 1 1 1 1 1 1 1	MD (m) (m) (m) (m) (m) (m) (m) (m) (m) (m)	Axial Force (bf) 228491 224646 181496 172681 172681 163429 163429 163429 134496 20332 20332 2032 2032 2032 2032 2032 2	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) sing Torque	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 49,00 37,39 35,00 35,00 37,99 37,99 47,18 62,22 76,20 77,16 83,60 35,00 35,00 35,00 35,00 35,00 35,00 35,00 35,00 35,00 35,00 35,00 35,00 35,00 35,00 37,99 47,18 62,22 76,20 77,16 77,18 77,99 77,18 77,99 77,18 77,99 77,10 83,600 77,199 77,99 77,99 77,99 77,99 77,99 77,99 77,99 77,99 77,99 77,99 77,99 77,10 77,99	Internal 0,05 40,43 493,51 596,07 586,17 683,21 683,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 Pressure Internal 0,05 40,43 493,51 586,07 586,17 683,21 683,21 683,21 683,21 1480,51 1942,93 1974,02	External 0,05 40,43 493,51 598,07 688,21 683,31 987,01 1480,51 1942,93 1974,02 2185,75 External 0,05 40,43 493,51 588,07 588,17 683,31 987,01 1480,51 1942,93 1974,02

Date/Time: March 01, 2018 03:00:19 PM Page: 5 of 18

224

Casi	ing Load Summ	hary - Initial C	Conditions - 7" F	Production Casi	ng				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	271235	0,00	0,0	0,0	50,00	0,06	0,0
	1	24,96	268616	0,00	0,0	0,0	49,00	51,07	51,0
	1	304,80	239238	0,00	0,0	0,0	37,39	623,38	623,3
	1	362,01	233233	0,00	0,0	0,0	35,00	740,36	740,3
	1	609,60	207238	0,00	0,0	0,0	47,18	1246,75	1246,
	1	914,40	175238	0,00	0,0	0,0	62,22	1870,13	1870,
	1	1219,20	143238	0,00	0,0	0,0	77,16	2493,50	2493,
	1	1349,96	129509	0,00	0,0	0,0	83,60	2760,95	2760,
	1	1350,02	129503	0,00	0,0	0,0	83,60	2761,07	2761,
2	1	1524,00	111238	0,00	0,0	0,0	92,20	3116,88	3116,
1	1	1828,80	79238	0,00	0,0	0,0	107,14	3740,25	3740,:
2	1	2133,60	47238	0,00	0,0	0,0	122,18	4363,63	4363,
3	1	2299,96	29768	0,00	0,0	0,0	130,40	4703,89	4703,
	1	2300,02	29768	0,00	0,0	0,0	130,40	4704,01	4704,
5	1	2438,40	15238	0,00	0,0	0,0	137,19	4987,01	5022,
3	1	2743,20	-16762	0,00	0,0	0,0	152,16	5610,38	5723,
7	1	3048,00	-48762	0,00	0,0	0,0	167,20	6233,76	6424,
3	1	3296,96	-74904	0,00	0,0	0,0	179,40	6742,95	
		nary - Displac	ceToGas#1 - 7	0,00 " Production Ca	o,o sing		179,40	6742,95	7056,6
	String	narγ - Displac MD	ceToGas #1 - 7 Axial Force	0,00 <u>Production Ca</u> Dogleg	0,0 sing Torque	Friction Force	179,40	6742,95 Pressure	7056,(
		narγ - Displac MD (m)	ceToGas #17 Axial Force (lbf)	0,00 <u>Production Ca</u> Dogleg (°/100ft)	0,0 sing Torque (ft-lbf)	Friction Force (lbf/ft)	179,40 Temperature(°F)	6742,95 Pressure Internal	7056, (psi) External
	String	narγ - Displac MD (m) 0,03	ceToGas #1 - 7 Axial Force (lbf) 320093	0,00 <u>Production Ca</u> Dogleg (°/100ft) 0,00	0,0 sing Torque (ft-lbf) 0,0	Friction Force (lbf/ft) 0,0	179,40 Temperature	6742,95 Pressure Internal 4773,63	7056, (psi) External 0,
	String	narγ - Displac MD (m) 0,03 24,96	ceToGas #1 - 7 Axial Force (lbf) 320093 317475	0,00 " Production Ca Dogleg (*/100ft) 0,00 0,00	0,0 Sing Torque (ft-lbf) 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0	179,40 Temperature	6742,95	7056, (psi) External 0, 51,
	String	narγ - Displac MD (m) 0,03 24,96 304,80	CeToGas #1 - 7 Axial Force (lbf) 320093 317475 288097	0,00 " Production Ca Dogleg (*/100ft) 0,00 0,00 0,00	0,0 <u>sing</u> Torque (ft-lbf) 0,0 0,0 0,0	Friction Force (lbf/tt) 0,0 0,0 0,0	179,40 Temperature	6742,95 Pressure Internal 4773,63 4781,81 4873,62	7056, (psi) External 0, 51, 623,
	String	nary - Displac MD (m) 0,03 24,96 304,80 362,01	CeToGas #1 - 7 Axial Force (lbf) 317475 288097 282092	0,00 " Production Ca Dogleg (°/100ft) 0,00 0,00 0,00 0,00	0,0 sing Torque (ft-lbf) 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0	179,40 Temperature (°F) 50,00 50,00 37,54 35,00	6742,95 Pressure Internal 4773,63 4781,81 4873,62 4882,38	7056, (psi) External 0, 51, 623, 740,
	String	nary - Displac MD (m) 24,96 304,80 362,01 609,60	2eToGas #1 - 7 Axial Force (lbf) 320093 317475 288097 282092 256097	0,00 " Production Ca Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00	0,0 sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/tt) 0,0 0,0 0,0 0,0 0,0	179,40 Temperature(°F) 50,00 50,00 37,54 35,00 47,19	6742,95 Pressure Internal 4773,63 4781,81 4873,62 4892,38 4973,62	7056, (psi) External 0, 51, 623, 740, 1246,
	String	nary - Displac MD (m) 0,03 24,96 304,80 362,01 609,60 914,40	2000 2000 2000 2000 2000 2000 2000 200	0,00 " Production Ca Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00	0,0 Sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	Temperature(°F) 50,00 37,54 35,00 47,19 62,19	6742,95	(psi) External 0, 51, 623, 740, 1246, 1870,
	String	mary - Displac MD (m) 304,90 362,01 609,60 914,40 1219,20	2eToGas #1 - 7 Axial Force (lbf) 320093 317475 286097 282092 256097 224097 192097	0,00 "Production Ca Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0,0 Sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature (°F) 50,00 37,54 35,00 47,19 62,19 77,19	6742,95 Pressure Internal 4773,63 4781,81 4873,62 4892,38 4973,62 5073,62 5073,62 5073,62	(psi) External 0, 51, 623, 740, 1246, 1870, 2493,
	String	nary - Displac MD (m) 304,80 362,01 609,60 914,40 1219,20 1349,96	2eToGas #1 - 7 Axial Force (lbf) 32093 317475 288097 282092 266097 224097 192097 192097 178368	0,00 " Production Ca Dogleg ('1100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0,0 Sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature(°F) 50,00 50,00 37,54 35,00 47,19 62,19 77,19 83,63	6742,95 Internal 4773,63 4781,81 4892,38 4993,62 5073,62 5073,62 5173,62 5216,52	(psi) External 0, 51, 623, 740, 1246, 1870, 2493, 2760,
Casi	String	nary - Displac MD (m) 304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02	22ToGas #1 - 7 Axial Force (lbf) 320093 317475 288097 226097 224097 192097 178368	0,00  "Production Ca Dogleg ("/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	0,0 sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	179,40 Temperature(°F)	6742,95 Pressure Internal 4773,63 4781,81 4873,62 4892,38 4973,62 5073,62 5073,62 5173,62 5216,54	7056, (psi) External 0, 51, 623, 740, 1246, 1870, 2493, 2760, 27761,
	String	MD (m) 0,03 24,96 304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00	2eToGas #1 - 7 Axial Force (lbf) 32093 317475 288097 282092 266097 224097 192097 192097 178368	0,00 "Production Ca Dogleg (*/100ft) 0,00 0,	0,0 Sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature (°F) 50,00 37,54 35,00 47,19 62,19 77,19 83,63 83,63 92,19	6742,95 Pressure Internal 4773,63 4781,81 4873,62 4892,38 4973,62 5073,62 5073,62 5173,62 5216,54 5276,54 5273,62	(psi) External 0, 51, 623, 740, 1246, 1870, 2493, 2760, 2761, 3116,
	String	nary - Displac (m) 0.03 24,96 362,01 609,60 914,40 1219,20 1349,96 1350,02 1352,80	2eToGas #1 - 7 Axial Force (lbf) 320093 317475 288097 222092 256097 224097 192097 178368 178368 178361	0,00  " Production Ca Dogleg ('/100ft)  ('/100ft)  0,00 0,00 0,00 0,00 0,00 0,00 0,00 0	0,0 Sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature(°F) 50,00 37,54 35,00 47,19 62,19 77,19 83,63 83,63 92,19 107,19	6742,95 Internal 4773,63 4781,81 4873,62 4892,38 4973,62 5073,62 5173,62 5216,54 5273,62 5373,62	7056, (psi) External 0, 51, 623, 740, 1246, 1870, 2493, 2760, 2761, 3116, 3740,
	String	MD (m) 0,03 24,96 304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00	2eToGas #1 - 7 Axial Force (bb) 320093 317475 288097 282092 266097 224097 192097 178368 178361 160097 128097	0,00 "Production Ca Dogleg (*/100ft) 0,00 0,	0,0 Sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature (°F) 50,00 37,54 35,00 47,19 62,19 77,19 83,63 83,63 92,19	6742,95 Pressure Internal 4773,63 4781,81 4873,62 4892,38 4973,62 5073,62 5073,62 5173,62 5216,54 5276,54 5273,62	7056, (psi) External 0, 51, 623, 740, 1246, 1870, 2760, 2761, 3116, 3740, 4363, 4703,
	String	MD (m) (m) 304.80 362.01 609.60 914.40 1219.20 1349.96 1350.02 1524.00 1828.80 2133.60	2eToGas #1 - 7 Axial Force (lbf) 320093 317475 288097 282092 256097 224097 192097 178368 178368 178361 160097 128097 96097	0,00  "Production Ca Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	0,0 sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature (°F) 50,00 37,54 35,00 47,19 62,19 77,19 83,63 83,63 92,19 107,19 122,19	6742,95 Pressure Internal 4773,63 4781,81 4873,62 5073,62 5173,62 5216,54 5273,62 5373,62 5373,62 5373,62 5373,62 5373,62 5473,62	7056, (psi) External 0, 51, 623, 740, 1246, 1870, 2493, 2760, 2761, 3116, 3740, 4363, 4703,
	String	MD (m) 0,03 362,01 609,60 914,40 1219,20 1349,96 136,02 1524,00 1828,80 2135,60 2299,96	2eToGas #1 - 7 Axial Force (lbf) 320093 317475 288097 282092 286097 224097 192097 178388 178361 18097 96097 78827	0,00	0,0 Sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature(°F) 50,00 50,00 37,54 35,00 47,19 62,19 77,19 83,63 83,63 92,19 107,19 122,19 130,38	6742,95 Internal 4773,63 4773,63 4781,81 4873,62 5073,62 5073,62 5173,62 5216,54 5273,62 5373,62 5373,62 5473,62 5473,62 5473,62	(psi) External 0, 51, 623, 740, 1246, 1870, 24930, 2761, 3116, 3740, 4363, 4703, 4704,
	String	MD (m) (m) (m) (m) (m) (m) (m) (m) (m) (m)	22ToGas #1 - 7 Axial Force (lbf) 320093 317475 286097 224097 224097 192097 178368 178361 160097 128097 96097 78627 44225	0,00  "Production Ca Dogleg ("/100#) ("/100#) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0,0 sing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature(°F)	6742,95 Pressure Internal 4773,63 4781,81 4873,62 5073,62 5073,62 5173,62 5216,54 5273,62 5373,62 5473,62 5528,20	(psi) External External 51, 623, 740, 1246, 1870, 2493, 2760, 3116, 3740, 4363, 4703, 4704, 4987,
Casi Casi 0 0 1 1 2 3 4 5 6 6 7 8	String	MD (m) 0,03 24,96 304,80 362,01 609,60 914,40 1349,96 1349,96 1349,96 1349,96 1350,02 1524,00 1828,80 2299,96 2300,02 2438,40	2eToGas #1 - 7 Axial Force (lbf) 320093 320093 317475 288097 282092 256097 224097 192097 192097 192097 192097 192097 192097 128097 96097 78627 44225 26295	0,00 "Production C23 Dogleg (*/100ft) 0,000 0,00	0.0 sing Torque (ft-lbf) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	179,40 Temperature (°F) 50,00 37,54 35,00 47,19 62,19 77,19 83,63 83,63 92,19 107,19 130,38 130,38 137,19	6742,95 Pressure Internal 4773,63 4781,81 4873,62 5073,62 5073,62 5216,54 5273,62 5373,62 5473,62 5473,62 5473,62 5473,62 5473,62 5473,62 5473,62 5473,62 5528,20 5528,22 5573,62	7056,(

String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	Éxternal
1	0,03	362236	0,00	0,0	0,0	50,00	5200,06	0
1	24,96	359618	0,00	0,0	0,0	49,00	5251,07	51,
1	304,80	330240	0,00	0,0	0,0	37,39	5823,37	623
1	362,01	324234	0,00	0,0	0,0	35,00	5940,36	740
1	609,60	298240	0,00	0,0	0,0	47,18	6446,75	1246
1	914,40	266240	0,00	0,0	0,0	62,22	7070,13	1870
1	1219,20	234240	0,00	0,0	0,0	77,16	7693,50	2493
1	1349,96	220511	0,00	0,0	0,0	83,60	7960,95	2760
1	1350,02	220504	0,00	0,0	0,0	83,60	7961,08	276
1	1524,00	202240	0,00	0,0	0,0	92,20	8316,88	3110
1	1828,80	170240	0,00	0,0	0,0	107,14	8940,25	3740
1	2133,60	138240	0,00	0,0	0,0	122,18	9563,63	436
1	2299,96	120770	0,00	0,0	0,0	130,40	9903,89	470
1	2300,02	120770	0,00	0,0	0,0	130,40	9904,01	4704
1	2438,40	107057	0,00	0,0	0,0	137,19	10187,01	498
1	2743,20	76856	0,00	0,0	0,0	152,16	10810,38	561
1	3048,00	46655	0,00	0,0	0,0	167,20	11433,76	623
1	3296,96	23341	0.00	0,0	0,0	179,40	11942.95	6742

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File: Slender Well Design, v0

Ca						Dute/Time. N	101101, 2010	00.00.201 10	Tuge. 7 of
	sing Load Sumn	harv - Green(	Cement #1 _ 7"	Production Cas	sina				
	Sing Load Odmin	MD MD	Autol Farra	Dealers	T	Estation Essa	T		/ N
	String		Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	e (psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	422904	0.00	0,0	0,0	50,00	5200,06	0,
	4	24,96	420286	0,00	0,0	0,0	49,00	5251,07	51,
-							37,39		
	1	304,80	390907	0,00	0,0	0,0	37,39	5823,38	623,
	1	362,01	384902	0,00	0,0	0,0	35,00	5940,36	740,
	1	609,60	358907	0,00	0,0	0,0	47,18	6446,75	1246,
	1	914,40	326907	0,00	0,0	0,0	62,22	7070,13	1870,
		514,40		0,00	0,0		02,22		
	1	1219,20	294907	0,00	0,0	0,0	77,16	7693,50	2493,
	1	1349,96	281178	0,00	0.0	0,0	83,60	7960,95	2760,
	1	1350,02	281172	0,00	0.0	0,0	83,60	7961,07	2761,
		1550,02	2011/2				00,00	7301,07	
	1	1524,00	262907	0,00	0,0	0,0	92,20	8316,88	3116
	1	1828,80	230907	0,00	0,0	0,0	107,14	8940,25	3740
	1	2133,60	198907	0,00	0,0	0,0	122,18	9563,63	4363
	1	2299,96	181438	0,00	0,0	0,0	130,40	9903,89	4703
							100,40		
4	1	2300,02	181438	0,00	0,0	0,0	130,40	9904,01	4704
	1	2438,40	166907	0,00	0,0	0,0	137,19	10187,01	5022
	1	2743,20	134907	0,00	0,0	0,0	152,16	10810,38	5723
		3048,00	102907	0,00	0,0	0,0	167.00	11433,76	6424
				0,00			167,20	1 1455,76	6424
	1	3296,96	76766	0,00	0,0	0,0	167,20 179,40	11942,95	7056
_									
)a	asing Load Sumn	<u>nary - OverPu</u>	<u>ull #1 - 7" Prod</u>	uction Casing	Taxava	Friction Force	Tanananahura	Duccou	- (1)
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	e (psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	333308	0,00	0,0	0,0	50,00 49,00	0,06	C
	1	24,96	330689	0,00	0,0	0,0	49,00	51,07	51
		304,80	301311	0,00	0,0	0,0	37,39	623,38	623
+				0,00		0,0	57,55		
	1	362,01	295306	0,00	0,0	0,0	35,00	740,36	740
	1	609,60	269311	0,00	0,0	0,0	47,18	1246,75	1246
	1	914,40	237311	0,00	0,0	0,0	62,22	1870,13	1870
	4	1219,20	205311	0,00	0,0	0,0	77.16	2493,50	2493
		1219,20		0,00	0,0	0,0	77,10	2493,00	2430
	1	1349,96	191582	0,00	0,0	0,0	77,16 83,60	2760,95	2760
	1	1350,02	191576	0,00	0.0	0,0	83,60	2761,08	2761
	1	1524,00	173311	0,00	0,0	0,0	92,20	3116,88	3116
		1828,80		0,00			107,14	3740,26	3740
		1828,80	141311	0,00	0,0	0,0	107,14	3740,26	5/40
	1	2133,60	109311	0,00	0,0	0,0	122,18 130,40	4363,63	4363
	1	2299,96	91841	0,00	0,0	0,0	130.40	4703.89	4703
	4	2300,02	91841	0,00	0,0	0,0	130,40	4703,89 4704,01	4704
							100,40	4704,01	
	1	2438,40	77311	0,00	0,0	0,0	137,19	4987,01	4987
	1	2743,20	45311	0,00	0,0	0,0	152,16	5610,38	5610
	1	3048,00	13311	0,00	0,0	0,0	167,20	6233,76	623
		3296,96	-12831	0,00	0,0	0,0	179,40	6742,95	6742
		3230,30	-12031	0,00	0,0	0,0	173,40	6742,95	074.
2	sing Load Sumn	narγ - Runnin MD	I <u>gHole #1 - 7" F</u> Axial Force		ng Torque	Friction Force			
a	String			Dogleg			Temperature	Pressure	
2	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
		0,03	308469	0,00	0,0	0,0	50,00 49,00	0,06	
	1		306326	0,00	0,0	0.0	49 00	51,07	5
	1	24.96		0,00	0,0	0,0	37,39	623,38	62
	1	24,96	202200	0.00				023,38	
	1 1 1	304,80	282280	0,00	0,0	0,0	07,00		
	1	304,80 362,01	282280 277365	0,00	0,0	0,0 0,0	35,00	740,36	
	1	304,80 362,01 609,60	282280 277365 256088	0,00 0,00	0,0 0,0	0,0	35,00 47,18	740,36 1246,75	124
	1 1 1 1 1	304,80 362,01 609,60	282280 277365 256088	0,00 0,00	0,0 0,0	0,0	35,00 47,18	740,36 1246,75	124
	1 1 1 1 1	304,80 362,01 609,60 914,40	282280 277365 256088 229896	0,00 0,00 0,00	0,0 0,0 0,0	0,0 0,0	35,00 47,18 62,22	740,36 1246,75 1870,13	1240 1870
	1 1 1 1 1 1 1	304,80 362,01 609,60 914,40 1219,20	282280 277365 256088 229896 203705	0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0	0,0 0,0 0,0	35,00 47,18 62,22 77,16	740,36 1246,75 1870,13 2493,50	124 187 249
	1	304,80 362,01 609,60 914,40 1219,20 1349,96	282280 277365 256088 229896 203705 192467	0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60	740,36 1246,75 1870,13 2493,50 2760,95	124 187 249 276
		304,80 362,01 609,60 914,40 1219,20 1349,96	282280 277365 256088 229896 203705 192467	0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60	740,36 1246,75 1870,13 2493,50 2760,95	124 187 249 276
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02	282280 277365 256088 229896 203705 192467 192462	0,00 0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 83,60	740,36 1246,75 1870,13 2493,50 2760,95 2761,08	124 187 249 276 276
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00	282280 277365 256088 229896 203705 192467 192462 177513	0,00 0,00 0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 83,60 92,20	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88	124 187 249 276 276 311
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80	282280 277365 256088 229896 203705 192467 192462 177513 151321	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 83,60 92,20 107,14	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26	124 187/ 249 276 276 311/ 374
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80	282280 277365 256088 229896 203705 192467 192462 177513 151321	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 83,60 92,20 107,14	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26	124 187/ 249 276 276 311/ 374
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80 2133,60	282280 277365 256098 203705 192467 192462 177513 151321 125129	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 92,20 107,14 122,18	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26 4363,63	124 187/ 249 276 276 311/ 374 436
		304,80 362,01 609,60 914,40 1349,96 1350,02 1524,00 1828,80 2133,60 2299,96	282280 277365 256088 229896 203705 192467 192462 177513 151321 125129 110833	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 92,20 107,14 122,18 130,40	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26 4363,63 4703,89	124 187 249 276 276 311 374 436 436
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80 2133,60 2299,96 2300,02	282280 277365 26008 229896 203705 192467 192462 177513 151321 125129 110833 110828	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0.0 0.0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 92,20 107,14 122,18 130,40 130,40	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26 4363,63 4703,89 4704,01	124 187 249 276 276 311 374 436 470 470
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80 2133,60 2299,96 2300,02 2438,40	282280 277365 266088 229896 203705 192467 192462 177513 151321 125129 110838 110828 98937	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 92,20 107,14 122,18 130,40 130,40 137,19	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26 4363,63 4703,89 4704,01 4987,01	124 187 249 276 276 311 374 436 470 470 470 498
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80 2133,60 2299,96 2300,02 2438,40	282280 277365 266088 229896 203705 192467 192462 177513 151321 125129 110838 110828 98937	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 92,20 107,14 122,18 130,40 130,40 137,19	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26 4363,63 4703,89 4704,01 4987,01	1244 1877 2493 2766 2766 3110 3744 4366 4703 4703 4700 498
		304.80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80 2133,60 2299,96 2300,02 2438,40 2743,20	282280 277365 26008 229896 203705 182467 182462 177513 151321 125129 110833 110828 98937 72745	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 92,20 107,14 122,18 130,40 130,40 137,19 152,16	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26 4363,63 4703,89 4704,01 4987,01 5610,38	740 1244 1877 2493 2766 3116 3116 3740 4365 4700 4987 5611 6233
		304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80 2133,60 2299,96 2300,02 2438,40	282280 277365 266088 229896 203705 192467 192462 177513 151321 125129 110838 110828 98937	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	35,00 47,18 62,22 77,16 83,60 92,20 107,14 122,18 130,40 130,40 137,19	740,36 1246,75 1870,13 2493,50 2760,95 2761,08 3116,88 3740,26 4363,63 4703,89 4704,01 4987,01	124 187 249 276 311 374 436 470 470 498

Conventional Well Design

WELLCAT 5000.1.13.1

Date/Time: March 01, 2018 03:00:20 PM Page: 7 of 18

## File: Slender Well Design, v0

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i ne.	Siender weil De	Joign, vo				Date/Time. N	arch 01, 2010	00.00.2111	r age. o or re
Cas	sing Load Summ	ary - Tubing	Leak #1 - 7" Pr	oduction Casing	g				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	0,03	287721	0,00	0,0	0,0	50,00	0,06	0,04
2	1	24,96	285102	0,00	0,0	0,0	50,00	51,07	35,45
3	1	304,80	255724	0,00	0,0	0,0	37,54	623,38	432,72
4	1	362,01	249719	0,00	0,0	0,0	35,00	740,36	513,93
5	1	609,60	223724	0,00	0,0	0,0	47,19	1246,75	865,45
6	1	914,40	191724	0,00	0,0	0,0	62,19	1870,13	1298,18
7	1	1219,20	159724	0,00	0,0	0,0	77,19	2493,50	1730,90
8	1	1349,96	145995	0,00	0,0	0,0	83,63	2760,95	1916,56
9	1	1350,02	145988	0,00	0,0	0,0	83,63	2761,08	1916,64
10	1	1524,00	127724	0,00	0,0	0,0	92,19	3116,88	2163,63
11	1	1828,80	95724	0,00	0,0	0,0	107,19	3740,26	2596,36
12	1	2133,60	63724	0,00	0,0	0,0	122,19	4363,63	3029,08
13	1	2299,96	46254	0,00	0,0	0,0	130,38	4703,89	3265,28
14	1	2300,02	29802	0,00	0,0	0,0	130,38	4704,01	4703,99
15	1	2438,40	18028	0,00	0,0	0,0	137,19	4987,01	4900,44
16	1	2743,20	-7707	0,00	0,0	0,0	152,20	5610,38	5333,17
17	1	3048,00	-33563	0,00	0,0	0,0	167,20	6233,76	5765,89
18	1	3296,96	-53363	0,00	0,0	0,0	179,45	6742,95	6119,36

### Safety Factor Summary - Initial Conditions - 13 3/8" Conductor Casing

	String	MD	Yield Strength	VME Stress	Absolute Safety Factors					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial	
1	1	0,03	55000,0	3585,3	D 15,340	N/A	100+	100+	15,350	
2	1	24,96	55000,0	3336,1	D 16,486	N/A	100+	100+	16,687	
3	1	304,80	55000,0	550,0	D 100+	N/A	100+	42,561	M 100+	
4	1	361,98	55000,0	550,0	DN 100+	N/A	100+	35,846	M 92,074	
5	1	362,04	55000,0	550,0	DN 100+	N/A	100+	35,800	M 91,952	
6	1	421,97	55000,0	1244,7	44,188	N/A	100+	10,641	M 42,970	
-										

 7
 Burst and Axial Flags

 9
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Con

 10
 10

 11
 Axial Flags

 12
 Default = Tension, M = Compression

 13
 14

 14
 Triaxial Flags

 15
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall

 16
 17

 17
 Envelope Flags

 18
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

Sa	afety Factor Sumn	nary - Press	ureTest #1 - 13	3 3/8" Conducto	or Casing				
	String	MD	Yield Strength	VME Stress			ute Safety Factors	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	55000,0	28826,0	N 1,908	N/A	1,709	100+	4,561
2	1	24,96	55000,0	28904,8	N 1,903	N/A	1,707	100+	4,634
3	1	304,80	55000,0	30071,1	N 1,829	N/A	1,687	100+	5,652
4	1	361,98	55000,0	30370,0	N 1,811	N/A	1,683	100+	5,918
5	1	362,04	55000,0	29474,8	N 1,866	N/A	1,709	100+	7,687
6	1	421,97	55000,0	29603,3	N 1,858	N/A	1,705	100+	8,023
7									
8	Burst and Axial Flags	\$							
9	Default = Pipe Body,	L = Connection	h Leak, B = Connec	tion Burst, F = Co	nnection Fracture	, J = Connection Ju	imp-out, Y = Con	nection Yield, C =	Connection
10									
11	Axial Flags								
12	Default = Tension, M	= Compression	า						
13									
14	Triaxial Flags								
15	Default = Inner Wall a	and Positive Be	nding OR No Bend	ling, D = Outer wal	I safety factor, N	= Negative Bending			
16			-		- /				

17 Envelope Flags 17 Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection 18 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

STOTU HORTO			- +	D				03:00:21 PM F	
	r Sumn			Drop #1 - 13 3/	8" Conductor				
String Section		MD (m)	Yield Strength (psi)	VME Stress (psi)	Triaxial	Envelope	ute Safety Factors Burst	Collapse	Axial
Section	1	0,03	55000,0	2140,6	D 25,694	N/A	100+	100+	25,7
	i	24,96	55000,0	2349,5	23,410	N/A	100+	29,451	29,7
	1	304,80	55000,0	9035,3	6,087	N/A	100+	2,419	M 40,0
	i	361,98	55000,0	10583,1	5,197	N/A	100+	2,037	M 27,0
	i	362,04	55000,0	10221,2	5,381	N/A	100+	2,037	M 16,7
	1	421,97	55000,0	11863,0	4,636	N/A	100+	1,747	M 13,6
		í l	· · · · · ·	· · · · · · · · · · · · · · · · · · ·	· · · · ·			· · · ·	í.
Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fla	nsion, M Is ner Wall a ags	= Compressior Ind Positive Be	1	tion Burst, F = Cor ding, D = Outer wall			mp-out, Y = Con	nection Yield, C = (	Connection
				" Conductor Cas					
String	Juli	MD MD	Yield Strength	VME Stress	Sing	Absol	ute Safety Factors	<b>`</b>	
Section		(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	55000,0	5504,6	D 9,992	N/A	100+	100+	9,9
	i	24,96	55000,0	5255,4	D 10,465	N/A	100+	100+	10,5
	i	304,80	55000,0	2459,4	D 22,363	N/A	100+	42,450	27,6
	1	361,98	55000,0	1888,2	D 29,128	N/A	100+	35,781	41,2
	i	362.04	55000,0	1887,6	D 29,138	N/A	100+	35,775	41.3
	i	421,97	55000,0	1288.7	D 42,679	N/A	100+	30,723	85,7
			00000,0						
Axial Flags	be Body,	L = Connectior		ction Burst, F = Cor	nnection Fracture	J = Connection Ju	mp-out, Y = Con	nection Yield, C = (	Connection
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fla	oe Body, nsion, M Is ner Wall a ags	L = Connectior = Compressior Ind Positive Be	1	ling, D = Outer wall			mp-out, Y = Con	nection Yield, C = (	Connection
Default = Pij Axial Flags Default = Te Triaxial Flag Default = Inr Envelope FI: EB = Envelo	oe Body, nsion, M s ner Wall a ags pe Burst	L = Connectior = Compressior and Positive Be , EC = Envelop	nding OR No Bend e Collapse, N/A = r	ling, D = Outer wall	safety factor, N =		mp-out, Y = Con	nection Yield, C = 6	Connection
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fi EB = Envelo	oe Body, nsion, M s ner Wall a ags pe Burst	L = Connectior = Compression and Positive Be , EC = Envelop nary - Runni	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13	ling, D = Outer wall to ISO Connection	safety factor, N =	Negative Bending			Connection
Default = Pij Axial Flags Default = Te Triaxial Flag Default = Inr Envelope FI: EB = Envelo	nsion, M s ner Wall a ags pe Burst r Sumn	L = Connectior = Compression and Positive Be , EC = Envelop , EC = Runni MD	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress	safety factor, N =	Negative Bending	ute Safety Factors	S	Connection
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo Afety Facto String	nsion, M s ner Wall a ags pe Burst r Sumn	L = Connectior = Compression and Positive Be , EC = Envelop nary - Runni	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13	ling, D = Outer wall to ISO Connection	safety factor, N = r Casing	Negative Bending			
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo Afety Facto String	nsion, M s ner Wall a ags pe Burst r Sumn	L = Connectior = Compression and Positive Be , EC = Envelop nary - Runni MD (m)	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength (psi)	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi)	safety factor, N = r Casing Triaxial	Negative Bending	ute Safety Factors Burst ∣∣	s Collapse	Axial 7,5
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo Afety Facto String	nsion, M s ner Wall a ags pe Burst r Sumn	L = Connectior = Compression and Positive Be EC = Envelop hary - Runni MD (m) 0,03	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength (psi) 55000,0	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi) 6916,3	safety factor, N = <u>r Casing</u> Triaxial D 7,952	Negative Bending Absol	ute Safety Factors Burst 100+	Collapse 100+	Axial
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo Afety Facto String	nsion, M s ner Wall a ags pe Burst r Sumn	L = Connectior = Compression and Positive Be = EC = Envelop MD (m) 0.03 24.96 304.80 361.98	nding OR No Bend e Collapse, N/A = r <u>ngHole #1 - 13</u> Yield Strength (psi) 55000,0 55000,0	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi) 6916,3 6705,3	safety factor, N = r <u>Casing</u> Triaxial D 7,952 D 8,202	Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+	Collapse 100+ 100+	Axial 7,5 8,2 14,2
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo Afety Facto String	nsion, M s ner Wall a ags pe Burst r Sumn	L = Connectior = Compression and Positive Be , EC = Envelop (m) 0.03 24,96 304,80 361,98 362,04	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi) 6916,3 6705,3 4338,5 3855,0 3854,5	safety factor, N = r Casing Triaxial D 7,952 D 8,202 D 12,677 D 14,269 D 14,269	Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+	5 Collapse 100+ 100+ 42,316 35,669 35,663	Axial 7,5 8,2,3 14,3 16,6 16,6
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo Afety Facto String	nsion, M s ner Wall a ags pe Burst r Sumn	L = Connectior = Compression and Positive Be = EC = Envelop MD (m) 0.03 24.96 304.80 361.98	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength (psi) 55000,0 55000,0 55000,0	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi) 6916, 3 6705, 3 4338, 5 3855, 0	safety factor, N = <u>r Casing</u> Triaxial D 7, 952 D 8, 202 D 12, 677 D 14, 267	Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+	3 Collapse 100+ 100+ 42,316 35,669	Axial 7,9 8,2
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo afety Facto String Section	nsion, M is her Wall a ags pe Burst r Sumn 1 1 1 1 1 1 1 1	L = Connectior = Compression and Positive Be , EC = Envelop (m) (m) (m) (m) (m) 304,80 361,98 362,04 421,97	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi) 6916,3 6705,3 4338,5 3855,0 3854,5	safety factor, N = r Casing Triaxial D 7,952 D 8,202 D 12,677 D 14,269 D 14,269	Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+	5 Collapse 100+ 100+ 42,316 35,669 35,663	Axial 7.9 8.2.3 14.2 16.6 16.6
Default = Pip Axial Flags Default = Te Triaxial Flag Default = Inr Envelope Fl: EB = Envelo Afety Facto String Section	pe Body, nsion, M ser Wall a ags pe Burst r Sumn 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	L = Connectior = Compression and Positive Be , EC = Envelop (m) 0.03 24.96 304.80 361.98 362.94 421.97	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0 55000,0	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi) 6916,3 6705,3 4338,5 3855,0 3854,5	safety factor, N = r Casing Triaxial D 7,952 D 8,202 D 12,677 D 14,269 D 16,430	Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+	Collapse 100+ 100+ 42,316 35,669 35,663 30,629	Axial 7,9 8,2 14,2,3 16,6 16,6 16,6 20,3
Default = Pip Axial Flags Default = Te Triaxial Flag Default = In Envelope FI: EB = Envelo afety Facto String Section Burst and A Default = Pip Axial Flags Default = Te Triaxial Flags	nsion, M is ner Wall a ags pe Burst r Sumn 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	L = Connectior = Compression and Positive Be , EC = Envelop (m) (m) (m) (0.03 24.96 304.80 361.98 362.04 421.97 5 L = Connectior = Compression	nding OR No Bend e Collapse, N/A = r ngHole #1 - 13 Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0 0 55000,0	ting, D = Outer wall to ISO Connection 3 3/8" Conductor VME Stress (psi) 6916,3 6705,3 4338,5 3855,0 3854,5 3854,5 3347,5	safety factor, N =           Casing           Triaxial           D 7,952           D 8,202           D 12,677           D 14,267           D 14,269           D 16,430	Negative Bending Absol Envelope N/A N/A N/A N/A J = Connection Ju	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+	Collapse 100+ 100+ 42,316 35,669 35,663 30,629	Axial 7,5 8,2 14,2 16,6 16,6 20,5

# File: Slender Well Design, v0 Safety Factor Summary - Ini

Date/Time: March 01, 2018 03:00:21 PM Page: 10 of 18

-lie	: Siender Weil De	esign, vu				Date/Time: War	ch 01, 2018 C	J3:00:21 PIVL Pa	age: 10 of 1
Sa	fety Factor Summ	nary - Initial	Conditions - 9		ising				
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	ŝ	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	9990,5	D 11,010	N/A	100+	100+	11,01
2	1	24,96	110000,0	9747,5	D 11,285	N/A	100+	100+	11,33
3	1	304,80	110000,0	7021,4	D 15,666	N/A	100+	100+	16,86
4	1	361,98		6464,4	D 17,016	N/A	100+	91,619	18,72
5	1	362,04		6463,9	D 17,017	N/A	100+	91,578	18,72
	1	421,97	110000,0	6075,2	18,106	N/A	100+	53,957	21,18
' I	1	422,03	110000,0	6074,8	18,108	N/A	100+	53,935	21,18
3	1	609,60		5004,0	21,982	N/A	100+	23,643	35,91
9	1	914,40	110000,0	4088,9	26,902	N/A	100+	12,386	100
10	1	1200,00	109728,6	4608,1	23,812	N/A	100+	8,553	M 30,14
11	1	1219,20		4810,2	22,805	N/A	100+	8,238	M 28,43
12	1	1349,96	109483,7	6230,2	17,573	N/A	100+	6,583	M 20,49
13									
	Burst and Axial Flag								
	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Cor	nection Fracture	, J = Connection Ju	ump-out, Y = Con	nection Yield, C = C	Connection
16									
	Axial Flags								
	Default = Tension, M	= Compression	า						
19									
	Triaxial Flags								
	Default = Inner Wall a	and Positive Be	naing OR No Bend	ling, D = Outer wall	sarety factor, N =	= Negative Bending			
22	Courlens Flags								
	Envelope Flags								
24	EB = Envelope Burst	, EC = Envelop	e Collapse, N/A = r	to ISO Connection					

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors				
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial		
	1	0,03	110000,0	21571,1	5,099	N/A	L 4,576	100+	7,52		
	1	24,96	110000,0	21267,7	5,172	N/A	L 4,639	100+	7,67		
	1	304,80		17872,5	6,155	N/A	L 5,488	100+	9,85		
	1	361,98	110000,0	17181,5	6,402	N/A	L 5,701	100+	10,46		
	1	362,04	110000,0	16399,5	6,708	N/A	L 5,969	100+	11,12		
	1	421,97	110000,0	15668,0	7,021	N/A	L 6,235	100+	12,02		
	1	422,03	110000,0	16547,6	6,647	N/A	L 5,885	100+	11,66		
	1	609,60	110000,0	14148,7	7,775	N/A	L 6,848	100+	15,62		
	1	914,40	110000,0	10366,8	10,611	N/A	L 9,328	100+	34,64		
0	1	1200,00	109727,1	7115,4	15,421	N/A	L 14,086	100+	100		
1	1	1219,20	109695,8	6912,0	15,870	N/A	L 14,585	100+	100		
2	1	1349,96	109482,8	5597,4	19,560	N/A	L 19,247	100+	M 52,47		
3											
4	Burst and Axial Flags	;									
5	Default = Pipe Body,	L = Connection	n Leak, B = Conne	tion Burst, F = Cor	nection Fracture,	J = Connection Ju	Imp-out, Y = Coni	nection Yield, C = 0	Connection		
6											
7	Axial Flags										
	Default = Tension, M	= Compression	n								
9											
0	Triaxial Flags										
1	Default = Inner Wall a	nd Positive Be	ending OR No Bend	ding, D = Outer wall	safety factor, N =	Negative Bending					
2											
	3 5 Envelope Flags										

Section         (m)         (psi)         Triaxial         Envelope           1         0.03         110000,0         54899,3         2,004         N/A           1         24,96         110000,0         54912,3         2,003         N/A           1         152,40         110000,0         55008,3         N 2,000         N/A           1         364,80         110000,0         55186,7         N 1,993         N/A           1         361,98         110000,0         55186,7         N 1,993         N/A           1         362,04         110000,0         55197,9         1,993         N/A           1         362,04         110000,0         55385,5         1,986         N/A           1         421,97         110000,0         55385,5         1,986         N/A           1         422,03         110000,0         567843,0         1,983         N/A           1         1200,00         109728,6         58518,5         1,873         N/A           1         1200,00         109728,6         58576,0         1,873         N/A           1         1349,96         109483,7         58959,4         1,857         N/A	Solute Safety Factors         Collapse         Axial           Burst         Collapse         Axial           L 1,762         100+         4,           L 1,762         100+         5,           L 1,762         100+         5,           L 1,762         100+         5,           L 1,758         100+         5,           L 1,729         100+         5,           L 1,729         100+         6,           L 1,729         100+         7,           L 1,684         100+         10,           L 1,684         100+         10,           Jump-out, Y = Connection Yield, C = Connection         Yield, C = Connection
1         0.03         110000,0         54899,3         2,004         N/A           1         124,96         110000,0         54912,3         2,003         N/A           1         152,40         110000,0         55008,3         N 2,000         N/A           1         304,80         110000,0         55198,7         N 1,993         N/A           1         3361,98         110000,0         55198,7         N 1,993         N/A           1         3362,04         110000,0         55197,9         1,993         N/A           1         421,97         110000,0         56385,5         1,986         N/A           1         422,03         110000,0         56384,0         1,953         N/A           1         420,00         109728,6         58518,5         1,875         N/A           1         1200,00         109728,6         58518,5         1,875         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection East         Enve	L 1,762 100+ 4, L 1,762 100+ 4, L 1,762 100+ 4, L 1,762 100+ 5, L 1,762 100+ 5, L 1,762 100+ 5, L 1,768 100+ 5, L 1,729 100+ 5, L 1,729 100+ 5, L 1,721 100+ 6, L 1,729 100+ 7, L 1,684 100+ 9, L 1,684 100+ 9, L 1,684 100+ 10,
1         152.40         110000,0         55008,3         N 1,993         N/A           1         304,80         110000,0         55198,7         N 1,993         N/A           1         361,98         110000,0         55198,7         N 1,993         N/A           1         362,04         110000,0         55198,7         N 1,993         N/A           1         362,04         110000,0         55198,5         1,998         N/A           1         422,03         110000,0         56395,5         1,986         N/A           1         422,03         110000,0         5679,4         1,933         N/A           1         609,60         110000,0         5679,4         1,937         N/A           1         914,40         110000,0         57643,0         1,909         N/A           1         210,00         109728,6         58518,5         1,875         N/A           1         1249,20         109696,8         58576,0         1,873         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Eatait Fla	L 1,762 100+ 4 L 1,762 100+ 5 L 1,762 100+ 5 L 1,762 100+ 5 L 1,758 100+ 5 L 1,729 100+ 5 L 1,729 100+ 5 L 1,729 100+ 6 L 1,729 100+ 7 L 1,684 100+ 9 L 1,684 100+ 9 L 1,684 100+ 10
1         152,40         110000,0         55008,3         N 1,993         N/A           1         304,80         110000,0         55198,7         N 1,993         N/A           1         361,98         110000,0         55198,7         N 1,993         N/A           1         362,04         110000,0         55198,7         N 1,993         N/A           1         362,04         110000,0         55198,5         1,998         N/A           1         422,03         110000,0         56338,5         1,986         N/A           1         422,03         110000,0         5679,4         1,937         N/A           1         420,00         109728,6         58618,5         1,875         N/A           1         1200,00         109728,6         58618,5         1,875         N/A           1         1249,20         109696,8         58959,4         1,857         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Axial Flags         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Axial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi </td <td>L 1,762 100+ 5, L 1,762 100+ 5, L 1,762 100+ 5, L 1,758 100+ 5, L 1,729 100+ 5, L 1,721 100+ 6, L 1,721 100+ 6, L 1,709 100+ 7, L 1,694 100+ 9, L 1,692 100+ 9, L 1,684 100+ 10,</td>	L 1,762 100+ 5, L 1,762 100+ 5, L 1,762 100+ 5, L 1,758 100+ 5, L 1,729 100+ 5, L 1,721 100+ 6, L 1,721 100+ 6, L 1,709 100+ 7, L 1,694 100+ 9, L 1,692 100+ 9, L 1,684 100+ 10,
1         361,98         110000,0         55287,5         N 1,990         N/A           1         362,04         110000,0         55197,9         1,993         N/A           1         421,97         110000,0         55197,9         1,993         N/A           1         422,03         110000,0         56336,5         1,986         N/A           1         422,03         110000,0         56334,0         1,953         N/A           1         609,60         110000,0         57643,0         1,908         N/A           1         914,40         110000,0         57643,0         1,908         N/A           1         1200,00         109728,6         59518,5         1,875         N/A           1         1219,20         109696,8         56576,0         1,873         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Axial Flags         Default = Tension, M = Compression         Triaxial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi           Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         Envelope Flags         Envelope Flags         Envelope Fl	L 1,762 100+ 5 L 1,762 100+ 5 L 1,758 100+ 5 L 1,729 100+ 5 L 1,729 100+ 6 L 1,729 100+ 6 L 1,709 100+ 7 L 1,694 100+ 9 L 1,694 100+ 9 L 1,684 100+ 10
1         382,04         110000,0         55197,9         1,993         N/A           1         421,97         110000,0         55395,5         1,996         N/A           1         422,03         110000,0         56334,0         1,953         N/A           1         609,60         110000,0         56799,4         1,937         N/A           1         609,60         110000,0         56799,4         1,937         N/A           1         914,40         110000,0         56799,4         1,937         N/A           1         1200,00         109728,6         58618,5         1.875         N/A           1         1219,20         109696,8         58576,0         1,873         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Axial Flags         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Axial Flags         Default = Inner Wail and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi         Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         EB = Envelope Burst, EC = Env	L 1,762 100+ 5 L 1,758 100+ 5 L 1,729 100+ 5 L 1,721 100+ 6 L 1,721 100+ 6 L 1,709 100+ 7 L 1,694 100+ 9 L 1,692 100+ 9 L 1,684 100+ 10
1       421.97       110000,0       55385,5       1,986       N/A         1       422,03       110000,0       56334,0       1,953       N/A         1       609,60       110000,0       56739,4       1,937       N/A         1       914,40       110000,0       57643,0       1,908       N/A         1       914,40       110000,0       57643,0       1,908       N/A         1       11200,00       10972,6       58518,5       1,875       N/A         1       1219,20       109696,8       58576,0       1,873       N/A         1       1349,96       109483,7       58959,4       1,867       N/A         9 Efault = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection       Enception       Enception         Axial Flags       Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi       Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection       Envelope Flags       Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection       Envelope Collapse, N/A = no ISO Connection       Envelope Collapse, N/A = no ISO Connection         afety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8" Surface Casing	L 1,758 100+ 5, L 1,729 100+ 5, L 1,721 100+ 6, L 1,709 100+ 7, L 1,694 100+ 9, L 1,692 100+ 9, L 1,684 100+ 10,
1         422.03         110000,0         56334,0         1,953         N/A           1         609,60         110000,0         56799,4         1,937         N/A           1         914,40         110000,0         57643,0         1,908         N/A           1         1200,00         109728,6         58518,5         1,875         N/A           1         1200,00         109728,6         58518,5         1,875         N/A           1         1219,20         10966,8         58576,0         1,873         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Burst and Axial Flags         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Axial Flags         Default = Tension, M = Compression           Triaxial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi         Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection           afety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8''' Surface Casing         String         MD         Yield Strength         VME Stress         Ab	L 1,729 100+ 5 L 1,721 100+ 6 L 1,709 100+ 7, L 1,694 100+ 9, L 1,692 100+ 9, L 1,684 100+ 10,
1         609.60         110000,0         56789,4         1,937         N/A           1         914,40         110000,0         57643,0         1,937         N/A           1         914,40         110000,0         57643,0         1,937         N/A           1         1200,00         109728,6         58518,5         1,875         N/A           1         1219.20         109696,8         58576,0         1,873         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Participie Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Participie Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection           Parture Tension, M = Compression         Triaxial Flags         Parture Tension, M = Compression         Parture Tension, M = Compression           Triaxial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendie         Parture Safety Factor Safety Factor, N = Negative Bendie           Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         Parture Safety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8'' Surface Casing           String	L 1,721 100+ 6, L 1,709 100+ 7, L 1,694 100+ 9, L 1,692 100+ 9, L 1,684 100+ 10,
1         914.40         110000,0         57643,0         1,908         N/A           1         1200,00         109728,6         58518,5         1,875         N/A           1         1219,20         109696,8         58576,0         1,875         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Burst and Axial Flags         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Axial Flags         Default = Tension, M = Compression           Triaxial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi         Envelope Flags           EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         String         MD         Yield Strength         VME Stress         Ab	L 1,709 100+ 7 L 1,694 100+ 9 L 1,692 100+ 9 L 1,684 100+ 10
1         1200,00         109728,6         58518,5         1,875         N/A           1         1219,20         10669,8         58576,0         1,873         N/A           1         1349,96         109483,7         58959,4         1,857         N/A           Burst and Axial Flags         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection         Axial Flags           Default = Tension, M = Compression         Triaxial Flags         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi           Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection           afety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8'' Surface Casing         String         MD         Yield Strength         VME Stress         Ab	L 1,694 100+ 9, L 1,692 100+ 9, L 1,684 100+ 10,
1       1219.20       109696,8       58576,0       1,873       N/A         1       1349,96       109483,7       58959,4       1,867       N/A         Burst and Axial Flags       Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection       Axial Flags         Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection       Axial Flags         Default = Tension, M = Compression       Triaxial Flags       Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi         Envelope Flags       EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection       String         afety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8'' Surface Casing       String       MD         String       MD       Yield Strength       VME Stress       Ab	L 1,692 100+ 9, L 1,684 100+ 10,
1       1349,96       109483,7       58959,4       1,857       N/A         Burst and Axial Flags       Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection       Axial Flags         Default = Tension, M = Compression       Triaxial Flags       Default = Tension, M = Compression         Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi       Envelope Flags         EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection       Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection         afety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8'' Surface Casing       String       MD         String       MD       Yield Strength       VME Stress       Ab	L 1,684 100+ 10,
Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Axial Flags Default = Tension, M = Compression Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection afety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8'' Surface Casing String MD Yield Strength VME Stress <u>Ab</u>	
Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Axial Flags Default = Tension, M = Compression Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection  afety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8'' Surface Casing String MD Yield Strength VME Stress <u>Ab</u>	Jump-out, Y = Connection Yield, C = Connection
Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bendi Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection fety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8" Surface Casing String MD Yield Strength VME Stress <u>Ab</u>	
	solute Safety Factors
Section (m) (psi) (psi) Triaxial Envelope	Burst Collapse Axial
1 0,03 110000,0 9210,1 D 11,943 N/A	100+ 100+ 11,
1 24,96 110000,0 9157,4 12,012 N/A	100+ 100+ 12,
1 152,40 110000,0 9146,9 12,026 N/A 1 304,80 110000,0 9689,0 11,353 N/A	100+ 23,532 14,
	100+ 11,790 19, 100+ 9.935 21.
1 361,98 110000,0 10031,9 10,965 N/A	
1 362,04 110000,0 10039,9 10,956 N/A	100+ 8,999 25,
1 421,97 110000,0 10440,7 10,536 N/A	100+ 7,833 31,
1 422,03 110000,0 10441,0 10,535 N/A	100+ 7,832 31,
1 609,60 110000,0 12091,1 9,098 N/A 1 914,40 110000,0 15678,5 7,016 N/A	100+ 5,577 1 100+ 3,795 M 35.
1 914,40 110000,0 15678,5 7,016 N/A 1 1200,00 109727,1 19591,6 5,601 N/A	100+ 3,795 M 35, 100+ 2,918 M 16,
1 1219,20 109695,8 19702,2 5,568 N/A	100+ 2,918 M 16, 100+ 2,895 M 15,
1 1318,81 109533,6 19553,3 5,602 N/A	100+ 2,833 M 13,
1 1349,96 109482,8 19319,3 5,667 N/A	

# File: Slender Well Design, v0 Safety Factor Summary - Gr

Date/Time: March 01, 2018 03:00:22 PM Page: 12 of 18

	e: Siender weil	Design, vu				Date/Time: Wa	arch UI, 2018	03:00:22 PIVI	Page: 12 of 18
S	afety Factor Su	mmary - Greer	nCement #1 - 9	9 5/8" Surface 0	Casing				
	String	MD	Yield Strength	VME Stress		Abs	olute Safety Facto	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	55178,1	1,994	N/A	L 1,762	100+	3,369
2	1	24,96	110000,0	55151,3	1,995	N/A	L 1,762	100+	
3	1	304,80	110000,0	54923,2	2,003	N/A	L 1,762		3,769
4	1	361,98		54893,1	2,004	N/A	L 1,762		
5	1	362,04	110000,0	54892,9	2,004	N/A	L 1,762		
6	1	421,97	110000,0	54552,0	2,016	N/A	L 1,772	100+	
7	1	422,03	110000,0	54551,7	2,016	N/A	L 1,772	100+	3,949
8	1	609,60	110000,0	53502,6	2,056	N/A	L 1,806		
9	1	914,40	110000,0	51858,6	2,121	N/A	L 1,863	100+	
10	1	1200,00		50391,5	2,178	N/A	L 1,915	100+	
11	1	1219,20	109696,8	50178,0	2,186	N/A	L 1,923	100+	
12	1	1349,96	109483,7	48727,2	2,247	N/A	L 1,978	100+	6,321
13									
14	Burst and Axial Fl								
15	Default = Pipe Bo	dy, L = Connectior	n Leak, B = Connec	ction Burst, F = Co	onnection Fractur	e, J = Connection	Jump-out, Y = Co	nnection Yield, C	= Connection
16									
17	Axial Flags								
18	Default = Tension	, M = Compression	า						
19									
20	Triaxial Flags								
21	Default = Inner Wa	all and Positive Be	nding OR No Bend	ding, D = Outer wa	all safety factor, N	= Negative Bendir	ng		
22 23	Envelope Eleme								
	Envelope Flags								
24	EB = Envelope Bu	irst, EC = Envelop	e Collapse, N/A = r	to iso connection					

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial			
	1	0,03	110000,0	16834,9	D 6,534	N/A	100+	100+	6,53			
	1	24,96	110000,0	16592,0	D 6,630	N/A	100+	100+	6,65			
	1	304,80	110000,0	13865,9	D 7,933	N/A	100+	100+	8,23			
	1	361,98	110000,0	13308,9	D 8,265	N/A	100+	90,806	8,65			
	1	362,04	110000,0	13308,3	D 8,266	N/A	100+	90,790	8,65			
	1	421,97	110000,0	12724,4	D 8,645	N/A	100+	77,972	9,14			
	1	422,03	110000,0	12723,8	D 8,645	N/A	100+	77,961	9,14			
	1	609,60	110000,0	10896,5	D 10,095	N/A	100+	54,133	11,10			
	1	914,40	110000,0	7927,1	D 13,876	N/A	100+	36,244	17,07			
0	1	1200,00	109728,6	5144,7	D 21,328	N/A	100+	27,700	34,29			
1	1	1219,20	109696,8	4957,7	D 22,127	N/A	100+	27,268	36,78			
2	1	1349,96	109483,7	3683,7	D 29,721	N/A	100+	24,653	73,12			
3												
	Burst and Axial Flags											
	Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection			
6												
	Axial Flags											
	Default = Tension, M	= Compression	า									
9												
	Triaxial Flags											
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N =	Negative Bending						
21												
1			Envelope Flags									

232

	fety Factor Summ String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	15851,5	D 6,939	N/A	100+	100+	6,94
	1	24,96	110000,0	15648,9	D 7,029	N/A	100+	100+	7,05
	1	304,80	110000,0	13375,9	D 8,224	N/A	100+	100+	8,5
	1	361,98	110000,0	12911,5	D 8,520	N/A	100+	90,859	8,93
	1	362,04	110000,0	12911,0	D 8,520	N/A	100+	90,844	8,93
	1	421,97	110000,0	12424,1	D 8,854	N/A	100+	78,006	9,37
	1	422,03	110000,0	12423,6	D 8,854	N/A	100+	77,995	9,37
	1	609,60	110000,0	10900,0	D 10,092	N/A	100+	54,133	11,10
	1	914,40	110000,0	8424,1	D 13,058	N/A	100+	36,223	15,8
0	1	1200,00	109728,6	6104,2	D 17,976	N/A	100+	27,673	26,38
1	1	1219,20	109696,8	5948,2	D 18,442	N/A	100+	27,240	27,61
2 3	1	1349,96	109483,7	4886,0	D 22,408	N/A	100+	24,624	40,56
	Burst and Axial Flags								
	Default = Pipe Body, I	= Connection	Leak B = Connec	tion Burst E = Con	nection Fracture	L= Connection Iu	mp-out X = Con	nection Vield C = (	Connection
	berdan – ripe body, i	connection	r Leak, D - Connee	don Barst, r = con	incention ractare	o - connection ou	mp-out, 1 – con		Johneedon
6	Axial Flags								
		Compression	<b>,</b>						
	Default = Tension M :								
7	Default = Tension, M =	••••••••••••							
3	· ·								
7 3 9 0	Default = Tension, M = Triaxial Flags Default = Inner Wall a	•	nding OR No Bend	ling. D = Outer wall	safety factor. N =	Negative Bending			

	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	29110,6	D 3,779	N/A	100+	100+	3,781
:	1	24,96	110000,0	28880,6	D 3,809	N/A	100+	100+	3,818
	1	304,80	110000,0	26299,8	D 4, 183	N/A	100+	100+	4,287
.	1	362,01	110000,0	25772,3	D 4,268	N/A	100+	100+	4,397
	1	609,60	110000,0	23488,8	D 4,683	N/A	100+	61,389	4,949
;	1	914,40	110000,0	20677,7	D 5,320	N/A	100+	41,572	5,852
·	1	1219,20	109696,8	17866,6	D 6,140	N/A	100+	31,574	7,140
:	1	1349,96	109483,7	16660,6	D 6,571	N/A	100+	28,646	7,881
	1	1350,02	109483,6	16660,0	D 6,572	N/A	100+	28,644	7,882
0	1	1524,00	109198,9	15055,5	D 7,253	N/A	100+	25,524	9,152
1	1	1828,80	108704,3	12244,5	D 8,878	N/A	100+	21,477	12,790
2	1	2133,60	108206,6	9433,4	D 11,471	N/A	100+	18,575	21,356
3	1	2299,96	107934,5	7898,7	D 13,665	N/A	100+	17,311	33,803
4	1	2300,02	107934,4	7898,9	D 13,664	N/A	100+	17,310	33,803
5	1	2438,40	107709,6	6794,0	15,854	N/A	100+	15,537	65,899
6	1	2743,20	107214,1	4437,7	24,160	N/A	100+	12,628	M 59,631
7	1	3048,00	106716,3	2448,4	43,587	N/A	100+	10,588	M 20,403
8	1	3147,00	106555,8	2071,8	51,432	N/A	100+	10,058	M 16,793
9	1	3296,96	106312,5	2548,4	41,717	N/A	100+	8,884	M 13,232
0									
:1 Ē	Burst and Axial Flags								

 21
 Burst and Axial Flags

 22
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 23
 Axial Flags

 24
 Axial Flags

 25
 Default = Tension, M = Compression

 26
 Triaxial Flags

 27
 Triaxial Flags

 28
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 30
 Envelope Flags

 31
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Conventional Well Design

File:	Slender Well De	sign, v0				Date/Time: Ma	rch 01, 2018 (	03:00:23 PM P	age: 14 of 18
Safe	ety Factor Summ	nary - Displa	aceToGas #1 -	7" Production (	Casing				
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	42179,1	2,608	N/A	B 2,437	100+	3,204
2	1	24,96	110000,0	41831,9	2,630	N/A	B 2,459	100+	3,230
3	1	304,80	110000,0	37945,4	2,899	N/A	B 2,737	100+	3,560
4	1	362,01	110000,0	37153,4	2,961	N/A	B 2,802	100+	3,635
5	1	609,60	110000,0	33736,7	3,261	N/A	B 3,122	100+	4,004
6	1	914,40	110000,0	29564,1	3,721	N/A	B 3,632	100+	4,576
7	1	1219,20	109695,8	25445,4	4,311	N/A	B 4,329	100+	5,324
8	1	1349,96	109482,8	23702,0	4,619	N/A	B 4,716	100+	5,722
9	1	1350,02	109482,7	23701,2	4,619	N/A	B 4,716	100+	5,723
10	1	1524,00	109199,3	21411,9	5,100	N/A	B 5,355	100+	6,359
11	1	1828,80	108702,7	17522,3	6,204	N/A	B 7,039	100+	7,911
12	1	2133,60	108206,1	13898,1	7,786	N/A	B 10,311	100+	10,498
13	1	2299,96	107935,1	12117,8	8,907	N/A	B 13,849	100+	12,798
14	1	2300,02	107935,0	9263,9	11,651	N/A	B 13,851	100+	22,753
15	1	2438,40	107709,5	7384,9	14,585	N/A	B 19,420	78,185	38,188
16	1	2590,80	107461,3	5486,4	19,587	N/A	B 34,980	26,290	M 100+
17	1	2743,20	107213,0	4015,1	26,703	N/A	100+	15,796	M 76,879
18	1	2895,60	106964,7	3526,1	30,335	N/A	100+	11,268	M 30,453
19	1	3048,00	106716,4	4382,6	24,350	N/A	100+	8,752	M 18,980
20	1	3296,96	106310,8	7274,3	14,615	N/A	100+	6,405	M 11,899
21			,,.						
22 B	urst and Avial Flags								

Burst and Axial Flags
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection
 Axial Flags
 Default = Tension, M = Compression
 Triaxial Flags
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
 Envelope Flags
 Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Abs	olute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	46544,9	2,363	N/A	B 2,237	100+	2,831
2	1	24,96	110000,0	46447,8	2,368	N/A	B 2,237	100+	2,852
3	1	304,80	110000,0	45424,1	2,422	N/A	B 2,237	100+	3,10
4	1	362,01	110000,0	45230,2	2,432	N/A	B 2,237	100+	3,163
5	1	609,60	110000,0	44453,0	2,475	N/A	B 2,237	100+	3,439
3	1	914,40	110000,0	43641,6	2,521	N/A	B 2,237	100+	3,852
7	1	1219,20	109696,8	42999,0	2,551	N/A	B 2,231	100+	4,366
3	1	1349,96	109483,7	42777,0	2,559	N/A	B 2,227	100+	4,629
3	1	1350,02	109483,6	42776,9	2,559	N/A	B 2,227	100+	4,629
10	1	1524,00	109198,9	42532,8	2,567	N/A	B 2,221	100+	5,034
11	1	1828,80	108704,3	42248,9	2,573	N/A	B 2,211	100+	5,953
12	1	2133,60	108206,6	42151,0	2,567	N/A	B 2,201	100+	7,297
13	1	2299,96	107934,5	42176,6	2,559	N/A	B 2,195	100+	8,332
4	1	2300,02	107934,4	42176,6	2,559	N/A	B 2,195	100+	8,332
15	1	2438,40	107709,6	42234,8	2,550	N/A	B 2,191	100+	9,380
6	1	2743,20	107214,1	42480,0	2,524	N/A	B 2,181	100+	13,005
17	1	3048,00	106716,3	42883,9	2,488	N/A	B 2,171	100+	21,325
8	1	3296,96	106312,5	43295,7	N 2,456	N/A	B 2,162	100+	42,461
9			· · · · ·	,	,		, ,		

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 3236,36
 100512,3
 43285,7
 N 2,436
 NVA
 5 2,162
 1007
 424

 20
 Burst and Axial Flags
 Expert and Axial Flags
 Expert and Axial Flags
 Expert and Axial Flags
 Expert and Axial Flags

 23
 Axial Flags
 Expert and Axial Flags
 Expert and Axial Flags
 Expert and Axial Flags

 26
 Triaxial Flags
 Expert and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
 Ending

 27
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
 Envelope Flags

 30
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection
 Envelope Flags

Conventional Well Design

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	;	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	49657,9	2,215	N/A	B 2,237	100+	2,42
	1	24,96	110000,0	49536,7	2,221	N/A	B 2,237	100+	2,44
	1	304,80	110000,0	48231,0	2,281	N/A	B 2,237	100+	2,62
	1	362,01	110000,0	47976,8	2,293	N/A	B 2,237	100+	2,66
	1	609,60	110000,0	46929,1	2,344	N/A	B 2,237	100+	2,85
	1	914,40	110000,0	45763,0	2,404	N/A	B 2,237	100+	3,13
	1	1219,20	109696,8	44743,3	2,452	N/A	B 2,231	100+	3,46
	1	1349,96	109483,7	44353,3	2,468	N/A	B 2,227	100+	3,63
	1	1350,02	109483,6	44353,2	2,468	N/A	B 2,227	100+	3,63
0	1	1524,00	109198,9	43880,4	2,489	N/A	B 2,221	100+	3,87
1	1	1828,80	108704,3	43183,5	2,517	N/A	B 2,211	100+	4,38
2	1	2133,60	108206,6	42660,8	2,536	N/A	B 2,201	100+	5,07
3	1	2299,96	107934,5	42451,3	2,543	N/A	B 2,195	100+	5,54
4	1	2300,02	107934,4	42451,2	2,543	N/A	B 2,195	100+	5,54
5	1	2438,40	107709,6	42048,2	2,562	N/A	B 2,206	100+	6,010
6	1	2743,20	107214,1	41259,1	2,599	N/A	B 2,229	100+	7,409
7	1	3048,00	106716,3	40612,2	2,628	N/A	B 2,253	100+	9,66
8	1	3296,96	106312,5	39699,3	2,678	N/A	B 2,301	100+	12,91
э									
) В	urst and Axial Flags	;							
D	efault = Pipe Body,	L = Connection	Leak, B = Connec	tion Burst. F = Con	nection Fracture.	J = Connection Ju	Imp-out. Y = Coni	nection Yield. C = 0	Connection

25 26 Triaxial Flags 27 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 28 29 Envelope Flags 30 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	35772,7	D 3,075	N/A	100+	100+	3,07
	1	24,96	110000,0	35542,7	D 3,095	N/A	100+	100+	3,10 <sup>.</sup>
	1	304,80	110000,0	32961,9	D 3,337	N/A	100+	100+	3,404
	1	362,01	110000,0	32434,4	D 3,391	N/A	100+	98,416	3,473
	1	609,60	110000,0	30150,8	D 3,648	N/A	100+	59,355	3,808
	1	914,40	110000,0	27339,8	D 4,023	N/A	100+	40,285	4,32
	1	1219,20	109696,8	24528,7	D 4,472	N/A	100+	30,655	4,98
	1	1349,96	109483,7	23322,7	D 4,694	N/A	100+	27,833	5,32
	1	1350,02	109483,6	23322,1	D 4,694	N/A	100+	27,832	5,328
	1	1524,00	109198,9	21717,6	D 5,028	N/A	100+	24,824	5,874
	1	1828,80	108704,3	18906,6	D 5,750	N/A	100+	20,923	7,17
	1	2133,60	108206,6	16095,5	D 6,723	N/A	100+	18,124	9,22
	1	2299,96	107934,5	14560,8	D 7,413	N/A	100+	16,904	10,95
	1	2300,02	107934,4	14560,9	D 7,413	N/A	100+	16,904	10,95
	1	2438,40	107709,6	13284,4	D 8,108	N/A	100+	16,014	12,98
	1	2743,20	107214,1	10473,4	D 10,237	N/A	100+	14,365	22,060
	1	3048,00	106716,3	7662,3	D 13,927	N/A	100+	13,037	74,74
	1	3296,96	106312,5	5365,8	D 19,813	N/A	100+	12,077	M 77,24
	st and Axial Flags								
Def	ault = Pipe Body, I	. = Connection	n Leak, B = Connec	tion Burst, F = Cor	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
	al Flags								
	ault = Tension, M :								

Triaxial Flags
 Triaxial Flags
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
 Browlope Flags
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Conventional Well Design

#### File: Slender Well Design, v0 Date/Time: March 01, 2018 03:00:24 PM Page: 16 of 18 Safety Factor Summary - RunningHole #1 - 7" Production Casing String MD Yield Strength VME Stress Section (m) (psi) (psi) (psi) Collapse 100+ Absolute Safety Factors Burst (psi) 110000,0 (psi) 33106,8 Triaxial D 3,323 D 3,341 D 3,558 D 3,606 D 3,829 D 4,144 D 4,504 D 4,675 D 4,956 D 4,956 D 4,956 D 5,440 D 6,601 D 6,502 D 6,503 D 6,902 D 7,990 D 9,503 D 11,258 Envelope Axia 3,325 3,348 3,633 3,697 4,005 4,461 5,000 5,303 5,303 5,735 6,697 8,062 9,079 9,080 10,150 13,740 21,371 39,394 N/A 100+ 0,03 33106,8 32927,9 30919,4 30508,8 28731,7 26544,0 24356,3 23417,7 23417,7 23417,3 110000,0 110000,0 110000,0 110000,0 110000,0 109696,8 109483,6 109483,6 109483,6 109483,6 109704,3 108206,3 107934,4 107709,6 107714,1 106312,5 N/A N/A 24,96 304,80 362,01 609,60 914,40 1219,20 1349,96 1350,02 1524,00 1828,80 2133,60 2299,96 2300,02 2438,40 100+ 100+ 99,484 59,805 40,446 30,680 27,821 27,820 24,774 20,828 18,001 16,771 16,770 15,874 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 8 9 21 22 24 25 26 27 N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A 23417,3 22168,6 19980,9 17793,2 16599,1 16598,7 15605,5 14,214 12,880 11,970 2743,20 3048,00 13417,8 11230,1 3296,96 9443.1 Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

Axial Flags Default = Tension, M = Compression

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

28 29 30

Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	30879,9	D 3,562	N/A	100+	100+	3,564
2	1	24,96	110000,0	30577,2	3,597	N/A	100+	100+	3,597
3	1	304,80	110000,0	27220,9	4,041	N/A	B 61,024	100+	4,010
4	1	362,01	110000,0	26545,5	4,144	N/A	B 51,382	100+	4,107
5	1	609,60	110000,0	23676,3	4,646	N/A	B 30,512	100+	4,584
6	1	914,40	110000,0	20306,7	5,417	N/A	B 20,342	100+	5,349
7	1	1219,20	109695,8	17215,2	6,372	N/A	B 15,214	100+	6,403
8	1	1349,96	109482,8	16014,6	6,836	N/A	B 13,714	100+	6,991
9	1	1350,02	109482,7	16014,1	6,837	N/A	B 13,713	100+	6,992
10	1	1524,00	109199,3	14579,8	7,490	N/A	B 12,116	100+	7,971
11	1	1828,80	108702,7	12687,8	8,567	N/A	B 10,051	100+	10,587
12	1	2133,60	108206,1	11899,5	9,093	N/A	B 8,576	100+	15,831
13	1	2299,96	107935,1	12025,1	8,976	N/A	B 7,935	100+	21,755
14	1	2300,02	107935,0	7902,4	D 13,659	N/A	100+	17,311	33,765
15	1	2438,40	107709,5	6554,4	16,433	N/A	100+	18,909	55,700
16	1	2590,80	107461,3	5210,7	20,623	N/A	B 62,486	21,033	M 100+
17	1	2743,20	107213,0	4147,3	25,851	N/A	B 40,905	23,613	100+
18	1	3048,00	106716,4	3818,2	27,950	N/A	B 24,124	31,175	M 29,643
19	1	3296,96	106310,8	5401,1	N 19,683	N/A	B 18,031	42,306	M 18,573

Burst and Axial Flags Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection 21 22 23 24 25 26 27 28 29 30 31

Axial Flags Default = Tension, M = Compression

Triaxial Flags Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

Envelope Flags EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Mover			ns - <u>13 3/8" Co</u> r				-	_
	MD (m) Top	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
1	0,03	362,00	0,000	0,000	0,000	0,000	0,000	3,14
Mover	nent Summary -	PressureTest	#1 - 13 3/8" Cor	nductor Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
	Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1	0,03	362.00	0.097	-0.002	-0.094	0.000	0.000	362.00

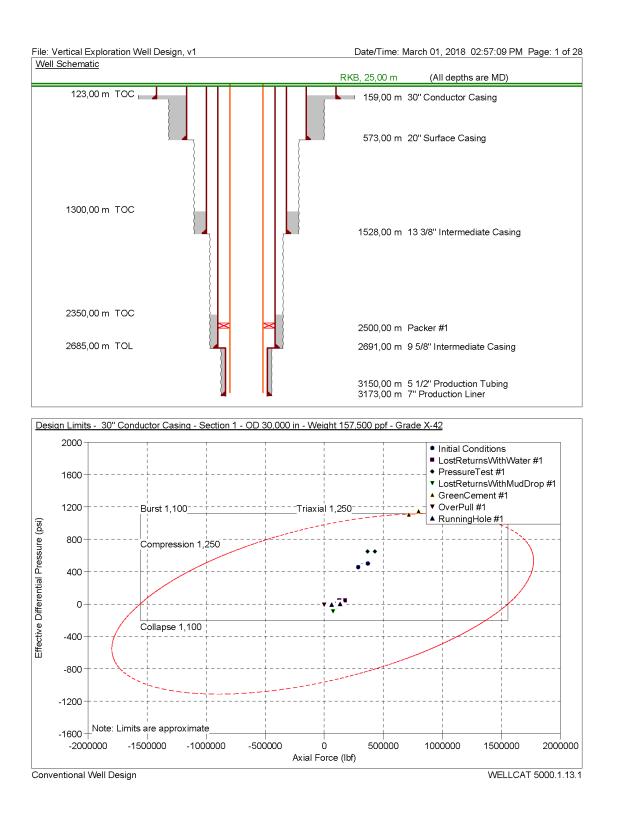
Conventional Well Design

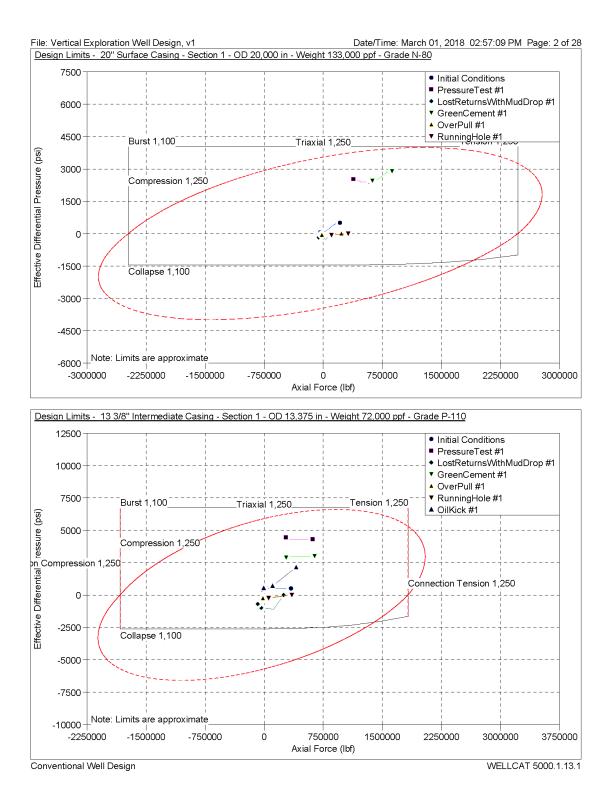
le: Slender	Well Desig	gn, vO			Date/Time	: March 01, 2018	03:00:24 PM	Page: 17 of 1
Novement S	Summary -	LostReturnsW	/ithMudDrop #1 -	13 3/8" Conduc				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
	0,03	362,00	-0,017	0,000	0,016	0,001	0,000	0,0
Aovement S	Summary -	OverPull #1 -	13 3/8" Conduct	or Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
t Ourface di	0,03	362,00	0,018	0,000	0,000	0,000	0,018*	0,1
* Surface di	splacement	due to pickup (+) o	or slackoπ (-)					
Novement S	Summarγ - MD (m)	RunningHole	<u>#1 - 13 3/8'' Con</u> Hooke's	ductor Casing Buckling	Balloon	Thermal	Total	Buckled
Тор	(,	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
				No results available fo	r this load case			
/lovement S	Summary -	Initial Conditio	ons - 95/8" Surfa	ace Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0.03	Base	Law (m) 0.000	(m)	(m)	(m)	(m)	Length (m)
	0,03	362,00	0,000	0,000	0,000	0,000	0,000	0,
Aovement S	Summary -	DisplaceToGa	as #1 - 95/8" Su	rface Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
	0,03	362,00	0.056					
		001,00	0,000	0,000	-0,057	0,001	0,000	0,0
Movement S 	MD (m)		#1 - <u>9 5/8'' Surfa</u> Hooke's Law (m) 0,165		-0,057 Balloon (m) -0,164	0,001 Thermal (m) 0,000	0,000 Total (m) 0,000	Buckled Length (m) 262,6
Тор	MD (m) 0,03	PressureTest Base 362,00	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165	ace Casing Buckling (m) -0,001	Balloon (m) -0,164	Thermal (m)	Total (m)	Buckled Length (m)
Тор	MD (m) 0,03 Summary -	PressureTest Base 362,00	<u>#1 - 9 5/8" Surfa</u> Hooke's Law (m) 0,165 VithMudDrop #1 -	ace Casing Buckling ( <sup>m)</sup> -0,001 9 5/8'' Surface (	Balloon (m) -0,164 Casing	Thermal (m) 0,000	Total (m) 0,000	Buckled Length (m) 262,
Top Novement S	MD (m) 0,03 Gummary - MD (m)	PressureTest Base 362,00	<u>#1 - 9 5/8'' Surfa</u> Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's	ace Casing Buckling (m) -0,001 9 5/8" Surface ( Buckling	Balloon (m) -0,164 Casing Balloon	Thermal (m) 0,000	Total (m) 0,000	Buckled Length (m) 262, Buckled
Тор	MD (m) 0,03 Gummary - MD (m)	PressureTest Base 362,00	<u>#1 - 9 5/8" Surfa</u> Hooke's Law (m) 0,165 VithMudDrop #1 -	ace Casing Buckling ( <sup>m)</sup> -0,001 9 5/8'' Surface (	Balloon (m) -0,164 Casing	Thermal (m) 0,000	Total (m) 0,000	Buckled Length (m) 262,
Top Novement S	MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf	ace Casing Buckling (m) -0,001 9 5/8" Surface ( Buckling (m) 0,000	Balloon (m) -0,164 Casing Balloon (m)	Thermal (m) 0,000 Thermal (m)	Total (m) 0,000	Buckled Length (m) 262, Buckled Length (m)
Aovement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m)	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCemen	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf Hooke's	ece Casing Buckling (m) -0,001 <u>9 5/8'' Surface (</u> Buckling (m) 0,000 ace Casing Buckling	Balloon (m) -0,164 Casing Balloon (m) 0,008 Balloon	Thermal (m) 0,000 Thermal (m) 0,001 Thermal	Total (m) 0,000 Total (m) 0,000	Buckled Length (m) 262, Buckled Length (m) 0, Buckled
Aovement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m)	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCement Base	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf Hooke's Law (m)	ace Casing Buckling (m) -0,001 9 5/8" Surface ( Buckling (m) 0,000 ace Casing Buckling (m)	Balloon (m) -0,164 Casing Balloon (m) 0,008 Balloon (m)	Thermal (m) 0,000 Thermal (m) 0,001	Total (m) 0,000 Total (m) 0,000	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Length (m)
Aovement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m)	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCemen	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf Hooke's	ece Casing Buckling (m) -0,001 <u>9 5/8'' Surface (</u> Buckling (m) 0,000 ace Casing Buckling	Balloon (m) -0,164 Casing Balloon (m) 0,008 Balloon	Thermal (m) 0,000 Thermal (m) 0,001 Thermal	Total (m) 0,000 Total (m) 0,000	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Length (m)
Aovement S Top Movement S Movement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCement Base 362,00	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf Hooke's Law (m)	ace Casing Buckling (m) -0.001 <u>9 5/8" Surface (</u> Buckling (m) 0,000 ace Casing Buckling (m) 0,000	Balloon (m) -0.164 Casing Balloon (m) 0,008 Balloon (m) 0,000	Thermal (m) 0,000 Thermal (m) 0,001 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109	Buckled Length (m) 262 Buckled Length (m) Buckled Length (m) 0
Aovement S Aovement S Aovement S Aovement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCemen Base 362,00 OverPull #1 -	#1 - 9 5/8" Surfa Hooke's Law (m) 0,185 //thMudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf Hooke's Law (m) 0,109 0,109	ace Casing Buckling (m) -0,001 9 5/8" Surface ( Buckling (m) 0,000 ace Casing Buckling (m) 0,000	Balloon (m) -0,164 Balloon (m) 0,008 Balloon (m) 0,000 Balloon	Thermal (m) 0,000 Thermal (m) 0,001 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Buckled
1ovement S Top 1ovement S 1ovement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m)	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCemen Base 362,00	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //th/MudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf Hooke's Law (m) 0,109 9 5/8" Surface C Hooke's Law (m)	ace Casing Buckling (m) -0,001 -0,001 <u>9 5/8'' Surface (</u> Buckling (m) 0,000 ace Casing Buckling (m) 0,000	Balloon (m) -0.164 Casing Balloon (m) 0,008 Balloon (m) 0,000	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109 Total (m)	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Length (m) 0 Buckled
Aovement S Aovement S Aovement S Aovement S Top Top Top Top Top	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCement Base 362,00 OverPull #1 - Base 362,00	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) 0,109 t #1 - 9 5/8" Surf Hooke's Law (m) 0,109 9 5/8" Surface C Hooke's Law (m) 0,166	ace Casing Buckling (m) -0,001 9 5/8" Surface ( Buckling (m) 0,000 ace Casing Buckling (m) 0,000	Balloon (m) -0,164 Balloon (m) 0,008 Balloon (m) 0,000 Balloon	Thermal (m) 0,000 Thermal (m) 0,001 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Length (m) 0 Buckled
Aovement S Aovement S Aovement S Aovement S Top Top Top Top Top	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCemen Base 362,00	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) 0,109 t #1 - 9 5/8" Surf Hooke's Law (m) 0,109 9 5/8" Surface C Hooke's Law (m) 0,166	ace Casing Buckling (m) -0,001 -0,001 <u>9 5/8'' Surface (</u> Buckling (m) 0,000 ace Casing Buckling (m) 0,000	Balloon (m) -0.164 Casing Balloon (m) 0,008 Balloon (m) 0,000	Thermal (m) 0,000 Thermal (m) 0,000 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109 Total (m)	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Length (m) 0 Buckled
Aovement S Aovement S Aovement S Top Aovement S Top Aovement S Top * Surface di	MD (m)           0,03           Summary -           MD (m)           0,03           Summary -           MD (m)           0,03           Summary -           MD (m)           0,03           Summary -           MD (m)           0,03           Summary -           MD (m)           0,03           Splacement of           Summary -	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCement Base 362,00 OverPull #1 - Base 362,00 due to pickup (+) o	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //th/MudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surfa 0,109 9 5/8" Surface C Hooke's Law (m) 0,109 9 5/8" Surface C Hooke's Law (m) 0,166 or stackoff (-) #1 - 9 5/8" Surfa	ace Casing Buckling (m) -0,001 -0,001 <u>9 5/8" Surface (C</u> Buckling (m) 0,000 ace Casing Buckling (m) 0,000 Ce Casing Ce Casing	Balloon (m) -0.164 Casing Balloon (m) 0,008 Balloon (m) 0,000 Balloon (m) 0,000	Thermal (m) 0,000 Thermal (m) 0,001 Thermal (m) 0,000 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109 Total (m) 0,166*	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Length (m) 0 Buckled Length (m) 0
Aovement S Aovement S Aovement S Top Aovement S Top Aovement S Top * Surface di	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCement Base 362,00 OverPull #1 - Base 362,00 due to pickup (+) o	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //thMudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surf Hooke's Law (m) 0,109 9 5/8" Surface C Hooke's Law (m) 0,166 or slackoff (-)	ace Casing Buckling (m) -0,001 9 5/8'' Surface ( Buckling (m) 0,000 ace Casing Buckling (m) 0,000 3asing Buckling (m) 0,000	Balloon (m) -0.164 Casing Balloon (m) 0,008 Balloon (m) 0,000	Thermal (m) 0,000 Thermal (m) 0,001 Thermal (m) 0,000 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109 Total (m) 0,166*	Buckled Length (m) 262, Buckled Length (m) 0, Buckled Length (m) 0, Buckled
Aovement S Aovement S Aovement S Aovement S Aovement S * Surface di Aovement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCement Base 362,00 OverPull #1 - Base 362,00 due to pickup (+) of RunningHole s	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //th/MudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surfa Hooke's Law (m) 0,109 9 5/8" Surface C Hooke's Law (m) 0,166 or slackoff (-) #1 - 9 5/8" Surfa	ace Casing Buckling (m) -0,001 9 5/8" Surface ( Buckling (m) 0,000 ace Casing Buckling (m) 0,000 ce Casing Buckling (m) 0,000 ce Casing Buckling (m) 0,000	Balloon (m) -0.164 Casing Balloon (m) 0,006 Balloon (m) 0,000 Balloon (m) 0,000	Thermal (m) 0,000 Thermal (m) 0,001 Thermal (m) 0,000 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109 Total (m) 0,166*	Buckled Length (m) 262, Buckled Length (m) 0, Buckled Length (m) 0, Buckled Length (m) 0,
10vement S 10vement S 10vement S 10vement S 10vement S 10vement S	MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03 Summary - MD (m) 0,03	PressureTest Base 362,00 LostReturnsW Base 362,00 GreenCement Base 362,00 OverPull #1 - Base 362,00 due to pickup (+) of RunningHole s	#1 - 9 5/8" Surfa Hooke's Law (m) 0,165 //th/MudDrop #1 - Hooke's Law (m) -0,009 t #1 - 9 5/8" Surfa Hooke's Law (m) 0,109 9 5/8" Surface C Hooke's Law (m) 0,166 or slackoff (-) #1 - 9 5/8" Surfa	ace Casing Buckling (m) -0,001 9 5/8" Surface ( Buckling (m) 0,000 ace Casing Buckling (m) 0,000 3asing Buckling (m) 0,000 ce Casing Buckling (m) 0,000	Balloon (m) -0.164 Casing Balloon (m) 0,006 Balloon (m) 0,000 Balloon (m) 0,000	Thermal (m) 0,000 Thermal (m) 0,001 Thermal (m) 0,000 Thermal (m) 0,000	Total (m) 0,000 Total (m) 0,000 Total (m) 0,109 Total (m) 0,166*	Buckled Length (m) 262 Buckled Length (m) 0 Buckled Length (m) 0 Buckled Length (m) 0

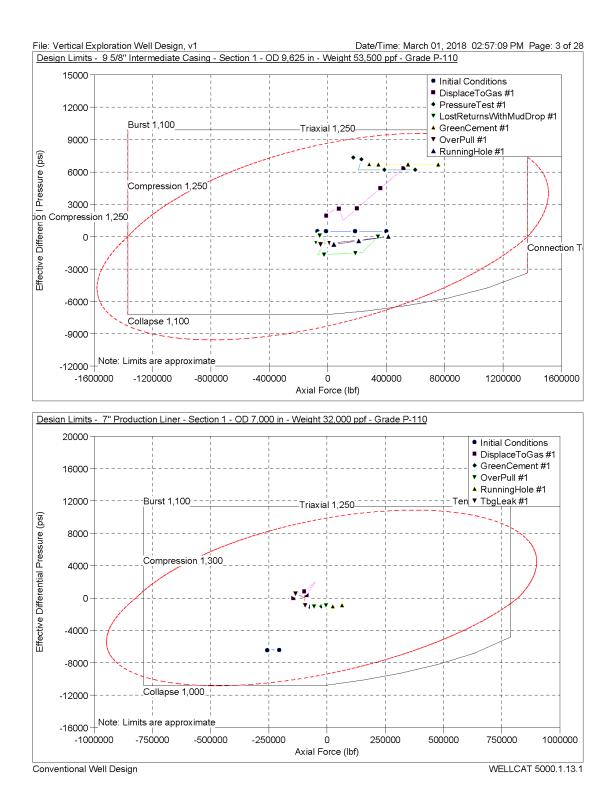
	ummarv -	<ul> <li>Initial Condition</li> </ul>	ns - 7" Productio	on Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
	0,03	2300,00	0,000	0,000	0,000	0,000	0,000	0,0
Movement Si			<u>is #1 - 7" Produc</u>					
T	MD (m)	Base	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0,03	2300,00	Law (m) 0,402	(m) 0,000	(m) -0,403	(m) 0,001	(m) 0,000	Length (m) 0,0
Movement Su			#1 - 7" Productio					
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0.03	Base 2300.00	Law (m) 0.749	(m) 0.000	(m) -0,749	(m) 0,000	(m) 0.000	Length (m) 0.0
	0,00	2000,00	0,740	0,000	-0,740	0,000	0,000	
Movement Si	ummary -	GreenCement	:#1 - 7" Producti	ion Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
	0,03	2300,00	0,499	0,000	0,000	0,000	0,499	0,0
Movement Si			7" Production Ca			<b>T</b> 1 1	<b>-</b>	
	ummary - MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Movement Si					Balloon (m) 0,000	Thermal (m) 0,000	Total (m) 0,590*	Buckled Length (m) 0,0
Тор	MD (m) 0,03	Base	Hooke's Law (m) 0,590	Buckling (m)	(m)	(m)	(m)	Length (m)
Top * Surface dis	MD (m) 0,03 placement	Base 2300,00 due to pickup (+) o	Hooke's Law (m) 0,590 r slackoff (-)	Buckling (m) 0,000	(m)	(m)	(m)	Length (m)
Top * Surface dis Movement Su	MD (m) 0,03 placement	Base 2300,00 due to pickup (+) o	Hooke's Law (m) 0,590	Buckling (m) 0,000	(m)	(m)	(m)	Length (m)
Top * Surface dis	MD (m) 0,03 placement ummary -	Base 2300,00 due to pickup (+) o	Hooke's Law (m) 0,590 r slackoff (-) #1 - 7" Productic	Buckling (m) 0,000	(m) 0,000	(m) 0,000	(m) 0,590*	Length (m) 0,
Top * Surface dis Movement Si Top	MD (m) 0,03 placement ummary -	Base 2300,00 due to pickup (+) o	Hooke's Law (m) o,590 r slackoff (-) #1 - 7" Productic Hooke's	Buckling (m) 0,000 on Casing Buckling	(m) 0,000 Balloon	(m) 0,000 Thermal	(m) 0,590* Total	Length (m) 0, Buckled
Top * Surface dis Movement Su	MD (m) 0,03 placement ummary -	Base 2300,00 due to pickup (+) o	Hooke's Law (m) 0,590 r slackoff (-) #1 - 7" Productic Hooke's Law (m)	Buckling (m) 0,000 on Casing Buckling	(m) 0,000 Balloon (m)	(m) 0,000 Thermal	(m) 0,590* Total	Length (m) 0, Buckled
Top * Surface dis Movement Su	MD (m) 0,03 placement ummary -	Base 2300,00 due to pickup (+) o	Hooke's Law (m) 0,590 r slackoff (-) #1 - 7" Productic Hooke's Law (m)	Buckling (m) 0,000 on Casing Buckling (m)	(m) 0,000 Balloon (m)	(m) 0,000 Thermal	(m) 0,590* Total	Length (m) 0,1
Top * Surface dis Movement Si Top	MD (m) 0,03 pplacement ummary - MD (m)	Base 2300,00 due to pickup (+) o RunningHole = Base	Hooke's Law (m) 0,590 r slackoff (-) #1 - 7" Productic Hooke's Law (m)	Buckling (m) 0,000 on <u>Casing</u> Buckling (m) No results available fo	(m) 0,000 Balloon (m)	(m) 0,000 Thermal	(m) 0,590* Total	Length (m) 0, Buckled
Top * Surface dis Movement Si Top	MD (m) 0,03 placement ummary - MD (m) ummary -	Base 2300,00 due to pickup (+) o RunningHole : Base TubingLeak #	Hooke's Law (m) 0,590 r slackoff (-) #1 - 7" Productic Law (m) 1 - 7" Production	Buckling (m) 0,000 on Casing Buckling (m) No results available fo	(m) 0,000 Balloon (m)	(m) 0,000 Thermal (m)	(m) 0,590* Total (m)	Length (m) 0, Buckled Length (m)
Top * Surface dis Movement Si Top	MD (m) 0,03 pplacement ummary - MD (m)	Base 2300,00 due to pickup (+) o RunningHole : Base TubingLeak #	Hooke's Law (m) 0,590 r slackoff (-) #1 - 7" Productic Hooke's Law (m)	Buckling (m) 0,000 on <u>Casing</u> Buckling (m) No results available fo	(m) 0,000 Balloon (m)	(m) 0,000 Thermal	(m) 0,590* Total	Length (m) 0, Buckled

# 5.2.3 North Sea

5.2.3.1 Conventional Well Design







File: Vertical Exploration Well	Desian. v1			Dat	te/Time: Mar	ch 01, 2018 0	2:57:09 PM	Page: 4 of 28
Ratings Summary - 30" Con						,		
String	Pipe Body		Connec	tion		Rati	ngs	
Section OD (in) 1 1 30,000 2	Weight (ppf) 157,500	Grade X-42	Name <n a=""></n>	Grade	Burst (psi) 1225,00	Collapse (psi) 224,86	Tension (lbf) 0 1946217	Compression (lbf 1946217
3       L = Connection Leak         4       B = Connection Burst         5       F = Connection Fracture         6       J = Connection Jump-out		· ·						
7 Y = Connection Yield 8 C = Connection								
L								
Ratings Summary - 20" Surf	ace Casing							
String	Pipe Body		Connec	tion	<b>n</b> ./ n	Rati		
Section         OD (in)           1         1         20,000           2         3         L = Connection Leak	Weight (ppf) 133,000	Grade N-80	Name TSH ER	Grade N-80	Burst (psi) 4445,00	Collapse (psi) 1603,35	Tension (lbf) 3090517	compression (lbf) 3090517
3 L = Connection Leak 4 B = Connection Burst 5 F = Connection Fracture								
6 J = Connection Jump-out								
7 Y = Connection Yield 8 C = Connection								
Ratings Summary - 13 3/8" I	ntermediate Ca	sina						
String	Pipe Body	Jing	Connec	tion		Rati	ngs	
Section OD (in)	Weight (ppf)	Grade P-110	Name	Grade P-110	Burst (psi)	Collapse (psi)	Tension (lbf)	Compression (lbf
1 1 13,375 2 3 L = Connection Leak	72,000	P-110	Vam 21	P-110	7397,76	2882,28	C 2284000	C 2284000
4 B = Connection Burst								
5 F = Connection Fracture 6 J = Connection Jump-out								
7 Y = Connection Yield								
8 C = Connection								
Ratings Summary - 9 5/8" In		ng						
String Section OD (in)	Pipe Body Weight (ppf)	Grade	Connec Name	tion Grade	Burst (psi)	Rati Collapse (psi)		compression (lbf
1 9,625	53,500	P-110	Vam 21	P-110	10900,00	7950,02	C 1710000	C 1710000
2 3 L = Connection Leak	<u> </u>							
4 B = Connection Burst 5 F = Connection Fracture								
6 J = Connection Jump-out								
7 Y = Connection Yield 8 C = Connection								
Ratings Summary - 7" Produ	uction Liner							
Ratings Summary - 7" Produ	uction Liner Pipe Body		Connec	tion		Rati	ngs	
String Section OD (in)	Pipe Body Weight (ppf)	Grade P.110	Name	Grade	Burst (psi)	Collapse (psi)	Tension (lbf)	Compression (lbf
String           Section         OD (in)           1         1         7,000	Pipe Body	Grade P-110			Burst (psi) 12457,50			Compression (lbf 1024904
String Section         OD (in)           1         1         7,000           2         3         L = Connection Leak	Pipe Body Weight (ppf)		Name	Grade	Burst (psi) 12457,50	Collapse (psi)	Tension (lbf)	
String         OD (in)           Section         OD (in)           1         1         7,000           3         L = Connection Leak           4         B = Connection Burst           5         F = Connection Fracture	Pipe Body Weight (ppf)		Name	Grade	Burst (psi) 12457,50	Collapse (psi)	Tension (lbf)	
String         OD (in)           1         1         7,000           3         L = Connection Leak         4           4         B = Connection Burst         5           5         F = Connection Fracture         6           6         J = Connection Jump-out         1	Pipe Body Weight (ppf)		Name	Grade	Burst (psi) 12457,50	Collapse (psi)	Tension (lbf)	
String         OD (in)           Section         OD (in)           1         1         7,000           3         L = Connection Leak           4         B = Connection Burst           5         F = Connection Fracture	Pipe Body Weight (ppf)		Name	Grade	Burst (psi) 12457,50	Collapse (psi)	Tension (lbf)	
String         OD (in)           2         0D (in)           3         L = Connection Leak           4         B = Connection Burst           5         F = Connection Fracture           6         J = Connection Jump-out           7         Y = Connection Jump-out	Pipe Body Weight (ppf)		Name	Grade	Burst (psi) 12457,50	Collapse (psi)	Tension (lbf)	
String         OD (in)           2         0D (in)           3         L = Connection Leak           4         B = Connection Burst           5         F = Connection Fracture           6         J = Connection Jump-out           7         Y = Connection Jump-out	Pipe Body Weight (ppf) 32,000	P-110	Name Vam TOP HC	Grade	Burst (psi) 12457,50	Collapse (psi)	Tension (lbf)	
String     OD (in)       1     1     7,000       3     L = Connection Leak       4     B = Connection Burst       5     F = Connection Fracture       6     J = Connection Nump-out       7     Y = Connection Yield       8     C = Connection       Casing Load Summary - Init       String	Pipe Body Weight (ppf) 32,000	P-110 30" Conduc Dogler	Name Vam TOP HC	Grade P-110 ue Fricti	12457,50	Collapse (psi) 10780,84	Tension (Ibf) C 1024904 Pressure	1024904
String     OD (in)       2     1     7,000       3     L = Connection Leak     4       4     B = Connection Burst     5       5     F = Connection Tracture     6       6     J = Connection Yield     8       8     C = Connection Yield     8       Casing Load Summary - Init     String     MD       Section     (m)     (m)	Pipe Body Weight (ppf) 32,000	P-110 30" Conduc Dogler (°/100f	Name Vam TOP HC	Grade P-110 ue Fricti	12457,50	Collapse (psi) 10780,84	Tension (Ibf) ( 1024904	(psi) External
String     OD (in)       1     1     7,000       3     L = Connection Leak     4       4     B = Connection Burst     5       5     F = Connection Fracture     6       6     J = Connection Yield     8       8     C = Connection Yield     8       Casing Load Summary - Init     String     MD       Section     (m)     1	Pipe Body Weight (ppf) 32,000 ial Conditions - Axial Force (lbf) 0,03 36941 9,66 35651	P-110 30" Conduc Dogler (°/100f 56 88	Name Vam TOP HC ctor Casing g Torq t) (ft-lt 0,00 0,00	Grade P-110 Ue Fricti of) (1 0,0 0,0	0,0 0,0	Collapse (psi) 10780,84 emperature (°F) 50,00 46,92	Tension (lb) [C 1024904 Pressure Internal 500,04 535,44	(psi) External 0,04
String         OD (in)           1         1         7,000           3         L = Connection Leak         4           4         B = Connection Burst         5           5         F = Connection Fracture         6           6         J = Connection Jump-out         7           7         Y = Connection Jump-out         8           8         C = Connection Yield         8           5         Tring         MD           String         MD         Section (m)           1         1         22           3         1         12	Pipe Body Weight (ppf) 32,000	P-110 30" Condut Doglet (*/100f 56 58 29	Name Vam TOP HC ctor Casing g Torq t) (f-lt	Grade P-110 ue Fricti of) (1 0,0	12457,50 on Force Te (bf/ft) 0,0	Collapse (psi) 10780,84 ************************************	Tension (lb) [ 1024904 Pressure Internal 500,04	(psi) External 0,04

6 Additional Pickup to Prevent Buckling = 16241 lbf

					#1 - 30" Condu				
ernal	Pressure (psi) Internal Exte	Temperature (°F)	Friction Force (lbf/ft)	Torque (ft-lbf)	Dogleg (°/100ft)	Axial Force (lbf)		MD (m)	String Section
Inai	45,85	50,00	0,0	0,0	0,00	174733	0,03	1	Gection
30	81,26	50,00	0,0	0,0	0,00	161846	24,96	1	
174	220,39	35,00	0,0	0,0	0,00	111207	122,96	1	
174 225	220,47 271,50	35,00 37,40	0,0 0,0	1,4 0,2	0,01 0,00	125927 126761	123,02 158,98	1	
	Pressure (psi)	Temperature	Friction Force	ng Torque	Conductor Casir Dogleg	reTest #1 - 30'' Axial Force		Summary - 1 MD	sing Load String
ernal	Internal Exte	(°F)	(lbf/ft)	(ft-lbf)	(°/100ft)	(lbf)		(m)	Section
3	650,04 685,45	50,00 46,92	0,0 0,0	0,0 0,8	0,00 0,00	429424 416537	0,03 24,96	1	
103	753,73	41,09	0,0	4,1	0,02	391684	73,06	1	
129	779,67	38,84	0,0	5,7	0,03	382245	91,32	1	
174	824,58	35,00	0,0	8,9	0,04	365898	122,96	1	
174 225	824,67 875,69	35,00 37,40	0,0 0,0	1,4 0,2	0,01 0,00	365376 366182	123,02 158,98	1	
223	675,69	37,40	0,0	0,2	0,00			ckup to Prevent	dditional Pi
						ig = 33872 ibi	t Buckin	ckup to Freven	
	Pressure (psi)	Temperature	ng Friction Force	nductor Casi Torque	rop #1 - 30'' Cor Dogleg	turnsWithMudD Axial Force		<u>Summary -    l</u> MD	sing Load String
ernal	Internal Exte	(°F)	(lbf/ft)	(ft-lbf)	(°/100ft)	(lbf)		(m)	Section
3	0,00 0,00	50,00 50,00	0,0 0,0	0,0 0,0	0,00 0,00	127799 114912	0,03 24,96	1	
174	76,94	35,00	0,0	0,0	0,00	64273	24,96 122,96	1	
174	77,05	35,00	0,0	1,4	0,01	69088	123,02	1	
22	138,30	37,40	0,0	0,2	0,00	73971	158,98	1	
ernal 3	1150,04	(°F) 50,00 46.92	(lbf/ft) 0,0 0.0	(ft-lbf) 0,0 0.0	(°/100ft) 0,00 0.00	(lbf) 798793 785906	0,03	(m) 1	Section
3	1185,44	46,92	0,0	0,0	0,00	785906	24,96	1	
103	1253,73 1279,67	41,09 38,84	0,0 0,0	0,0 0,1	0,00 0,00	761053 751614	73,06 91,32	1	
174	1324,58	35,00	0,0	1,4	0,00	735267	122,96	1	
174	1324,66	35,00	0,0	1,4	0,01	735236	123,02	1	
27	1375,69	37,40	0,0	0,0	0,00	716665	158,98	1	
					ductor Casing	ull #1 - 30'' Con	OverPu	Summary - (	sing Load
	Pressure (psi)	Temperature	Friction Force	Torque	Dogleg	Axial Force		MD	String
		(°F)	(lbf/ft)	(ft-lbf)	(°/100ft)	(lbf)		(m)	Section
ernal	0,04 35,45	50,00 46,92	0,0 0,0	0,0 0,0	0,00 0,00	81625 68738	0,03 24,96	1	
	174,58	35,00		0,0	0,00	18099	122,96	1	
3			0.0						
3 17-	174,67	35,00	0,0 0,0	0,0	0,00	18067	123,02	1	
3 17 17					0,00	18067 -503		1	
3 17- 17-	174,67	35,00	0,0	0,0 0,0	0,00	-503	123,02 158,98	1 1	singlasd
3 17- 17- 22:	174,67 225,69 Pressure (psi)	35,00 37,40 Temperature	0,0 0,0 Friction Force	0,0 0,0	0,00 <u>Conductor Casir</u> Dogleg	-503 IgHole #1 - 30'' Axial Force	123,02 158,98 Runnin	MD	String
3: 174 174 225	174,67 225,69 Pressure (psi) Internal Exte	35,00 37,40 Temperature (°F)	0,0 0,0 Friction Force (lbf/ft)	0,0 0,0 Ig Torque (ft-lbf)	0,00 Conductor Casir Dogleg (°/100ŧ)	-503 IgHole #1 - 30'' Axial Force (lbf)	123,02 158,98 Runnin		
3: 174 174 229	174,67 225,69 Pressure (psi)	35,00 37,40 Temperature	0,0 0,0 Friction Force	0,0 0,0	0,00 <u>Conductor Casir</u> Dogleg	-503 IgHole #1 - 30'' Axial Force	123,02 158,98 Runnin	MD	String
3: 17- 17- 22: ernal 3: 17-	174,67 225,69 Pressure (psi) Internal Exte 0,04 35,45 174,58	35,00 37,40 Temperature (°F) 50,00 46,92 35,00	0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	0,0 0,0 IC Torque (ft-lbf) 0,0 0,0 0,0	0,00 <u>Conductor Casir</u> Dogleg (°/100#) 0,00 0,00 0,00	-503 IgHole #1 - 30'' Axial Force (lbf) 134243 122997 78805	123,02 158,98 Runnin 0,03 24,96 122,96	MD	String
3 17 17 22 22 ernal 3 17 17	174,67 225,69 Pressure (psi) Internal Exte 0,04 35,45 174,58 174,67	35,00 37,40 Temperature (°F) 50,00 46,92 35,00 35,00	0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0	0,00 Conductor Casir Dogleg (°/100ft) 0,00 0,00 0,00 0,00	-503 agHole #1 - 30'' (lbf) 134243 122997 78805 78777	123,02 158,98 Runnin 0,03 24,96 122,96 123,02	MD	String
3 17 17 22 22 ernal 3 17 17	174,67 225,69 Pressure (psi) Internal Exte 0,04 35,45 174,58	35,00 37,40 Temperature (°F) 50,00 46,92 35,00	0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	0,0 0,0 IC Torque (ft-lbf) 0,0 0,0 0,0	0,00 <u>Conductor Casir</u> Dogleg (°/100#) 0,00 0,00 0,00	-503 IgHole #1 - 30'' Axial Force (lbf) 134243 122997 78805	123,02 158,98 Runnin 0,03 24,96 122,96	MD	String
3 17 17 22 22 ernal 3 17 17	174,67 225,69 Pressure (psi) Internal Exte 0,04 35,45 174,58 174,67	35,00 37,40 Temperature (°F) 50,00 46,92 35,00 35,00	0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0	0,00 Conductor Casir Dogleg ('/100ħ) 0,00 0,00 0,00 0,00 0,00	-503 IgHole #1 - 30'' Axial Force (lbf) 134243 122997 78905 78777 62571	123,02 158,98 Runnin 0,03 24,96 122,96 122,96 123,02 158,98	MD (m) 1 1 1 1	String Section
3 174 174 229 ernal 3 174 177 229	174,67 225,69 Pressure (psi) Internal Exte 0,04 35,45 174,58 174,57 225,69 Pressure (psi)	35,00 37,40 Temperature(°F) 50,00 35,00 35,00 37,40 Temperature	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,00 Conductor Casir Dogleg ('/100ft) 0,00	-503 aqHole #1 - 30" Axial Force (bf) 134243 122997 78805 78777 62571 62571 Conditions - 20" Axial Force	123,02 158,98 Runnin 0,03 24,96 122,96 123,02 158,98	MD (m) 1 1 1 1 1 5ummary - 1 MD	String Section
3 17. 17. 22. ermal 3 17. 17. 22. ermal	174,67           225,69           Internal         Exte           0,04           35,45           174,58           174,67           225,69	35,00 37,40 Temperature(°F) (°F) 35,00 35,00 35,00 37,40 Temperature (°F) 50,00	0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	0.0 0.0 0.0 Torque (ft-lbf) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0,00 Conductor Casir Dogleg (*/100ft) 0,00	-503 adHole #1 - 30" Axial Force (lbf) 134243 122997 78905 78777 62571 Conditions - 20" Axial Force (lbf) 213040	123,02 158,98 Runnin 0,03 24,96 122,96 123,02 158,98 Initial C	MD (m) 1 1 1 1 1 5ummarγ - Ι	String Section sing Load String
ornal 33 177 174 229 0 174 174 229 174 174 229 0 174 174 229 0 174 174 229 174 174 229 174 174 174 209 174 174 209 177 174 174 174 174 209 177 174 174 174 174 174 174 174 174 174	174,67           225,69           Pressure (psi)           Internal         External           0,04           35,45           174,58           174,67           225,69           Pressure (psi)           Internal           External           500,04           550,04	35,00 37,40 Temperature	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,00 Conductor Casir Dogleg ('/100t) 0,00 0	-503 Axial Force (lbf) 134243 122997 78805 78777 62571 Conditions - 20'' Axial Force (lbf) 213040 202158	123,02 158,98 Runnin 0,03 24,96 122,96 123,02 158,98 Initial C	MD (m) 1 1 1 1 1 5ummary - 1 MD	String Section sing Load String
33 177 174 229 ernal 174 177 229 ernal 47 229	174,67           225,69           Internal         External           0,04           35,45           174,67           225,69           Internal           External           174,58           174,67           225,69           Internal         External           500,04           535,44           674,58	35,00 37,40 Temperature (°F)	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,00 Conductor Casir Dogleg ('/100ft) 0,00	-503 adHole #1 - 30" Axial Force (lbf) 134243 122997 78905 78777 62571 Conditions - 20" Axial Force (lbf) 213040 202158 159395	123,02 158,98 Runnin 0,03 24,96 122,96 122,96 122,96 122,96	MD (m) 1 1 1 1 1 5ummary - 1 MD	String Section sing Load String
ernal 33 174 174 225 ernal 33 174 177 225 ernal 4 4 200 200	174,67           225,69           Pressure (psi)           Internal         External           0,04           35,45           174,58           174,67           225,69           Pressure (psi)           Internal           External           500,04           550,04	35,00 37,40 Temperature (°F) 50,00 46,92 35,00 37,40 Temperature (°F) 50,00 46,92 35,00 35,00	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,00 Conductor Casir Dogleg ('/100t) 0,00 0	-503 Axial Force (lbf) 134243 122997 78805 78777 62571 Conditions - 20'' Axial Force (lbf) 213040 202158	123,02 158,98 Runnin 0,03 24,96 122,96 123,02 158,98 Initial C	MD (m) 1 1 1 1 1 5ummary - 1 MD	String Section sing Load String
() 33 174 225 ernal () 35 37 174 225 () 42 205 300 300 300	174,67           225,69           Pressure (psi)           Internal         Exte           0,04         53,45           174,67           225,69           Pressure (psi)           Internal         Exte           535,44           674,58           674,67           729,80	35,00 37,40 Temperature (°F) 50,00 35,00 37,40 Temperature (°F) 50,00 46,92 37,40 37,40 37,40	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.0 0.0 0.0 10 10 10 10 10 10 0.0 0.0 0.	0,00 Conductor Casir Dogleg (*/100ft) 0,00	-503 igHole #1 - 30" Axial Force (lbf) 134243 1322997 78805 78777 62571 Conditions - 20" Axial Force (lbf) 213040 202158 159369 159369 1436807 143660	123,02 158,98 Runnin 0,03 24,96 122,96 122,96 122,98 158,98 Initial C 0,03 24,96 122,96 122,96 122,96 122,96 122,96	MD (m) 1 1 1 1 1 5ummary - 1 MD	String Section sing Load String
3 17, 17, 22; ernal 3 17, 17, 22; ernal 4 4 20; 20; 30;	174,67           225,69           Pressure (psi)           Internal         External           0,04           35,45           174,58           174,57           225,69           Pressure (psi)           Internal         External           500,04           535,44           674,58           674,67           729,80	35,00 37,40 Temperature (°F)	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,00 Conductor Casir Dogleg ('/100R) 0,000 0,00	-503 agHole #1 - 30" Axial Force (lbf) 134243 122997 78805 78777 62571 Conditions - 20" Axial Force (lbf) 213040 202158 159369 143887	123,02 158,98 0,03 24,96 122,96 123,02 158,98 Initial C 0,03 24,96 123,02 158,98	MD (m) 1 1 1 1 1 5ummary - 1 MD	String Section sing Load String

asing Load Summa		sign, v1	Curta es Caral	-	Date/Time: IV	larch 01, 2018	02:57:10 PM P	'age: 6 of
			Surface Casing					
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	
Section	(m) 0.03	(lbf) 544771	(°/100ft) 0.33	(ft-lbf) 101.7	(lbf/ft) 0,1	(°F) 50,00	Internal 2400,05	External (
	24,96	533978	0,33	113,9	0,1	46,92	2400,05	42
1	122,96	491712	0,36	113,9	0,1	46,92	2442,56	209
1	122,96	491712	0,46	0.0	0,2	35,00	2609,58	208
	158,98	473212	0.00	0,0	0,0	35,00	2670,93	208
	158,98	473212	0,00	0,0	0,0	37,40	2671,04	260
	304,80	448693	0,00	0,0	0,0	47,12	2919,48	467
	572,96	383460	0,00	0,0	0,0	65,00	3376,53	848
			0,00	0,0	0,0	00,00	3370,03	044
Additional Pickup to F	Prevent Bucklin	ıg = 176516 lbf						
asing Load Summa								
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	0,03	103716	0,00	0,0	0,0	50,00	0,00	(
1	24,96	92834	0,00	0,0	0,0	50,00	0,00	42
1	122,96	50072	0,00	0,0	0,0	35,00	0,00	20
1	123,02	47839	0,00	0,0	0,0	35,00	0,00	20
1	158,98	31567	0,00	0,0	0,0	37,40	10,96	270
1	159,04	31569	0,00	0,0	0,0	37,40	11,07	27
1	304,80	6956	0,00	0,0	0,0	47,11	305,76	51
1	572,96	-57388	0,00	0,0	0,0	64,97	854,21	97
i <u>sing Load Summa</u> String Section	MD (m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)	Friction Force (lbf/ft)	Temperature (°F)	Pressure ( Internal	psi) External
1	0.03	874306	0.00	0,0	0,0	50.00	2900.04	External
1	24,96	863424	0.00	0,0	0,0	46,92	2935,44	4:
1	122,96	820662	0,00	0,0	0,0	35,00	3074,58	20
1	123,02	820636	0,00	0,0	0,0	35,00	3074,67	20
1	158,98	804953	0,00	0,0	0,0	37,40	3129,80	30
1	159,04	804927	0,00	0,0	0,0	37,40	3129,89	30
1	304,80	741320	0,00	0,0	0,0	47,12	3353,49	699
1	572,96	624304	0,00	0,0	0,0	65,00	3790,39	133
				Torque	Friction Force	Temperature	Pressure (	psi)
ising Load Summa String Section	MD	Axial Force	Dogleg	Torque (ft-Ibf)	Friction Force (lbf/ft)	Temperature	Pressure (	psi) External
String				Torque (ft-lbf) 0.0		Temperature (°F) 50,00		External
String	MD (m) 0,03	Axial Force (lbf) 232259	Dogleg (°/100ft)	(ft-lbf) 0,0	(lbf/ft) 0,0	(°F) 50,00	Internal 0,05	External
String	MD (m) 0,03 24,96	Axial Force (lbf) 232259 221377	Dogleg (°/100ft) 0,00 0,00	(ft-lbf) 0,0 0,0	(lbf/ft) 0,0 0,0	(°F) 50,00 46,92	Internal 0,05 42,56	Éxternal 4
String	MD (m) 0,03 24,96 122,96	Axial Force (lbf) 232259 221377 178615	Dogleg (°/100ft) 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0	(°F) 50,00 46,92 35,00	Internal 0,05 42,56 209,58	External 4 20
String	MD (m) 24,96 122,96 123,02	Axial Force (lbf) 232259 221377 178615 178588	Dogleg (°/100ft) 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 35,00	Internal 0,05 42,56 209,58 209,69	External 4 20 20
String	MD (m) 24,96 122,96 123,02 158,98	Axial Force (lbf) 232259 221377 178615 178588 162906	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 35,00 37,40	Internal 0,05 42,56 209,58 209,69 270,93	External 4 20 20 27
String	MD (m) 24,96 122,96 123,02	Axial Force (lbf) 232259 221377 178615 178588	Dogleg (°/100ft) 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 35,00 37,40 37,40	Internal 0,05 42,56 209,58 209,69	External 4 20 20 27 27 27
String	MD (m) 24,96 122,96 123,02 158,98 159,04	Axial Force (lbf) 232259 221377 178615 178588 162906 162879	Dogleg (°/100ft) 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 35,00 37,40	Internal 0,05 42,56 209,58 209,69 270,93 271,04	External 4 20 20 27 27 51
String Section 1 1 1 1 1 1 1 1 1	MD (m) 24,96 122,96 123,02 158,98 159,04 304,80 572,96	Axial Force (lb) 232259 221377 178615 178588 162806 162879 99272 -17744	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 35,00 37,40 37,40 47,12	Internal 0,05 42,56 209,58 209,69 270,93 271,04 519,48	External 4 20 20 27 27 51
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	MD (m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 572,96	Axial Force (b) 232259 221377 178615 178589 162906 162879 99272 -17744	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 36,00 37,40 47,12 65,00	Internal 0.05 42,56 209,58 270,93 271,04 519,48 976,53	External 4 20: 20: 27: 27: 51: 97:
String Section 1 1 1 1 1 1 1 1 1	MD (m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 ary - Runnin MD (m)	Axial Force (lb) 232259 221377 178615 178588 162809 162879 99272 -17744 -17744 ugHole #1 - 20'' Axial Force (lbf)	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 37,40 47,12 65,00 Temperature (°F)	Internal 0.05 42,56 209,58 209,69 270,93 271,04 519,48 976,53 Pressure ( Internal	External 4 20 20 27 27 51: 97 97 51: 97
String           1	MD (m) 0.03 24.96 122.96 123.02 158.98 159.04 304.80 572.96 ary - Runnin MD (m) 0.03	Axial Force (lbf) 232259 221377 178615 178588 162906 162879 99272 -17744 - - - - - - - - - - - - - - - - - -	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	(°F) 50,00 46,92 35,00 35,00 37,40 47,12 65,00 Temperature (°F) 50,00	Internal 0.05 42,56 209,58 270,93 271,04 519,48 976,53 Pressure ( Internal 0,05	External 4 20 20 27 27 51: 97 51: 97 97
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 5 1 5 1 1 1 1	MD (m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 MD (m) 0,03 24,96	Axial Force (lb) 232259 221377 178615 178585 162879 99272 -17744 <u>1940le #1 - 20''</u> Axial Force (lb) 316596 307356	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	(°F) 50,00 46,92 35,00 37,40 37,40 47,12 65,00 Temperature (°F) 50,00 46,92	Internal 0,05 42,56 209,68 270,93 271,04 519,48 976,53 Pressure ( Internal 0,05 42,56	External 4: 200 200 277 511 970 970 512 970 512 970 512 970 512 970 512 970 512 970 512 970 512 970 512 970 512 970 512 970 512 512 512 512 512 512 512 512 512 512
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 5 1 5 1 1 1 1	MD (m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 ary - Runnin MD (m) 0,03 24,96 122,96	Axial Force (lb) 232259 221377 178615 178588 162906 162879 99272 -17744 add Force (lb) 316596 307356 271046	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 (ft-lbf) 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	(°F) 50,00 46,92 35,00 37,40 47,12 65,00 Temperature (°F) 50,00 46,92 35,00	Internal 0.05 42,56 209,58 270,93 271,04 519,48 976,53 Pressure ( Internal 0.05 42,56 209,58	Éxternal 4 200 200 277 27 511 970 511 970 511 970 511 970 511 970 27 27 27 27 27 27 27 27 20 20 20 20 20 20 20 20 20 20 20 20 20
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 5 1 5 1 1 1 1	MD (m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 ary - Runnin MD (m) 0,03 24,96 122,96 122,96	Axial Force (lb) 232259 221377 178615 178598 162879 99272 -17744 http://www.axial.force (lbf) 316596 307366 271024	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 37,40 37,40 37,40 47,12 65,00 Temperature (°F) 50,00 46,92 35,00	Internal 0.05 42,56 209,58 270,93 271,04 519,48 976,53 Pressure ( Internal 0.05 42,56 209,68	External 4 200 200 277 27 51: 97/ 97/ 97/ 51: 97/ 97/ 4 200 200 200
String           1	MD (m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 ary - Runnin MD (m) 0,03 24,96 122,96 122,96 123,02 158,98	Axial Force (lb) 232259 221377 178615 178588 162879 99272 -17744 asial Force (lb) 316596 316596 271024 271024 257708	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 37,40 47,12 65,00 Temperature (°F) 50,00 46,92 35,00 35,00 35,00	Internal 0.05 42,56 209,58 270,93 271,04 519,48 976,53 976,54 976,55	External (4 200 200 200 27 511 970 970 970 (4 200 200 200 200 200
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	MD (m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 ary - Runnin MD (m) 0,03 24,96 122,96 122,96	Axial Force (lb) 232259 221377 178615 178598 162879 99272 -17744 http://www.axial.force (lbf) 316596 307366 271024	Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	(ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 37,40 37,40 37,40 47,12 65,00 Temperature (°F) 50,00 46,92 35,00	Internal 0.05 42,56 209,58 270,93 271,04 519,48 976,53 Pressure ( Internal 0.05 42,56 209,68	External ( 205 205 277 271 515 976

### 244

Conventional Well Design

		ation Well Des	<u> </u>	2/0!! Lute was!! -	ta Casina	Date/Time: N	larch 01, 2018	02:57:10 PIVE	-age: / of
ası	ng Load Sumi String	MD MD	Axial Force	3/8" Intermedia Dogleg	te Casing Torque	Friction Force	Temperature	Duranum	(
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Pressure Internal	(psi) External
	1	0,03	341302	0,00	0,0	0,0	50,00	500,06	External (
	1	24,96	335411	0,00	0,0	0,0	46,92	551,07	5.
	1	122,99	312254	0,00	0,0	0,0	35,00	751,56	25
	i	304,80	269309	0.00	0.0	0,0	47,12	1123,37	623
	i	572,96	205962	0,00	0,0	0,0	65,00	1671,83	117
	i	573,02	205948	0,00	0,0	0,0	65,00	1671,96	117
	1	609,60	197309	0.00	0,0	0,0	67,44	1746,75	124
	1	914,40	125309	0.00	0,0	0,0	87,66	2370,13	187
	1	1219,20	53309	0,00	0,0	0,0	107,98	2993,51	249
	1	1299,97	34230	0,00	0,0	0,0	113,36	3158,70	265
	1	1300,03	34216	0.00	0.0	0,0	113,37	3158,82	265
	1	1524,00	-18691	0,00	0,0	0,0	128,33	3616,88	321
	1	1527,96	-19635	0,00	0,0	0,0	128,60	3625,00	322
asi				3/8" Intermedia					
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
	Section	(m) 0.03	(lbf)	(°/100ft) 0.00	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
			616181 610290		0,0 0,0	0,0	50,00	4300,06	-
-	1	24,96		0,00		0,0	46,92	4351,07	5
		122,99 304,80	587133 544188	0,00	0,0 0,0	0,0	35,00	4551,56 4923,38	25 62
	1	533,19	490236	0,00	0,0	0,0	47,12 62,35	4923,38 5390,50	62 109
	1	572,96	490236 480842	0,01	0,2	0,0	65,00	5390,50	109
		572,96	480842	0,07		0,0	65,00		
		609,60	472194	0,05	1,1 2,4	0,0	67,44	5471,96 5546,75	117 124
	1	762,00	472194	0,05	2,4	0,0	77,60	5858,44	155
		914,40	400547	0,25	22.9	0,0	87,66	6170,13	187
		1066,80	365135	0,41	37.2	0,1	97,82	6481,81	218
		1219,20	330152	0,73	53,5	0,1	107,98	6793,50	218
	1	1299,97	311819	0,73	62,7	0,2	113,36	6958,70	245
		1300,03	307210	0.00	0.0	0.0	113,37	6958,82	265
-		1524,00	274640	0.00	0,0	0,0	128,33	7416,88	203
	1	1527,96	274123	0,00	0.0	0,0	128,60	7425,00	298
	1	( )		0,00	0,0	0,0	128,00	7423,00	230
Ad	Iditional Pickup t	o Prevent Buckli	ng = 150404 lbf						
asi	ng Load Sum	mary - LostRe	turnsWithMudE	Drop #1 - 13 3/8	3" Intermediat	e Casing			
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	Éxternal
	1	0,03	247619	0,00	0,0	0,0	50,00	0,00	
	1	24,96	241728	0,00	0,0	0,0	50,00	0,00	5
	1	122,99	218572	0,00	0,0	0,0	35,00	0,00	25
	1	304,80	175627	0,00	0,0	0,0	47,11	0,00	62
	1	572,96	112280	0,00	0,0	0,0	64,97	87,21	117
	1	573,02	112265	0,00	0,0	0,0	64,97	87,34	117
	1	609,60	103627	0,00	0,0	0,0	67,40	167,53	124
	1	914,40	31627	0,00	0,0	0,0	87,70	892,39	187
	1	1219,20	-40373	0,00	0,0	0,0	108,00	1619,67	249
	1	1299,97	-59453	0,00	0,0	0,0	113,37	1812,39	265
	1	1300,03	-40184	0,00	0,0	0,0	113,38	1812,53	239
	i	1524,00 1527,96	-80241 -80873	0,00 0.00	0,0 0.0	0,0 0,0	128,29 128,56	2346,94 2356,41	286 287

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	640634	0,00	0,0	0,0	50,00	3000,06	0,0
	1	24,96	634743	0,00	0,0	0,0	46,92	3051,07	51,0
	1	122,99	611586	0,00	0,0	0,0	35,00	3251,56	251,5
	1	304,80	568641	0,00	0,0	0,0	47,12	3623,37	623,3
	1	572,96	505294	0,00	0,0	0,0	65,00	4171,83	1171,8
	1	573,02	505280	0,00	0,0	0,0	65,00	4171,96	1171,9
	1	609,60	496641	0,00	0,0	0,0	67,44	4246,75	1246,
	1	914,40	424641	0,00	0,0	0,0	87,66	4870,13	1870,
	1	1219,20	352641	0,00	0,0	0,0	107,98	5493,51	2493,
0	1	1299,97	333562	0,00	0,0	0,0	113,36	5658,70	2658,
1	1	1300,03	333547	0,00	0,0	0,0	113,37	5658,82	2658,
2	1	1524,00	280641	0,00	0,0	0,0	128,33	6116,88	3218,
3	1	1527,96	279696	0.00	0,0	0.0	128.60	6125.00	3228,

e: Vertical Explor asing Load Sumr	mary - OverPu	ıll #1 - 13 3/8" I	ntermediate Ca	ising				
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	0,03	346021	0,00	0,0	0,0	50,00	0,06	0,
1	24,96 122,99	340130 316973	0,00 0,00	0,0	0,0	46,92 35,00	51,07 251,56	51. 251.
	304,80	274028	0,00	0,0	0,0	47,12	623,38	623
1	572,96	210681	0,00	0,0	0,0	65,00	1171,84	1171
1	573,02	210667	0,00	0,0	0,0	65,00	1171,96	1171
i	609,60	202028	0,00	0,0	0,0	67,44	1246,75	1246
1	914,40	130028	0,00	0,0	0.0	87,66	1870,13	1870
1	1219,20	58028	0,00	0,0	0,0	107,98	2493,51	2493
1	1299,97	38949	0,00	0,0	0,0	113,36	2658,70	2658
1	1300,03	38935	0,00	0,0	0,0	113,37	2658,82	2658
1	1524,00	-13972	0,00	0,0	0,0	128,33	3116,88	3116
1	1527,96	-14916	0,00	0,0	0,0	128,60	3125,00	3125
asing Load Sumr	mary - Runnin	aHole #1 - 13.3	3/8" Intermediat	e Casina				
String	MD MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	0,03	352111	0,00	0,0	0,0	50,00	0,06	C
1	24,96	347280	0,00	0,0	0,0	46,92	51,07	51
1	122,99	328287	0,00	0,0	0,0	35,00	251,56	251
1	304,80	293063	0,00	0,0	0,0	47,12	623,38	62
1	572,96	241106	0,00	0,0	0,0	65,00	1171,84	117
1	573,02	241095	0,00	0,0	0,0	65,00	1171,96	117
1	609,60	234009	0,00	0,0	0,0	67,44	1246,75	1246
1	914,40	174955	0,00	0,0	0,0	87,66	1870,13	1870
1	1219,20	115901 100253	0,00 0,00	0,0 0,0	0,0	107,98	2493,51 2658,70	2493 2658
1	1299,97		0,00	0,0	0,0	113,36		
	1300,03 1524,00	100241 56847	0,00	0,0	0,0 0,0	113,37 128,33	2658,82 3116,88	2658 3116
	1527,96	56079	0,00	0,0	0,0	128,55	3125,00	3125
	mary - OilKick	#1 - 13 3/8" Ini	termediate Cas	ing				
Casing Load Summ String Section	mary - OilKick MD	#1 - 13 3/8" In Axial Force	termediate Cas Dogleg (°/100ft)		Friction Force	Temperature	Pressure	(psi)
	mary - OilKick MD (m) 0,03	#1 - 13 3/8" In Axial Force (lbf) 406511	termediate Cas Dogleg (°/100ft) 0,00	ing Torque (ft-lbf) 0,0	Friction Force (lbf/ft) 0,0	(°F) 50,00	Pressure Internal 2148,52	(psi) External
String Section 1	mary - OilKick MD (m) 0,03 24,96	#1 - 13 3/8" In Axial Force (lbf) 406511 400620	termediate Cas Dogleg (°/100ft) 0,00 0,00	ing Torque (ft-lbf) 0,0 0,0	Friction Force (lbf/tt) 0,0 0,0	(°F) 50,00 46,92	Pressure Internal 2148,52 2171,10	(psi) External 5
String	mary - OilKick MD (m) 0,03 24,96 122,99	#1 - 13 3/8" Ini Axial Force (lbf) 406511 400620 377463	termediate Cas Dogleg (°/100ft) 0,00 0,00 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0	Friction Force (lbf/tt) 0,0 0,0 0,0	(°F) 50,00 46,92 35,00	Pressure Internal 2148,52 2171,10 2259,87	(psi) External 5 25
String Section 1	mary - OilKick MD (m) 0,03 24,96 122,99 304,80	#1 - 13 3/8" In Axial Force (bf) 406511 400620 377463 334518	termediate Cas Dogleg (°/100ft) 0,00 0,00 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0	Friction Force (lbf/t) 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12	Pressure Internal 2148,52 2171,10 2259,87 2424,49	(psi) External 5 25 62:
String Section 1	mary - OilKick MD (m) 24,96 122,99 304,80 572,96	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377463 334518 271171	termediate Cas Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/tt) 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12 65,00	Pressure 2148,52 2171,10 2259,87 2424,49 2667,32	(psi) External ( 25 622 622 117
String Section 1	Mary - OilKick MD (m) 24,96 122,99 304,80 572,96 573,02	#1 - 13 3/8" In Axial Force (bb) 406511 400620 377463 334518 271171 271157	termediate Cas Dogleg (°/100ft) (°/100ft) 0,00 0,00 0,00 0,00 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12 65,00 65,00	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,33	(psi) External 5 25 62: 117 117
String Section 1	mary - OilKick MD (m) 122,99 304,80 572,96 573,02 609,60	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377463 334518 271171 271157 262518	termediate Cas Dogleg (*/100ft) 0.00 0.00 0.00 0.00 0.00 0.00 0.00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,37 2700,49	(psi) External 5 251 622 1171 1177 1246
String Section 1	Mary - OilKick MD (m) 24,96 122,99 304,80 572,96 573,02 609,60 914,40	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377453 334518 271157 262518 190518	termediate Cas Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 65,00 67,44 87,66	Pressure Internal 2149,52 2171,10 2259,87 2424,49 2667,32 2667,32 2667,32 2700,49 2976,49	r (psi) External 251 623 1171 1171 1244 1870
String Section 1	Mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377463 334518 271171 271157 262518 190518 118518	termediate Cas Dogleg (*/100ft) (*/00ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ħ) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 65,00 67,44 87,66 107,98	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,37 2700,49 2976,49 3252,49	(psi) External 5 25; 62; 117; 117; 124; 187; 249;
String Section 1	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97	#1 - 13 3/8" Ini Axial Force (lbf) 406511 406511 400520 334518 271171 271157 262518 190518 118518 99439	termediate Cas Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 65,00 67,44 87,66 107,98 113,36	Pressure internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2700,49 2976,49 3252,49 3252,63	(psi) External 5 62: 62: 117: 117: 117: 124: 187: 249: 249: 265:
String Section 1 1	mary - OilKick MD (m) 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03	#1 - 13 3/8" In Axial Force (bb) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204	termediate Cas Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	ing Torque (ft-lbf) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 67,04 87,66 107,98 113,36 113,37	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,37 2700,49 2976,49 3252,49 3325,68 3325,68	(psi) External 5 62 62 117 117 124 187 249 265 265
String Section 1 1	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97	#1 - 13 3/8" Ini Axial Force (lbf) 406511 406511 400520 334518 271171 271157 262518 190518 118518 99439	termediate Cas Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 65,00 67,44 87,66 107,98 113,36	Pressure internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2700,49 2976,49 3252,49 3252,63	(psi) External 5 62 62 62 117 117 124 187 249 265 265 265 297
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1	Mary - OilKick MD (m) 122,99 304,80 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377453 334518 271157 262518 190518 118518 99439 46204 -4699 -5542	termediate Cas Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 67,41 87,66 107,98 113,36 113,37 128,33	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2667,32 2700,49 2976,49 3252,49 3325,68 3325,68 3528,49	(psi) External ( 5 25 62 62 62 62 62 62 62 62 62 117 124 187 265 265 265 265 265 297
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String Section 1	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m)	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204 -4699 -5542	termediate Cas Dogleg (*/100t) 0,00 0,	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,37 128,33 128,60 Temperature (°F)	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2667,32 2700,49 2976,49 3252,49 3325,68 3325,68 3528,49	(psi) External 5 622 117 117 1124 187 2856 2856 2856 2856 2976 2980 2980 (psi) External
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String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	mary - OilKick MD (m) 24,96 122,99 304,80 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 24,96	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204 -4699 -5542 Conditions - 9 5/ Axial Force (lbf)	termediate Cas Dogleg (*/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 67,44 87,66 107,98 113,36 113,37 128,33 128,60 Temperature (°F) 50,00 46,92	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 276,49 3325,63 3325,68 3528,49 3532,08 Pressure Internal	(psi) External 5 625 622 117 117 1244 2656 2876 2985 2985 (psi) External
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String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 3 5 5 5 tring	mary - OilKick (m) (m) 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1527,96 mary - Initial C MD (m) 0.03 24,96 122,99 304,80	#1 - 13 3/8" Im Axial Force (lb) 406511 406511 406520 377483 334518 271171 271157 262518 190518 118518 118518 118518 99439 46204 -4689 -5542 -5542 200ditions - 9 5, Axial Force (lbf) 401312 396934 379728 347817	termediate Cas Dogleg (*/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 67,44 87,66 107,98 113,36 113,37 128,60 Temperature (°F) 50,00 46,92 35,00 46,92 35,00	Pressure Internal 2148,52 2171,10 2258,87 2424,49 2667,32 2667,32 2700,49 2976,49 3325,63 3325,63 3325,63 3325,63 3526,89 3532,08 Pressure Internal 500,07 559,58 793,48 1227,27	(psi) External ( 5 25; 62; 117; 117; 1244 187; 249; 265; 298; (psi) External ( 5; 29; 29; 29; 29; 29; 29; 29; 29
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 3 5 5 5 tring	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 24,96 122,99 304,80 609,60	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204 -4699 -5542 200ditions - 9 5, Axial Force (lbf) 401312 366934 379728 347817 284317	termediate Cas Dogleg (*/100ft) 0,00 0	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,37 128,33 128,60 Temperature (°F) 50,00 46,92 35,00 47,12 67,44	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,37 2700,49 2976,49 3325,68 3322,68 3528,49 3532,68 3528,49 3532,08 Pressure Internal Internal 500,07 569,58 793,48 1227,27 1954,54	(psi) External ( 5 25 622 117 117 1244 2656 2656 2656 2656 2656 2657 2970 2980 (psi) External ( 5 297 2970 2980 2980 2980 2980 2980 2980 2980 2980 2980 2980 2980 2980 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2980 2970 2970 2970 2980 2970 20
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 3 5 5 5 tring	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 24,96 122,99 304,80 609,60 914,40	#1 - 13 3/8" In: Axial Force (lbf) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204 -4699 -5542 Conditions - 9 5, Axial Force (lbf) 401312 396334 379728 347817 294317 204817	termediate Cas Dogleg (*/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,36 113,37 128,33 128,60 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2700,49 2976,49 3325,63 3325,63 3325,63 3325,63 3526,89 3532,08 Pressure Internal 500,07 559,58 793,48 1227,27 1954,54 2681,82	(psi) External 5 625 625 625 117 117 1244 117 2499 2666 2967 2985 (psi) External 5 5 298 722 145 218
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String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	mary - OilKick MD (10,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 129,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 122,99	#1 - 13 3/8" In           Axial Force (lbf)           4066111           400620           377463           334518           271171           271177           262518           190518           118518           99439           -6204           -4699           -5542           Conditions - 9 5           Axial Force (lbf)           401312           396934           379728           347817           187517           187517           133817	termediate Cas Dogleg (*/100th) 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,37 128,33 128,60 Temperature (°F) 50,00 46,92 35,00 46,92 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 46,92 50,00 5	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2976,49 3325,68 3522,49 3325,68 3528,49 3532,08 Pressure Internal 500,07 559,58 1227,27 1954,54 1227,27 1954,54 1227,27 1954,54 2681,82 3409,08 4136,36	(psi) External 5 62 62 117 117 124 265 287 298 (psi) External 5 297 298 72 1455 218 2218 2218 230 363
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1527,96 mary - Initial C MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 1524,00 1524,00 1524,00 1527,96	#1 - 13 3/8" Im Axial Force (lb) 406511 406511 40651 377453 334518 271171 271157 262518 109518 118518 99439 46204 -4689 -5542 -5542 Conditions - 9 5, Axial Force (lbf) 401312 396934 379728 347817 204317 139817 139817 139817	termediate Cas Dogleg (*/100ft) 0,000 0,00	ing Torque (ft-lbf) (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,37 1128,33 128,60 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,30 128,50	Pressure Internal 2148,52 2171,10 2258,87 2424,49 2667,32 2667,32 2700,49 2976,49 3325,63 3325,63 3325,63 3325,63 3526,89 3552,08 Pressure Internal 500,07 559,58 793,48 1227,27 1954,54 2681,82 3409,08 4136,36 4145,83	(psi) External 5 25 62 117 1244 187 249 265 298 (psi) External 5 298 (psi) External 5 298 298 (psi) 298 298 298 298 298 298 298 298
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	mary - OilKick MD (m) 122,99 304,80 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 121,92 1524,00 1527,96	#1 - 13 3/8" In           Axial Force (lbf)           406511           400620           377463           334518           234518           2117171           2717157           262518           190518           99439           -6204           -4699           -5542           Conditions - 9 5.           Axial Force (lbf)           401312           396934           379728           347817           240817           133115	termediate Cas Dogleg (*/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 66,00 67,44 87,66 107,98 113,37 128,33 128,60 Temperature (°F) (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,30 128,30 128,30 128,57	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2976,49 3325,68 3325,68 3325,68 3528,49 3532,08 Pressure Internal 500,07 559,58 793,48 1227,27 1954,54 2681,82 3409,08 4136,36 4145,88	(psi) External 5 25 622 117 117 1244 265 265 265 287 297 297 297 297 297 297 297 29
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 577,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 (1524,00 1527,96 1528,02 1528,80	#1 - 13 3/8" In Axial Force (lbf) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204 -4689 -5542 Conditions - 9 5, Axial Force (lbf) 401312 396934 379728 347817 294317 204317 187317 133817 133115 133115 133115	termediate Cas Dogleg ('/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,37 128,33 128,60 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,50 128,50 128,56 128,57 148,62 128,56 128,57 148,56 128,57 148,56 128,57 148,57 1	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2667,32 2700,49 2976,49 3252,49 3325,68 3325,68 3522,68 3522,68 3522,69 3532,08 Pressure Internal 500,07 559,58 793,48 1227,27 1954,54 2681,82 3409,08 4136,36 4145,83 4145,85 4182,63 28 28 28 28 28 28 28 28 28 28	(psi) External 5 625 622 117 1244 187 2469 2865 297 2985 (psi) External 5 287 72 145 218 290 36444 3644 3644 36444 3644 3644 3644 36444 3644
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 0,03 24,96 122,99 304,80 609,60 914,40 122,99 304,80 609,60 914,40 1527,96	#1 - 13 3/8" In           Axial Force (lbf)           406511           400620           377463           334518           271171           271172           118518           99439           46204           -5542           Conditions - 9 5.           Axial Force (lbf)           401312           366934           379728           347817           240817           133115           133115           80317	termediate Cas Dogleg (*/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(*F) 50,00 46,92 35,00 47,12 65,00 67,44 87,66 107,98 113,36 113,37 128,33 128,60 Temperature (*F) 50,00 46,92 35,00 47,42 67,44 87,66 107,98 128,56 128,56 128,57 148,52 168,94	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 276,49 3325,63 3325,68 3528,49 3532,68 3528,49 3532,08 Pressure Internal 550,07 559,58 793,48 1227,27 1954,54 2681,82 3409,08 4136,36 4145,83 4145,83	.(psi) External 5 622 117 1124 187 2489 265 265 265 265 265 265 265 287 297 298 (psi) External 5 298 72 145 218 298 364 364 364 364 364 364 364 364
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 3 5 5 5 tring	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) (m) 0,03 24,96 609,60 914,40 1219,20 1522,99 304,80 609,60 914,40 1219,20 1522,98 1524,00 1527,96	#1 - 13 3/8" In Axial Force (lb) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204 -4699 -5542 Conditions - 9 5 Axial Force (lb) 401312 396934 347817 240817 187317 2347817 133115 133115 133115	termediate Cas Dogleg ('/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,37 128,33 128,60 Temperature (°F) 50,00 46,92 35,00 46,92 50,00 47,12 67,44 87,66 107,98 103,85 1	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,37 2700,49 2976,49 3325,68 3528,49 3532,08 Pressure Internal 500,07 559,58 723,48 1227,27 1954,54 2681,82 3409,08 4136,36 4145,98 4145,88 41	(psi) External 5 622 622 622 72 117 1244 187 2464 2865 2987 2967 2977 2977 2977 2977 2977 2977 2977 2977 2977 2977 2977 20777 2077 2077 2077 2077 2077 2077 2077 2077 2077 2077
String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 577,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 122,99 304,80 609,60 915,200 1528,00 152	#1 - 13 3/8" Im Axial Force (lb) 406511 400620 377483 334518 271171 271157 262518 100518 118518 99439 46204 -4689 -5542 -554 -5542	termediate Cas Dogleg (*/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(*F) 50,00 46,92 35,00 47,42 65,00 67,44 87,66 113,36 113,37 128,33 128,60	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,32 2667,32 2700,49 2976,49 3325,63 3325,63 3325,63 3526,89 3532,08 Pressure Internal 500,07 559,58 793,48 1227,27 1954,54 2681,82 3409,08 4136,36 41345,83 4145,83 4	(psi) External 5 265 622 1117 1249 2493 2493 2493 2493 2493 2983 2977 2983 (psi) External 5 297 298 298 297 298 298 297 298 298 297 297 298 297 297 297 297 297 297 297 297
String Section 1 1 1 1 1 1 1 1 1 1 3 1 3 5 1 1 1 1 1 1	mary - OilKick MD (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1524,00 1527,96 mary - Initial C MD (m) (m) 0,03 24,96 609,60 914,40 1219,20 1522,99 304,80 609,60 914,40 1219,20 1522,98 1524,00 1527,96	#1 - 13 3/8" In Axial Force (lb) 406511 400620 377463 334518 271171 271157 262518 190518 118518 99439 46204 -4699 -5542 Conditions - 9 5 Axial Force (lb) 401312 396934 347817 240817 187317 2347817 133115 133115 133115	termediate Cas Dogleg ('/100ft) 0,000 0,00	ing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	(°F) 50,00 46,92 35,00 47,12 65,00 65,00 67,44 87,66 107,98 113,37 128,33 128,60 Temperature (°F) 50,00 46,92 35,00 46,92 50,00 47,12 67,44 87,66 107,98 103,85 103,85 103,85 103,95	Pressure Internal 2148,52 2171,10 2259,87 2424,49 2667,32 2667,37 2700,49 2976,49 3325,68 3528,49 3532,08 Pressure Internal 500,07 559,58 723,48 1227,27 1954,54 2681,82 3409,08 4136,36 4145,98 4145,88 41	(psi) External 5 625 622 117 117 1244 187 2469 265 297 298 (psi) External 5 298 72 1454 218 249 72 1454 218 249 363 364 364 364 364 364 364 364

	oloration Well Des Immary - Displa	<u> </u>	5/8" Intermedia	to Cocinc		1arch 01, 2018		
String Load Su	MD	Axial Force	Dogleg	Torque	Friction Force	T		
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	Temperature	Pressure	External
Section	1 0,03	519268	0.00	0.0	(101/10)	(°F) 50,00	6352,76	External
	1 24,96	514890	0,00	0,0	0,0	50,00	6360,94	5
	1 122,99	497684	0,00	0,0	0,0	35,00	6393,10	29
			0,00		0,0			
	1 304,80	465773	0,00	0,0		47,11	6452,75	72
	1 609,60	412273		0,0	0,0	67,40	6552,75	145
	1 914,40	358773	0,00	0,0	0,0	87,70	6652,75	218
	1 1219,20	305273	0,00	0,0	0,0	108,00	6752,75	290
	1 1524,00	251773	0,00	0,0	0,0	128,29	6852,75	363
	1 1527,96	251071	0,00	0,0	0,0	128,55	6854,05	364
	1 1528,02	251071	0,00	0,0	0,0	128,56	6854,07	364
	1 1828,80	198273	0,00	0,0	0,0	148,59	6952,75	436
	1 2133,60	144773	0,00	0,0	0,0	168,89	7052,75	509
	1 2349,98	106790	0,00	0,0	0,0	183,29	7123,74	560
	1 2350,04	73850	0,00	0,0	0,0	183,30	7123,76	446
	1 2438,40	52643	0,00	0,0	0,0	189,18	7152,75	463
	1 2690,96	-10596	0,00	0,0	0,0	206,00	7235,61	528
	ımmary - Pressu							
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1 0,03	597418	0,00	0,0	0,0	50,00	6200,07	
	1 24,96	593040	0,00	0,0	0,0	46,92	6259,58	5
	1 122,99	575834	0,00	0,0	0,0	35,00	6493,48	29
	1 304,80	543923	0,00	0,0	0,0	47,12	6927,27	72
	1 609,60	490423	0,00	0,0	0,0	67,44	7654,54	145
	1 914,40	436923	0,00	0,0	0,0	87,66	8381,82	218
	1 1219,20	383423	0,00	0,0	0,0	107,98	9109,09	290
	1 1524,00	329923	0,00	0,0	0,0	128,30	9836,36	363
	1 1527,96	329221	0,00	0,0	0,0	128,56	9845,83	364
	1 1528,02	329221	0.00	0.0	0.0	128,57	9845,98	364
	1 1828,80	276423	0.10	0.8	0.0	148,62	10563,63	436
	1 1981,20	249673	0,30	4,1	0,0	158,78	10927,27	472
	1 2133,60	222923	0,49	8,8	0,0	168,94	11290,91	509
	1 2286,00	196173	0,69	14.6	0.0	179,10	11654,55	545
	1 2349,98	184940	0,77	17.4	0.0	183,36	11807,18	560
	1 2350,04	234401	0.00	0.0	0.0	183,37	11807,32	446
	1 2438,40	219686	0,00	0,0	0,0	189,16	12018,18	463
	1 2690,96	174280	0,00	0,0	0,0	206,00	12620,83	528
	2030,30	174200	0,00	0,0	0,0	200,00	12020,03	526
Additional Picku	up to Prevent Buckli	ng = 83048 lbf	I		I	I		
asing Load Su	Immary - LostRe	eturnsWithMudE	) Drop #1 - 95/8"	Intermediate	Casing			
String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressur	
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1 0,03	343559	0,00	0,0	0,0	50,00	0,00	_
	1 24,96	339182	0,00	0,0	0,0	50,00	0,00	5
	1 122,99	321975	0,00	0,0	0,0	35,00	0,00	29
	1 304,80	290065	0,00	0,0	0,0	47,11	0,00	72
	1 609,60	236565	0,00	0,0	0,0	67,40	5,64	145
	1 914,40	183065	0,00	0,0	0,0	87,70	739,52	218
	1 1219,20	129565	0,00	0,0	0,0	108,00	1518,74	290
	1 1524,00	76065	0,00	0,0	0,0	128,29	2297,96	363
	1 1527,96	75363	0,00	0,0	0,0	128,55	2308,11	364
	1 1528,02	75363	0,00	0,0	0,0	128,56	2308,26	364
	1 1828,80	22565	0,00	0,0	0,0	148,59	3077,18	436
		-30935	0,00	0,0	0,0	168,89	3856,40	509
	1 2133.60						4409,55	560
	1 2133,60 1 2349,98		0,00	0.0	0.0	183.79	4409 55	
	1 2349,98	-68919	0,00 0.00	0,0 0.0	0,0 0.0	183,29 183,30		
	1 2349,98 1 2350,04	-68919 -19318		0,0	0,0 0,0 0,0	183,30	4409,70	446 463
	1 2349,98	-68919	0,00		0,0			44

asing Load Sum	mary - Green		5/8" Intermediate					
String Section	MD (m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)	Friction Force (lbf/ft)	Temperature (°F)	Pressure Internal	(psi) External
Section 1	0,03	756034	0.00	(10-101)	(101/11)	50,00	6700,07	External
1	24,96 122,99	751657	0,00	0,0	0,0	46,92	6759,58	59
1	122,99	734450	0,00	0,0	0,0	35,00	6993,48	293
1	304,80	702539	0,00	0,0	0,0	47,12	7427,27	727
1	609,60	649039	0,00	0,0	0,0	67,44	8154,54	1454
1	914,40	595539	0,00	0,0	0,0	87,66	8881,82	2181
1	1219,20	542039	0,00	0,0	0,0	107,98	9609,08	2909
1	1524,00 1527,96	488539 487837	0,00	0,0	0,0 0,0	128,30 128,56	10336,36 10345,83	3636 3645
1	1528,02	487837	0,00	0,0	0,0	128,50	10345,98	3645
1	1828,80	435039	0,00	0,0	0,0	148,62	11063,63	4363
i	2133,60	381539	0,00	0,0	0,0	168,94	11790,90	5090
1	2349,98	343556	0,00	0,0	0,0	183,36	12307,18	5607
1	2350,04	343556	0,00	0,0	0,0	183,37	12307,32	5607
1	2438,40	328039	0,00	0,0	0,0	189,16	12518,18	5795
1	2690,96	283702	0,00	0,0	0,0	206,00	13120,83	6418
<u>asing Load Sum</u> String	mary - OverPi MD	ull #1 - 9 5/8" Ir Axial Force	termediate Cas	ing Torque	Friction Force	Temperature	Pressure	(psi)
Section	(m)	(lbf)	Dogleg (°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	0.03	422500	0,00	0,0	0,0	50,00	0,07	(
1	24,96 122,99	418123	0,00	0,0	0,0	46,92	59,58	59
1	122,99	400916	0,00	0,0	0,0	35,00	293,48	293
1	304,80	369006	0,00	0,0	0,0	47,12	727,27	727
1	609,60	315506	0,00	0,0	0,0	67,44	1454,54	1454
	914,40 1219,20	262006 208506	0,00 0,00	0,0 0,0	0,0 0,0	87,66	2181,82 2909,09	218 <sup>-</sup> 2909
	1524,00	155006	0,00	0,0	0,0	107,98 128,30	3636,36	3636
1	1527,96	154304	0,00	0,0	0,0	128,56	3645,83	3645
i	1528,02	154304	0,00	0,0	0,0	128,57	3645,98	3645
i	1828,80	101506	0,00	0,0	0,0	148,62	4363,63	4363
1	2133,60	48006	0,00	0,0	0,0	168,94	5090.91	5090
1	0040 00							
	2349,98	10022	0,00	0,0	0,0	183,36	5607,18	5607
i	2350,04	10022	0,00	0,0	0,0	183,37	5607,18 5607,32	5607 5607
1 1 1						183,36 183,37 189,16 206,00	5607,18 5607,32 5818,18 6420,83	5607 5818
asing Load Sum	2350,04 2438,40 2690,96	10022 -5494 -49832	0,00 0,00 0,00	0,0 0,0 0,0	0,0 0,0	183,37 189,16	5607,32 5818,18	5607 5818
	2350,04 2438,40 2690,96	10022 -5494 -49832	0,00 0,00 0,00 78'' Intermediate	0,0 0,0 0,0 Casing	0,0 0,0	183,37 189,16 206,00	5607,32 5818,18 6420,83	5607 5818 6420
1 1 asing Load Sum String Section	2350,04 2438,40 2690,96 <u>mary - Runnir</u> MD (m)	10022 -5494 -49832 ngHole #1 - 9 5/	0,00 0,00 0,00 <u>(%" Intermediate</u> Dogleg (%7/100ft)	0,0 0,0 0,0 0,0 Casing Torque (ft-lbf)	0,0 0,0 0,0	183,37 189,16 206,00 Temperature	5607,32 5818,18	5607 5818 6420 (psi) External
String	2350,04 2438,40 2690,96 mmary - Runnir MD (m) 0,03	10022 -5494 -49832 ngHole #1 - 9 5/ Axial Force (lbf) 414487	0,00 0,00 0,00 /8" Intermediate Dogleg (°/100ft) 0,00	0,0 0,0 0,0 <u>Casing</u> Torque (ft-lbf) 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	183,37 189,16 206,00 Temperature (°F)	5607,32 5818,18 6420,83 Pressure Internal 0,07	5607 5818 6420 (psi) External
String	2350,04 2438,40 2690,96 mmary - Runnir MD (m) 0,03 24,96	10022 -5494 -49832 ngHole #1 - 9 5/ Axial Force (lbf) 414487 411034	0,00 0,00 0,00 /8" Intermediate Dogleg (°/100ft) 0,00 0,00	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	183,37 189,16 206,00 Temperature (°F)	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58	5607 5818 6420 (psi) External ( 55
String	2550,04 2438,40 2690,96 mmary - Runnir MD (m) 0,03 24,96 122,99	10022 -5494 -49832 ngHole #1 - 9 5/ Axial Force (lbf) 414487 411034 397464	0.00 0,00 0,00 /8" Intermediate Dogleg (*/100R) 0,00 0,00	0,0 0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48	560; 5818 6420 (psi) External 55 292
String	2350,04 2438,40 2690,96 mmary - Runnir MD (m) 0,03 24,96 122,99 304,80	10022 -5494 -49832 mgHole #1 - 9 5/ Axial Force (lbf) 414487 411034 397464 37464	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0,0 0,0 0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27	560) 5816 6420 (psi) External ( 55 293 293 72)
String	2550,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60	10022 -5494 -49832 ngHole #1 - 9 5, Axial Force (lbf) 414487 411034 397464 372287 330104	0.00 0,00 0,00 (%) Intermediate Dogleg (%)100ft 0.00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 47,12 67,44	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54	560; 5816 6420 (psi) External ( 55 293 722 722 7455
String	2350,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40	10022 -5494 -49832 hgHole #1 - 9 5/ Axial Force (lbf) 411487 411034 397464 372297 330104 287910	0.00 0.00 0.00 (7) (7) (7) (7) (7) (7) (7) (7) (7) (7)	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54 2181,82	(psi) (psi)
String	2550,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20	10022 -5494 -49832 ngHole #1 - 9 5, Axial Force (lbf) 414487 411034 337464 372287 330104 287910 245717	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98	5607,32 5818,18 6420,83 Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 290,09	(psi) (psi) (psi) (psi) (0) (0) (0) (0) (0) (0) (0) (0) (0) (0
String	2350,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 1524,00	10022 -5494 -49832 ngHole #1 - 9 5/ Axial Force (lbf) 414487 411034 397464 372287 330104 287910 245717 203523	0.00 0,00 0,00 (7/100ft) 0.00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	183,37 189,16 206,00 Temperature(°F) 50,00 48,92 35,00 47,12 67,44 87,66 107,98 128,30	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 2909,09 3636,36	560) 5818 6420 (psi) External ( 56 290 72: 145- 218: 2905 363
String	2550,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20	10022 -5494 -49832 ngHole #1 - 9 5, Axial Force (lbf) 414487 411034 337464 372287 330104 287910 245717	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0,0 0,0 0,0 Casing Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 46,92 35,00 47,12 67,44 87,66 107,98 128,30 128,56	5607,32 5818,18 6420,83 Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 2909,09 3636,36 3645,83	(psi) (psi) External ( 290 72: 1455 218 2905 3634
String	2350,04 2438,40 2690,96 mary - Runnir (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 1527,96 1527,96 1528,80	10022 -5494 -49832 hgHole #1 - 9 5/ Axial Force (bf) 414487 411034 397464 377297 330104 287910 245717 203523 202974 202966 181330	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,30 128,56 128,56 128,56 128,56 128,56	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 2909,09 3636,36 3645,83 3645,83 3645,83	(psi) (psi) External ( 50 290 722 1455 218 2900 3634 3644 3644
String	2550,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 1524,00 1527,96 1528,02 1528,02 1528,02 1528,03	10022 -5494 -49832 ngHole #1 - 9 5, Axial Force (lbf) 414487 411034 337464 372287 330104 287910 245717 203523 202974 202966 161330 119136	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.0 0.0 0.0 7 0.0 0.0 0.0 0.0 0.0 0.0 0.	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,30 128,56 128,57 148,62 128,57	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 2909,09 3636,36 3645,83 3645,89 4363,63 5090,91	560 5611 642 (psi) External ( 552 722 722 722 722 722 722 723 723 723 72
String	2350,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 1524,00 1524,00 1527,96 1528,02 1828,02 1828,02 2133,60 2349,98	10022 -5494 -49832 ngHole #1 - 9 5. Axial Force (lbf) 414487 414487 411034 397464 372297 330104 287910 245717 203523 202974 202966 161330 119136 89185	0.00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0.0 0.0 0.0 7 Torque (ft-lbf) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,50 128,50 128,57 148,62 168,94 148,82 168,94 148,33	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 2909,09 3636,36 3645,88 3645,98 4363,63 5090,91 5607,18	5600 56111 6420 (psi) External 2909 2632 722 722 722 722 723 722 723 723 723 7
String	2350,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 1524,00 1527,96 1528,00 2133,60 2349,98 2350,04	10022 -5494 -49832 mgHole #1 - 9 5, Axial Force (lbf) 414487 411034 397464 377464 330104 287910 245717 203523 202974 202966 161330 119136 89185 89176	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,30 128,56 128,57 148,62 168,94 183,36 183,37	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 2909,09 3636,36 3645,83 36	660; 69119 6421 (psi) External ( 51 290; 722; 145- 218; 290; 3634 3634 3644 3645 560;
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String	2350,04 2438,40 2690,96 mary - Runnir MD (m) 0,03 24,96 122,99 304,80 609,60 914,40 1219,20 1524,00 1527,96 1528,00 2133,60 2349,98 2350,04	10022 -5494 -49832 mgHole #1 - 9 5, Axial Force (lbf) 414487 411034 397464 377464 330104 287910 245717 203523 202974 202966 161330 119136 89185 89176	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 Torque (ft-lbf) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	183,37 189,16 206,00 Temperature (°F) 50,00 46,92 35,00 47,12 67,44 87,66 107,98 128,30 128,56 128,57 148,62 168,94 183,36 183,37	5607,32 5818,18 6420,83 Pressure Internal 0,07 59,58 293,48 727,27 1454,54 2181,82 2909,09 3636,36 3645,83 36	560 5911 6420 (psi) External ( 551 290 3634 3644 3644 3644 3644 3644 3644 5090 5600 5600 5600 5601 5811
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asing Load Sumi String	MD MD	Axial Force	Dogleg	Torque		Friction Force	Temperature	Pressure	(nai)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F)	Internal	External
1	2685,04	-87387	0,00	0	0	0,0	205,60	7233,67	686
1	2690,96	-87794	0,00	0		0,0	206,00	7235,61	685
1	2691,02	-51412	0,00	0		0,0	206,00	7235,63	528
1	2743,20	-66451	0,00	0	,0	0,0	209,48	7252,75	571
1	3048,00	-125266	0,00	0		0,0	229,78	7352,75	703
1	3150,99 3172,97	-140570 -143780	0,00 0,00	0 0	,0 ,0	0,0 0,0	236,64 238,10	7386,54 7393,75	733 738
asing Load Sum	mary - Green0	Cement #1 - 7"	Production Line	er					
String	MD	Axial Force	Dogleg	Torque		Friction Force	Temperature	Pressure	(psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)		(lbf/ft)	(°F)	Internal	External
1	2685,04	-24386	0,00	0		0,0	205,60	6700,08	686
1	2690,96	-25016	0,00	0		0,0	206,00	6715,26	687
1	2691,02	-25016	0,00	0		0,0	206,00	6715,41	687
1	2743,20 3048,00	-30496 -62496	0,00 0,00	0	,0	0,0	209,48 229,80	6848,79 7628,01	698
	3048,00	-62496 -73310	0,00	0		0,0 0,0	229,80	7891,33	765 792
1	3150,99	-75619	0,00	0		0,0	238,10	7947,49	792
	0172,07	10010	0,00		,0	5,5	200,10	7017,10	100
asing Load Sum							-		
String	MD	Axial Force	Dogleg	Torque		Friction Force	Temperature	Pressure	
Section	(m) 2685,04	(lbf) -4352	(°/100ft) 0.00	(ft-lbf) 0	0	(lbf/ft) 0,0	(°F) 205,60	Internal 6864,27	External 686
1	2690,96	-4982	0.00	0		0,0	206,00	6879,45	687
1	2691,02	-4982	0,00	0		0,0	206,00	6879,61	687
		10,000							
1	2743,20	-10462	0,00	0	U,	0,0	209,48	7012,98	/01
1	2743,20 3048,00	-42462	0,00	0	,0	0,0	229,80	7792,20	779
1 1 1	3048,00 3150,99	-42462 -53276	0,00 0,00	0 0	0	0,0 0,0	229,80 236,67	7792,20 8055,52	779 805
1 1 1 1	3048,00	-42462	0,00	0 0	,0	0,0	229,80	7792,20	779 805
asing Load Sum	3048,00 3150,99 3172,97	-42462 -53276 -55585	0,00 0,00 0,00	0 0 0	0	0,0 0,0	229,80 236,67	7792,20 8055,52	779 805
1 1 1 asing Load Sumi String	3048,00 3150,99 3172,97	-42462 -53276 -55585	0,00 0,00 0,00	0 0 0	0	0,0 0,0	229,80 236,67	7792,20 8055,52 8111,68	779 805 811
	3048,00 3150,99 3172,97 <u>mary - Runnin</u> MD (m)	-42462 -53276 -55585 gHole #1 - 7" F Axial Force (lbf)	0,00 0,00 0,00 0,00 Production Liner Dogleg (°/100ft)	0 0 0 Torque (ft-lbf)	0	0,0 0,0 0,0 Friction Force (lbf/ft)	229,80 236,67 238,10 	7792,20 8055,52 8111,68 Pressure Internal	779 805 811 (psi) External
String	3048,00 3150,99 3172,97 <u>mary - Runnin MD</u> (m) 2685,04	-42462 -53276 -55585 g <u>Hole #1 - 7" F</u> Axial Force (lbf) 64764	0,00 0,00 0,00 0,00 Production Liner Dogleg (°/100ft) 0,00	0 0 0 Torque (ft-lbf) 0	,0 ,0 ,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0	229,80 236,67 238,10 Temperature (°F) 205,60	7792,20 8055,52 8111,68 Pressure Internal 6864,27	775 805 811 (psi) External 686
String	3048,00 3150,99 3172,97 mary - Runnin MD (m) 2685,04 2690,96	-42462 -53276 -55585 gHole #1 - 7" F Axial Force (lbf) 64764 64282	0,00 0,00 0,00 2roduction Liner Dogleg (*/100ft) 0,00 0,00	0 0 0 Torque (ft-lbf) 0 0	,0 ,0 ,0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	229,80 236,67 238,10 Temperature (°F) 205,60 206,00	7792,20 8055,52 8111,68 Pressure Internal 6864,27 6879,45	779 805 811 (psi) External 686 687
String	3048.00 3150,99 3172,97 mary - Runnin MD (m) 2685,04 2690,96 2691,02	-42462 -53276 -55585 gHole #1 - 7" F Axial Force (lbf) 64764 64282 64277	0,00 0,00 0,00 0,00 Production Liner Dogleg (*/100ft) 0,00 0,00	0 0 0 0 0 0 (ft-lbf) 0 0 0 0 0 0 0	0 0 0 0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 206,00	7792.20 8055.52 8111.68 Pressure Internal 6864.27 6879.45 6879.61	779 805 811 (psi) External 686 687 687
String	3048.00 3150,99 3172,97 <u>Mary - Runnin</u> MD (m) 2685,04 2690,96 2691,02 2743,20	-42462 -53276 -55585 <u>gHole #1 - 7" F</u> Axial Force (lbf) 64764 64282 64277 60042	0,00 0,00 0,00 Production Liner Dogleg (*/100t) 0,00 0,00 0,00	0 0 0 0 0 (ft-lbf) 0 0 0 0 0 0 0 0	0 0 0 0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 206,00 206,00 209,48	7792,20 8055,52 8111,68 Pressure Internal 6864,27 6879,45 6879,45 6879,61 7012,98	779 800 811 (psi) External 680 687 687 70
String	3048.00 3150,99 3172,97 mary - Runnin MD (m) 2685,04 2690,96 2691,02 2743,20 3048,00	-42462 -53276 -55585 <u>gHole #1 - 7" F</u> Axial Force (lbf) 64764 64282 64277 60042 35303	0,00 0,00 0,00 2roduction Liner Dogleg ('/100ft) 0,00 0,00 0,00 0,00	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 206,00 209,48 229,80	7792.20 8055.52 8111.68 Pressure Internal 6864.27 6879.61 6879.61 7012.98 7792.20	(psi) (psi) External 680 683 701 775
String	3048.00 3150.99 3172,97 mary - Runnin MD (m) 2685,04 2690.96 2691.02 2743.20 3048.00 3150,99	-42462 -53276 -55585 -55585 Axial Force (lbf) 64764 64282 64277 60042 35303 26942	0.00 0.00 0.00 Production Liner Dogleg (*/100ft) 0.00 0.00 0.00 0.00 0.00 0.00	0 0 0 0 0 0 (ft-lbf) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 209,48 229,80 236,67	7792,20 8065,52 8111,68 Pressure Internal 6864,27 6879,45 6879,45 6879,61 7012,98 7792,20 8055,52	77: 80: 81 External 68: 68: 68: 700 77: 80:
String	3048.00 3150,99 3172,97 mary - Runnin MD (m) 2685,04 2690,96 2691,02 2743,20 3048,00	-42462 -53276 -55585 <u>gHole #1 - 7" F</u> Axial Force (lbf) 64764 64282 64277 60042 35303	0,00 0,00 0,00 2roduction Liner Dogleg ('/100ft) 0,00 0,00 0,00 0,00	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 206,00 209,48 229,80	7792.20 8055.52 8111.68 Pressure Internal 6864.27 6879.61 6879.61 7012.98 7792.20	775 805 811 External 686 687 687 707 775 805
String Section 1 1 1 1 1 1 1	3048.00 3150,99 3172,97 mary - Runnin (m) 2685,04 2691,02 2743,20 3048,00 3150,99 3172,97	-42462 -53276 -55585 <u>gHole #1 - 7" F</u> Axial Force (lbf) 64764 64282 64277 60042 35303 26942 25159	0,00 0,00 0,00 0,00 Production Liner Dogleg (*/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0 0 0 0 0 0 (ft-lbf) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0 0	0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0	229,80 236,67 238,10 Temperature ( <sup>°</sup> F) 205,60 206,00 209,48 229,80 236,67 238,10	7792.20 8055.52 8111.68 Internal 6864.27 6879.61 7012.98 7792.20 8055.52 8111.68	775 805 811 External 688 687 701 775 805 811
String Section 1 1 1 1 1 1 1 1 2 3 3 3 3 3 3 3 3 3 3 3	3048.00 3150,99 3172,97 mary - Runnin (m) 2685,04 2691,02 2743,20 3048,00 3150,99 3172,97 mary - TbgLea MD (m)	-42462 -53276 -55585 <u>gHole #1 - 7" F</u> Axial Force (lbf) 64764 64282 64277 60042 35303 26942 25159 <u>kk #1 - 7" Produ</u> Axial Force (lbf)	0,00 0,00 0,00 2roduction Liner Dogleg ('/100ft) 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0,0 0,0 0,0 Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 209,48 229,80 236,67 238,10 Temperature (°F)	7792.20 8055.52 8111.68 Pressure Internal 6864.27 6879.61 7012.98 7792.20 8055.52 8111.68 911.68	775 805 811 External 688 687 701 775 805 811
String Section 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	3048.00 3150.99 3172,97 mary - Runnin MD (m) 2685,04 2690.96 2691,02 2743,20 3048,00 3150,99 3172,97 mary - TbgLea MD (m) 2685,04	-42462 -53276 -55595 -55595 	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 209,48 229,80 209,48 229,80 238,10 238,10	7792.20 8055.52 8111,68 9111,68 9111,68 9054.27 6879.45 6879.45 6879,61 7012,98 7792.20 8055.52 8111,68 9111,68 9055.52 8111,68	(psi) External 686 687 701 775 806 811 External 668 61 811 61 External 668
String Section 1 1 1 1 1 1 1 1 3 1 3 5 tring	3048.00 3150.99 3172,97 mary - Runnin (m) 2685,04 2691,02 2743,20 3048.00 3150,99 3172,97 mary - TbgLea (m) (m) 2685,04 2685,04 2680,96	-42462 -53276 -55585 -55585 <u>gHole #1 - 7" F</u> Axial Force (lbf) 64764 64272 60042 35303 26942 25159 <u>ak #1 - 7" Produ</u> Axial Force (lbf) -93847 -93847	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 206,00 206,00 236,67 238,10 Temperature (°F) 205,60 205,60	7792.20 8055.52 8111,68 9111,68 9111,68 9145 6879,61 7012,98 7792,20 8055,52 8111,68 905,52 8111,68 9145 9145 9145 9145 9145 9145 9145 9145	(psi) (psi) External 686 687 700 775 805 811 (psi) External 686 687 687 686 687 686 687 686 687 686 687 687
String Section 1 1 1 1 1 1 1 1 3 1 3 5 tring	3048.00 3150.99 3172,97 mary - Runnin (m) 2685,04 2690.96 2691.02 2743.20 3048.00 3150,99 3172,97 mary - TbgLee MD (m) 2685,04 2690.96 2691,02	-42462 -53276 -55595 -55595 Axial Force (lbf) 64764 64282 64277 60042 35303 26942 25159 ak #1 - 7" Produ Axial Force (lbf) -93847 -94378	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	229,80 236,67 238,10 Temperature(°F) 205,60 206,00 209,48 229,80 209,48 229,80 238,10 Temperature (°F)  238,10 238,00 205,60 206,00	7792.20 8065.52 8111,68 9111,68 9111,68 9111,68 9111,68 919,45 6879,45 6879,45 6879,61 7792,20 8055,52 8111,68 9111,68	(psi) External 686 687 701 775 800 811 External 686 687 686 687 687 687 687
String Section 1 1 1 1 1 1 1 1 3 1 3 5 5 tring	3048.00 3150.99 3172,97 mary - Runnin (m) 2685.04 2691,02 2743,20 3048.00 3150.99 3172,97 mary - TbgLees MD (m) 2885.04 2690,96 2691,02 2743,20	-42462 -53276 -55585 -55585 	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	229,80 236,67 238,10 Temperature (°F) 205,60 206,00 206,00 209,48 229,80 236,67 238,10 Temperature (°F) 205,60 206,00 206,00 206,00 206,00	7792.20 8055.52 8111.68 9111.68 9684.27 6879.45 6879.45 6879.45 6879.45 8055.52 8111.68 9055.52 8055.55 8055.55 8055.55 8055.55 8055.55 8055.55 8055.5	(psi) External 688 687 701 775 805 811 External 688 687 687 687 687 687
Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3048.00 3150.99 3172,97 mary - Runnin (m) 2685,04 2690.96 2691.02 2743.20 3048.00 3150,99 3172,97 mary - TbgLee MD (m) 2685,04 2690.96 2691,02	-42462 -53276 -55595 -55595 Axial Force (lbf) 64764 64282 64277 60042 35303 26942 25159 ak #1 - 7" Produ Axial Force (lbf) -93847 -94378	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0		0.0 0.0 0.0 Friction Force (lbf/ft) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	229,80 236,67 238,10 Temperature(°F) 205,60 206,00 209,48 229,80 209,48 229,80 238,10 Temperature (°F)  238,10 238,00 205,60 206,00	7792.20 8065.52 8111,68 9111,68 9111,68 9111,68 9111,68 919,45 6879,45 6879,45 6879,61 7792,20 8055,52 8111,68 9111,68	External 686 687 701 779 805 811 (psi)

	actor S	ummarv	- Initial	Conditions - 30	)" Conductor Ca	asina				
S	tring	Ń	//D	Yield Strength	VME Stress		Abso	lute Safety Factors	;	
Se	ection	(	m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
		1	0,03	42000,0	15067,4	2,787	N/A	2,450	100+	5,2
		1	24,96	42000,0	15073,0	2,786	N/A	2,450	100+	5,4
		1	91,32	42000,0	15107,4	N 2,780	N/A	2,450	100+	6,1
		1	122,96	42000,0	15139,5	N 2,774	N/A	2,450	100+	6,
		1	123,02	42000,0	15138,4	N 2,774	N/A	2,450	100+	6,
		1	158,98	42000,0	13721,5	N 3,061	N/A	2,697	100+	6,
Burst a	nd Axial	Flags								
			connection	n Leak, B = Connec	tion Burst, F = Co	nnection Fracture	J = Connection J	ump-out, Y = Coni	nection Yield, C = (	Connection
		-								
Axial FI	lags									
Default	= Tensio	on, M = Co	mpression	ı						
Triaxial		Noll and E	e oitiuo Pa			Loofoty footor N	Nonotiuo Bondina	-		
Derault	= inner v	wan and P	OSILIVE BE	nding OR No Bend	ing, D = Outer wai	i sarety ractor, N =	Negauve Bending	9		
Envelor	pe Flags									
		Burst, EC	= Envelop	e Collapse, N/A = r	o ISO Connection					
	interope i	541 St, 20		e oonapse, n/A - i						
afety Fa	actor S	ummary	- LostR	eturnsWithWat		nductor Casing				
	tring		//D	Yield Strength	VME Stress			lute Safety Factors		
Se	ection	(	m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
		1	0,03	42000,0	3320,2	12,650	N/A	26,741	100+	11,
		1	24,96	42000,0	3101,1	13,544	N/A	26,741	100+	12,
		1	91,32	42000,0	2539,1	16,541	N/A	26,739	100+	15,
		1	122,96	42000,0	2286,9	18,366	N/A	26,742	100+	17,
		1	123,02	42000,0	2606,6	16,113	N/A	26,744	100+	15,
		1	158,98	42000,0	2620, 1	16,030	N/A	26,741	100+	15,
Default Axial FI	lags	ody, L = 0	Connection mpression	n Leak, B = Connec	tion Burst, F = Co	nnection Fracture	J = Connection J	ump-out, Y = Coni	nection Yield, C = (	Connection
Default Axial FI Default Triaxial Default Envelop	= Pipe B lags = Tensio   Flags = Inner V pe Flags	ody, L = C on, M = Co Nall and F	mpression Positive Be		ling, D = Outer wal	I safety factor, N =			nection Yield, C = (	Connection
Default Axial FI Default Triaxial Default Envelop EB = Er	= Pipe B lags = Tensio   Flags = Inner V pe Flags nvelope B	iody, L = C on, M = Co Wall and F Burst, EC	mpression Iositive Be = Envelop	n ending OR No Bend e Collapse, N/A = r	ling, D = Outer wal	ll safety factor, N =			nection Yield, C = 0	Connection
Default Axial FI Default Triaxial Default Envelop EB = Er	= Pipe B lags = Tensio   Flags = Inner V pe Flags nvelope B actor S	ody, L = C on, M = Co Nall and F Burst, EC ummary	mpression Positive Be = Envelop - Press	n e Collapse, N/A = r ureTest #1 - 3(	ling, D = Outer wal	ll safety factor, N =	: Negative Bending			Connection
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	on, M = Co Nall and F Burst, EC <u>ummary</u>	mpression Positive Be = Envelop - Press	n e Collapse, N/A = r .ureTest #1 - 30 Yield Strength	ting, D = Outer wal to ISO Connection D'' Conductor C: VME Stress	II safety factor, N = asing	: Negative Bending	g Jute Safety Factors		
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio   Flags = Inner V pe Flags nvelope B actor S	on, M = Co Nall and F Burst, EC <u>ummary</u>	mpression lositive Be = Envelop - Press MD m)	n e Collapse, N/A = r 	ling, D = Outer wal to ISO Connection D <sup>111</sup> Conductor C: VME Stress (psi)	I safety factor, N = asing Triaxial	Negative Bending	g Jute Safety Factors Burst ∣	Collapse	Axial
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	iody, L = C on, M = Co Wall and F Burst, EC <u>ummary</u> ( 1	mpression rositive Be = Envelop - Press AD m) 0,03	n e Collapse, N/A = r <u>ureTest #1 - 3(</u> Yield Strength (psi) 42000,0	ting, D = Outer wat to ISO Connection <u>D" Conductor C:</u> VME Stress (psi) 19634,7	I safety factor, N = asing Triaxial 2,139	: Negative Bending Absc Envelope N/A	9 Jute Safety Factors Burst 1,885	Collapse 100+	Axial 4,
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	on, M = Co Nall and F Burst, EC <u>ummary</u>	mpression rositive Be = Envelop - Press MD m) 0,03 24,96	n e Collapse, N/A = r ureTest #1 - 3( Yield Strength (psi) 42000,0 42000,0	ting, D = Outer wal to ISO Connection D" Conductor C: VME Stress (psi) 19634.7 19657.4	I safety factor, N = asing Triaxial 2, 139 N 2, 137	: Negative Bending Absc Envelope N/A N/A	9 Jute Safety Factors Burst 1,885 1,885	Collapse 100+ 100+	Axial 4,
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	iody, L = C on, M = Co Wall and F Burst, EC <u>ummary</u> ( 1	mpression rositive Be = Envelop - Press MD m) 0,03 24,96 91,32	n e Collapse, N/A = r .ureTest #1 - 3( Yield Strength (psi) 42000,0 42000,0 42000,0	ling, D = Outer wal to ISO Connection D" Conductor C: VME Stress (psi) 19634,7 19657,4 19739,6	I safety factor, N = asing Triaxial N 2, 139 N 2, 128	E Negative Bending Absc Envelope N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885	Collapse 100+ 100+ 100+	Axial 4, 4, 4,
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	iody, L = C on, M = Co Wall and F Burst, EC <u>ummary</u> ( 1	mpression rositive Be = Envelop - Press MD m) 0,03 24,96 91,32 122,96	n e Collapse, N/A = r ureTest #1 - 30 Yield Strength (psi) 42000,0 42000,0 42000,0	ting, D = Outer wal to ISO Connection "Conductor C: VME Stress (psi) 19634.7 19657.4 19738,0	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,123	Envelope N/A N/A N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 4, 5,
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	iody, L = C on, M = Co Wall and F Burst, EC <u>ummary</u> ( 1	mpression rositive Be = Envelop - Press MD m) 0,03 24,96 91,32 122,96 122,96	n e Collapse, N/A = r ureTest #1 - 30 Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0	ling, D = Outer wal to ISO Connection D <sup>11</sup> Conductor C: VME Stress (psi) 19634.7 19634.7 19739.6 19789.0 19788.0	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,127 N 2,123 N 2,125	E Negative Bending Absc Envelope N/A N/A N/A N/A N/A N/A N/A	Jute Safety Factors Burst 1,885 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 4, 5, 5,
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	iody, L = C on, M = Co Wall and F Burst, EC <u>ummary</u> ( 1	mpression rositive Be = Envelop - Press MD m) 0,03 24,96 91,32 122,96	n e Collapse, N/A = r ureTest #1 - 30 Yield Strength (psi) 42000,0 42000,0 42000,0	ting, D = Outer wal to ISO Connection "Conductor C: VME Stress (psi) 19634.7 19657.4 19738,0	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,123	Envelope N/A N/A N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 4, 4, 5, 5,
Default Axial FI Default Triaxial Default Envelop EB = Er S Se	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S itring	iody, L = C on, M = Co Wall and F Burst, EC ummary ( 1 1 1 1 1 1 1	mpression rositive Be = Envelop - Press MD m) 0,03 24,96 91,32 122,96 122,96	n e Collapse, N/A = r ureTest #1 - 30 Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0	ling, D = Outer wal to ISO Connection D <sup>11</sup> Conductor C: VME Stress (psi) 19634.7 19634.7 19739.6 19789.0 19788.0	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,127 N 2,123 N 2,125	E Negative Bending Absc Envelope N/A N/A N/A N/A N/A N/A N/A	Jute Safety Factors Burst 1,885 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+	
Default Axial FI Default Triaxial Default Envelop EB = Er	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S tring actor S	ody, L = C on, M = Co Nall and F Burst, EC ummary ( 1 1 1 1 1 1 1 1 1 1 1 1 1 1	mpression ositive Be = Envelop - Press MD 0,03 24,96 91,32 122,96 123,02 158,98	n e Collapse, N/A = r ureTest #1 - 30 Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0	ling, D = Outer wal to ISO Connection D" Conductor C: VME Stress (psi) 19634,7 19634,8 19780,6 19780,6 19780,6 19766,6 19760,8	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,125 N 2,126	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,
Default Axial FI Default Triaxial Default Envelop EB = Er	= Pipe B lags = Tensio Flags = Inner V pe Flags nvelope B actor S tring actor S	ody, L = C on, M = Co Nall and F Burst, EC ummary ( 1 1 1 1 1 1 1 1 1 1 1 1 1 1	mpression ositive Be = Envelop - Press MD 0,03 24,96 91,32 122,96 123,02 158,98	n e Collapse, N/A = r .ureTest #1 - 3( Yield Strength (ps) 42000,0 42000,0 42000,0 42000,0 42000,0	ling, D = Outer wal to ISO Connection D" Conductor C: VME Stress (psi) 19634,7 19634,8 19780,6 19780,6 19780,6 19766,6 19760,8	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,125 N 2,126	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,
Default Axial Fi Default Triaxial Default Envelog EB = Er S Se Burst al Default Axial Fi	= Pipe B lags = Tensic Flags = Inner V pe Flags nvelope F actor S tring actor S tring = Pipe B lags	ody, L = C Mail and F Burst, EC Ummary 1 1 1 1 Flags ody, L = C	mpression ositive Be = Envelop - Press AD m) 0,03 24,96 91,32 122,96 123,02 158,98 Connection	nding OR No Bence e Collapse, N/A = r <u>ureTest #1 - 3(</u> Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0 0 10 Leak, B = Connec	ling, D = Outer wal to ISO Connection D" Conductor C: VME Stress (psi) 19634,7 19634,8 19780,6 19780,6 19780,6 19766,6 19760,8	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,125 N 2,126	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,
Default Axial Fi Default Triaxial Default Envelog EB = Er S Se Burst al Default Axial Fi	= Pipe B lags = Tensic Flags = Inner V pe Flags nvelope F actor S tring actor S tring = Pipe B lags	ody, L = C Mail and F Burst, EC Ummary 1 1 1 1 Flags ody, L = C	mpression ositive Be = Envelop - Press MD 0,03 24,96 91,32 122,96 123,02 158,98	nding OR No Bence e Collapse, N/A = r <u>ureTest #1 - 3(</u> Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0 0 10 Leak, B = Connec	ling, D = Outer wal to ISO Connection D" Conductor C: VME Stress (psi) 19634,7 19634,8 19780,6 19780,6 19780,6 19766,6 19760,8	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,125 N 2,126	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,
Default Axial FI Default Triaxial Default Envelop EB = Er S Se Burst a Default Axial FI Default	= Pipe B lags = Tensic   Flags = Inner V pe Flags nvelope B actor S tring ection nd Axial = Pipe B lags = Tensic	ody, L = C Mail and F Burst, EC Ummary 1 1 1 1 Flags ody, L = C	mpression ositive Be = Envelop - Press AD m) 0,03 24,96 91,32 122,96 123,02 158,98 Connection	nding OR No Bence e Collapse, N/A = r <u>ureTest #1 - 3(</u> Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0 0 10 Leak, B = Connec	ling, D = Outer wal to ISO Connection D" Conductor C: VME Stress (psi) 19634,7 19634,8 19780,6 19780,6 19780,6 19766,6 19760,8	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,125 N 2,126	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	9 Jute Safety Factors Burst 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S S S Burst at Default Axial FI Default Triaxial	= Pipe B lags = Tensic Flags = Inner V pe Flags nvelope E actor S tring actor S actor S s actor S actor  ody, L = C on, M = Co Wall and F Burst, EC Ummary M ( 1 1 1 1 Flags oody, L = C on, M = Co	mpression ositive Be = Envelop - Press AD m) 0,03 24,96 91,32 122,96 122,96 123,02 158,98 Connection	nding OR No Bence e Collapse, N/A = r <u>ureTest #1 - 3(</u> Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0 0 10 Leak, B = Connect	ting, D = Outer wal to ISO Connection <u>0" Conductor C:</u> VME Stress (psi) 19637.4 19637.4 19739.6 19789.0 19786.6 19750.8 ttion Burst, F = Con	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,128 N 2,125 N 2,126 nnection Fracture	: Negative Bending Absc Envelope N/A N/A N/A N/A N/A N/A N/A	9 Burst 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,	
Default Axial FI Default Triaxial Default Envelop EB = Er afety Fi S S S Burst at Default Axial FI Default Triaxial	= Pipe B lags = Tensic Flags = Inner V pe Flags nvelope E actor S tring actor S actor S s actor S actor  ody, L = C on, M = Co Wall and F Burst, EC Ummary M ( 1 1 1 1 Flags oody, L = C on, M = Co	mpression ositive Be = Envelop - Press AD m) 0,03 24,96 91,32 122,96 122,96 123,02 158,98 Connection	nding OR No Bence e Collapse, N/A = r <u>ureTest #1 - 3(</u> Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0 0 10 Leak, B = Connec	ting, D = Outer wal to ISO Connection <u>0" Conductor C:</u> VME Stress (psi) 19637.4 19637.4 19739.6 19789.0 19786.6 19750.8 ttion Burst, F = Con	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,128 N 2,125 N 2,126 nnection Fracture	: Negative Bending Absc Envelope N/A N/A N/A N/A N/A N/A N/A	9 Burst 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,	
Default Axial FI Default Triaxial Default Envelog EB = Er afety Fi S Se Burst al Default Axial FI Default Triaxial Default	= Pipe B lags = Tensic Flags = Inner V pe Flags nvelope E actor S tring actor S actor S s actor S actor  ody, L = C on, M = Co Wall and F Burst, EC Ummary M ( 1 1 1 1 Flags oody, L = C on, M = Co	mpression ositive Be = Envelop - Press AD m) 0,03 24,96 91,32 122,96 122,96 123,02 158,98 Connection	nding OR No Bence e Collapse, N/A = r <u>ureTest #1 - 3(</u> Yield Strength (psi) 42000,0 42000,0 42000,0 42000,0 0 10 Leak, B = Connect	ting, D = Outer wal to ISO Connection <u>0" Conductor C:</u> VME Stress (psi) 19637.4 19637.4 19739.6 19789.0 19786.6 19750.8 ttion Burst, F = Con	I safety factor, N = asing Triaxial 2,139 N 2,137 N 2,128 N 2,128 N 2,128 N 2,125 N 2,126 nnection Fracture	: Negative Bending Absc Envelope N/A N/A N/A N/A N/A N/A N/A	9 Burst 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885 1,885	Collapse 100+ 100+ 100+ 100+ 100+ 100+	Axial 4, 4, 5, 5, 5, 5,	

	String	MD	Yield Strength	VME Stress		Absolu	ite Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	42000,0	2758,7	D 15,225	N/A	100+	100+	15,22
	1	24,96	42000,0	3275,5	12,823	N/A	100+	6,344	16,93
	1	91,32	42000,0	4838,6	8,680	N/A	100+	2,094	24,14
	1	122,96	42000,0	4319,3	9,724	N/A	100+	2,244	30,28
	1	123,02	42000,0	4447,9	9,443	N/A	100+	2,244	26,86
	1	158,98	42000,0	4199,6	10,001	N/A	100+	2,444	26,02
Bu	rst and Axial Flags	;							
De	Foult = Dino Dody I	Connection				I = Connection lu	an out V - Cons	nastion Viold C = /	Connection
26	iault – Pipe Bouy, i	L = Connection	i Leak, D = Connec	tion Burst, F = Con	nection Fracture,	J - Connection Ju	np-out, r = com	nection neiu, c = v	Connection
	iauit – Pipe Bouy, i	L = Connection	Leak, B = Connec	lion Burst, F - Con	nection Fracture,	J = Connection Ju	mp-out, r = com	nection neid, C = C	Connection
)	ial Flags	L = Connection	i Leak, B = Connec	tion Buist, F - Con	nection Fracture,	o - connection ou	mp-out, f = Com	nection field, C = C	Connection
) I Ax				tion Burst, F = Con	nection Fracture,	5 - Connection Su	np-out, r = com	nection field, C = C	Connection
) IAx 2 De	ial Flags			uon Burst, P – Con	nection Fracture,	5 - Connection Su	mp-out, r = com	nection field, C - G	connection
0 1 Ax 2 De 3	ial Flags			uon Burst, P – Con	nection Fracture,	5 - Connection Su	mp-out, f = Com	nection field, C - G	Connection
0 1 Ax 2 De 3 4 Tri	ial Flags fault = Tension, M axial Flags	= Compressior	1	ing, D = Outer wall			mp-out, Y = Com	nection mela, c = v	Connection
) Ax 2 De 3 4 Tri 5 De	ial Flags fault = Tension, M axial Flags	= Compressior	1	·			mp-out, r = com	nection field, c = v	Connection
)   Ax 2 De 3   Tri 5 De 6	ial Flags fault = Tension, M axial Flags	= Compressior	1	·			mp-out, r = com	nection field, C = V	
) Ax 2 De 3 Tri 5 De 6 De	ial Flags fault = Tension, M axial Flags fault = Inner Wall a velope Flags	= Compressior nd Positive Be	n nding OR No Bend	ing, D = Outer wall			mp-out, r = com	nection field, C – V	
) Ax 2 De 3 Tri 5 De 6 De	ial Flags fault = Tension, M axial Flags fault = Inner Wall a velope Flags	= Compressior nd Positive Be	1	ing, D = Outer wall			np-out, f – com	nection field, C – V	
Ax De Tri De De	ial Flags fault = Tension, M axial Flags fault = Inner Wall a velope Flags	= Compressior nd Positive Be	n nding OR No Bend	ing, D = Outer wall			np-out, r – com	iection field, C - Y	
Ax De Tri De En	ial Flags fault = Tension, M axial Flags fault = Inner Wall a velope Flags	= Compressior nd Positive Be	n nding OR No Bend	ing, D = Outer wall			iip-out, r – com		
Ax De Tri De En EB	ial Flags fault = Tension, Mi axial Flags fault = Inner Wall a velope Flags = Envelope Burst,	= Compression nd Positive Be EC = Envelop	nding OR No Bend e Collapse, N/A = n	ing, D = Outer wall o ISO Connection	safety factor, N =		np-out, r – com		
Ax De Tri De En EB	ial Flags fault = Tension, M axial Flags fault = Inner Wall a velope Flags = Envelope Burst, ty Factor Summ	= Compression nd Positive Be EC = Envelop nary - Greer	nding OR No Bend e Collapse, N/A = n Cement #1 - 3	ing, D = Outer wall o ISO Connection 0" Conductor C:	safety factor, N =	Negative Bending			
) Ax 2 De 3 4 Tri 5 De 6 7 En 3 EB	ial Flags fault = Tension, Mi axial Flags fault = Inner Wall a velope Flags = Envelope Burst,	= Compression nd Positive Be EC = Envelop	nding OR No Bend e Collapse, N/A = n	ing, D = Outer wall o ISO Connection	safety factor, N =	Negative Bending	ite Safety Factors Burst ∣		Axial

•		(11)	(psi)	(psi)		Envelope	Duisi	Cullapse	
	1	0,03	42000,0	34688,9	1,211*	N/A	1,065*	100+	2,43
2	1	24,96	42000,0	34701,1	1,210*	N/A	1,065*	100+	2,4
3	1	73,06	42000,0	34729,3	1,209*	N/A	1,065*	100+	2,5
	1	91,32	42000,0	34742,3	N 1,209*	N/A	1,065*	100+	2,5
	1	122,96	42000,0	34771,1	N 1,208*	N/A	1,065*	100+	2,6
3	1	123,02	42000,0	34771,1	N 1,208*	N/A	1,065*	100+	2,6
7	1	152,40	42000,0	33613,4	N 1,249*	N/A	1,101	100+	2,7
3	1	158,98	42000,0	33354,5	N 1,259	N/A	1,109	100+	2,7
Э									
10	* Safety factor < Design	n factor							
11									
	Burst and Axial Flags								
13	Burst and Axial Flags Default = Pipe Body, L	= Connection Lo	eak, B = Connectio	on Burst, F = Con	nection Fracture,	J = Connection Ju	ump-out, Y = Con	nection Yield, C =	Connection
12 13 14		= Connection L	eak, B = Connectio	on Burst, F = Con	nection Fracture,	J = Connection Ju	ump-out, Y = Con	nection Yield, C =	Connection
12 13 14 15	Default = Pipe Body, L Axial Flags		eak, B = Connectio	on Burst, F = Con	nection Fracture,	J = Connection Ju	ump-out, Y = Con	nection Yield, C =	Connection
12 13 14 15 16	Default = Pipe Body, L		eak, B = Connectio	on Burst, F = Con	nection Fracture,	J = Connection Ju	ump-out, Y = Con	nection Yield, C =	Connection
12 13 14 15 16 17	Default = Pipe Body, L Axial Flags Default = Tension, M =		eak, B = Connectio	on Burst, F = Con	nection Fracture,	J = Connection Ju	ump-out, Y = Con	nection Yield, C =	Connection
12 13 14 15 16 17 18	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags	Compression						nection Yield, C =	Connection
12 13 14 15 16 17 18 19	Default = Pipe Body, L Axial Flags Default = Tension, M =	Compression						nection Yield, C =	Connection
12 13 14 15 16 17 18 19 20	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall an	Compression						nection Yield, C =	Connection
12 13 14 15 16 17 18 19 20 21	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall an Envelope Flags	Compression d Positive Bend	ing OR No Bendin	ig, D = Outer wall				nection Yield, C =	Connection
12 13 14 15 16 17 18 19 20 21	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall an	Compression d Positive Bend	ing OR No Bendin	ig, D = Outer wall				nection Yield, C =	Connection
12 13 14 15 16 17 18 19 20 21	Default = Pipe Body, L Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall an Envelope Flags	Compression d Positive Bend	ing OR No Bendin	ig, D = Outer wall				nection Yield, C =	Connection

String	MD	Pull #1 - 30" Co Yield Strength	VME Stress		Abso	ute Safety Factors	S	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	0,03	42000,0	1761,5	D 23,843	N/A	100+	100+	23,843
1	24,96	42000,0	1518,8	D 27,653	N/A	100+	100+	28,313
- 1 ·	122,96	42000,0	565,2	D 74,316	N/A	100+	38,640	100+
1	123,02	42000,0	564,6	D 74,394	N/A	100+	38,621	100+
1	158,98	42000,0	420,0	D 100+	N/A	100+	29,890	M 100+
							· · · · · · · · · · · · · · · · · · ·	
Burst and Axial Fla	gs							
		n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	ımp-out, Y = Con	nection Yield, C = (	Connection
Burst and Axial Flag		n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	Imp-out, Y = Con	nection Yield, C = 0	Connection
Burst and Axial Flag Default = Pipe Body		n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	ımp-out, Y = Con	nection Yield, C = 0	Connection
Burst and Axial Fla Default = Pipe Body	, L = Connection	,	tion Burst, F = Con	nection Fracture,	J = Connection Ju	ımp-out, Y = Con	nection Yield, C = 0	Connection
Burst and Axial Fla Default = Pipe Body 0 Axial Flags	, L = Connection	,	tion Burst, F = Con	nection Fracture,	J = Connection Ju	Imp-out, Y = Con	nection Yield, C = 0	Connection
Burst and Axial Flag Default = Pipe Body 0 Axial Flags 1 Default = Tension, I	, L = Connection	,	tion Burst, F = Con	nection Fracture,	J = Connection Ju	imp-out, Y = Con	nection Yield, C = 0	Connection

15 16 16 Envelope Flags 17 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

5	Section 1	(m)	(			Absol	ute Safety Factors	<b>`</b>	
	1		(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
_		0,03	42000,0	2897,0	D 14,498	N/A	100+	100+	14,49
	1	24,96	42000,0	2689,7	D 15,615	N/A	100+	100+	15,82
	1	122,96		1875,2	D 22,398	N/A	100+	38,640	24,69
	1	123,02	42000,0	1874,7	D 22,404	N/A	100+	38,621	24,70
	1	158,98	42000,0	1576,0	D 26,650	N/A	100+	29,890	31,10
	and Axial Flags		n Leak, B = Connec						
Derud	ni – Tipe Body,		r Lean, B - Connee	lion Burst, r = Gon	needon naedare,	e = eenneedon ea	mp out, r = con		, on the other
	Flage								
) Axial I		= Compression	n						
Defau	Flags Ilt = Tension, M	= Compression	n						
Defau	llt = Tension, M	= Compression	n						
Defau 2 3 Triaxia	ılt = Tension, M al Flags	·		ing. D = Outer wall	safetv factor. N =	Negative Bending			
Defau 2 3 Triaxia	ılt = Tension, M al Flags	·	n ending OR No Bend	ing, D = Outer wall	safety factor, N =	Negative Bending			
Defau Triaxia Defau	ılt = Tension, M al Flags	·		ing, D = Outer wall	safety factor, N =	Negative Bending			
Defau Triaxia Defau Envelo	ılt = Tension, M al Flags ılt = Inner Wall a ope Flags	nd Positive Be			safety factor, N =	Negative Bending			
Defau Triaxia Defau Envelo	ılt = Tension, M al Flags ılt = Inner Wall a ope Flags	nd Positive Be	ending OR No Bend		safety factor, N =	Negative Bending			
Defau Triaxia Defau	ılt = Tension, M al Flags ılt = Inner Wall a ope Flags	nd Positive Be	ending OR No Bend		safety factor, N =	Negative Bending			

	String	MD	Yield Strength	VME Stress		Abso	plute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	80000,0	8134,8	9,834	N/A	8,890	100+	14,516
2	1	24,96	80000,0	7993,3	10,008	N/A	9,018	100+	15,297
3	1	122,96	80000,0	7471,3	10,708	N/A	9,559	100+	19,401
4	1	123,02	80000,0	7470,5	10,709	N/A	9,560	100+	19,404
5	1	158,98	80000,0	6807,1	11,752	N/A	10,501	100+	21,522
6	1	159,04	80000,0	6806,0	11,754	N/A	10,502	100+	21,526
7	1	304,80	80000,0	4131,9	19,362	N/A	17,479	100+	38,629
8	1	572,96	80000,0	858,3	93,208	N/A	83,235	45,959	CM 83,647
9									
10	Burst and Axial Flag	s							
11	Default = Pipe Body,	L = Connection	n Leak, B = Connec	ction Burst, F = Co	nnection Fracture	, J = Connection J	ump-out, Y = Con	nection Yield, C =	Connection
12									
13	Axial Flags								
14	Default = Tension, M	= Compression	n						
15									
16	Triaxial Flags								
17	Default = Inner Wall a	and Positive Be	ending OR No Bend	ding, D = Outer wal	ll safety factor, N :	= Negative Bendin	g		
18									
19	Envelope Flags								
20	EB = Envelope Burst	, EC = Envelop	e Collapse, N/A = r	no ISO Connection					
<u> </u>									
_									

	String	MD	Yield Strength	VME Stress		Abs	olute Safety Factor	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	80000,0	39119,8	N 2,045	N/A	1,852	100+	5,149
:	1	24,96	80000,0	39183,0	N 2,042	N/A	1,852	100+	5,204
	1	122,96	80000,0	39459,4	N 2,027	N/A	1,852	100+	5,434
	1	123,02	80000,0	39144,0	2,044	N/A	1,852	100+	6,452
	1	158,98	80000,0	39340,3	2,034	N/A	1,844	100+	6,535
:	1	159,04	80000,0	39340,6	2,034	N/A	1,844	100+	6,535
·	1	304,80	80000,0	40143,6	1,993	N/A	1,813	100+	6,892
:	1	572,96	80000,0	41768,2	1,915	N/A	1,758	100+	8,064

 9
 0
 Burst and Axial Flags

 10
 Burst and Axial Flags

 12
 12

 13
 Axial Flags

 14
 Default = Tension, M = Compression

 15
 Triaxial Flags

 16
 Triaxial Flags

 17
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 18
 Envelope Flags

 20
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	fety Factor Sumr				unace casing				
	String	MD	Yield Strength	VME Stress			ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	80000,0	2685,2	D 29,793	N/A	100+	100+	29,8
	1	24,96	80000,0	2878,9	27,788	N/A	100+	37,678	33,3
I	1	122,96	80000,0	4664,8	17,150	N/A	100+	7,650	61,7
I	1	123,02	80000,0	4626,8	17,291	N/A	100+	7,647	64,6
I	1	158,98	80000,0	5275,7	15,164	N/A	100+	6,151	97,
	1	159,04	80000,0	5275,7	15,164	N/A	100+	6,151	97,
	1	171,91	80000,0	5236,1	15,279	N/A	100+	6,139	1
	1	304,80	80000,0	4220,4	18,956	N/A	100+	6,877	M 10
Ι	1	572,96	80000,0	2024,0	39,526	N/A	100+	9,081	CM 53,
l									
	Burst and Axial Flag								
1	Default = Pipe Body,	L = Connection	Leak, B = Conned	ction Burst, F = Cor	nection Fracture.	J = Connection Ju	imp-out, Y = Conr	ection Yield, C = 0	Connection
			,	,,-				,	
	Axial Flags								
	Default = Tension, M	= Compression	1						
1	,								
	Triaxial Flags								
	Default = Inner Wall a	and Positive Re	nding OP No Ben	ding D = Outer wall	safety factor N =	Negative Rending			
		and Positive De	nung ok no ben	ung, D - Outer wan	salety factor, it -	negative benuing			
	Envelone Flags								
	Envelope Flags EB = Envelope Burst	, EC = Envelop	e Collapse, N/A = r	no ISO Connection					
1	EB = Envelope Burst	nary - Greer	1Cement #1 - 2	20'' Surface Casi	ing	AL			
	EB = Envelope Burst fety Factor Sumr String	narγ - Greer MD	nCement #1 - 2 Yield Strength	20'' Surface Casi VME Stress			ute Safety Factors	Callance	A
	EB = Envelope Burst	narγ - Greer MD (m)	nCement #1 - 2 Yield Strength (psi)	20" Surface Cas VME Stress (psi)	Triaxial	Envelope	Burst	Collapse	Axial
	EB = Envelope Burst fety Factor Sumr String	nary - Greer MD (m) 0,03	nCement #1 - 2 Yield Strength (psi) 80000,0	20'' Surface Cas VME Stress	Triaxial 1,720	Envelope N/A	Burst 1,533	100+	3,
	EB = Envelope Burst fety Factor Sumr String	narγ - Greer MD (m) 0,03 24,96	nCement #1 - 2 Yield Strength (psi) 80000,0 80000,0	20" Surface Casi VME Stress (psi) 46510,4 46401,9	Triaxial 1,720 1,724	Envelope N/A N/A	Burst 1,533 1,537	100+ 100+	3, 3,
	EB = Envelope Burst fety Factor Sumr String	nary - Greer MD (m) 0,03 24,96 122,96	nCement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0	20" Surface Cas VME Stress (psi) 46510,4 46401,9 45983,6	Triaxial 1,720 1,724 1,740	Envelope N/A N/A N/A	Burst 1,533 1,537 1,551	100+ 100+ 100+	3,5 3,5 3,7
	EB = Envelope Burst fety Factor Sumr String	nary - Greer MD (m) 0,03 24,96 122,96 123,02	Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0	20" Surface Casi VME Stress	Triaxial 1,720 1,724 1,740 1,740	Envelope N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,551 1,552	100+ 100+ 100+ 100+ 100+	3,5 3,5 3,7 3,7
	EB = Envelope Burst fety Factor Sumr String	nary - Greer MD (m) 0,03 24,96 122,96 123,02 158,98	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0	20" Surface Casi VME Stress	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765	Envelope N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,552 1,574	100+ 100+ 100+ 100+ 100+ 100+	3,5 3,5 3,7 3,7 3,8
	EB = Envelope Burst fety Factor Sumr String	nary - Greer MD (m) 0,03 24,96 122,96 123,02 158,98 159,04	Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0	20" Surface Casi VME Stress	Triaxial 1,720 1,724 1,740 1,740 1,765 1,765	Envelope N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,552 1,574 1,574	100+ 100+ 100+ 100+ 100+ 100+ 100+	3,5 3,5 3,7 3,7 3,8 3,8
	EB = Envelope Burst fety Factor Sumr String	nary - Greer MD (m) 0,03 24,96 122,96 123,02 158,98	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0	20" Surface Casi VME Stress	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765	Envelope N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,552 1,574	100+ 100+ 100+ 100+ 100+ 100+	3,5 3,5 3,7 3,7 3,8
	EB = Envelope Burst fety Factor Sumr String	nary - Greer MD (m) 0,03 24,96 122,96 123,02 158,98 159,04	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Casi (psi) 46510,4 46401,9 45982,9 45314,3 45313,2	Triaxial 1,720 1,724 1,740 1,740 1,765 1,765	Envelope N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,552 1,574 1,574	100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4,
	EB = Envelope Burst fety Factor Sumr String	mary - Greer MD (m) 124,96 122,96 123,02 158,98 159,04 304,80	Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas: VME Stress (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45314,3 45513,2 42601,3	Triaxial 1,720 1,724 1,740 1,740 1,765 1,765 1,878	Envelope N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,552 1,574 1,574 1,574 1,675	100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4,
a	EB = Envelope Burst	nary - Greer MD (m) 0.03 24.96 122.96 123.02 156.98 159.04 304.80 572.96	Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas: VME Stress (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45314,3 45513,2 42601,3	Triaxial 1,720 1,724 1,740 1,740 1,765 1,765 1,878	Envelope N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,552 1,574 1,574 1,574 1,675	100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 3, 4,
	EB = Envelope Burst	mary - Greer MD (m) 122,96 122,96 123,02 156,98 159,04 304,80 572,96 s	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45313,2 42501,3 39428,9	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,551 1,554 1,574 1,574 1,675 1,812	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4, 4,
a	EB = Envelope Burst	mary - Greer MD (m) 122,96 122,96 123,02 156,98 159,04 304,80 572,96 s	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45313,2 42501,3 39428,9	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,551 1,554 1,574 1,574 1,675 1,812	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4, 4,
	EB = Envelope Burst	mary - Greer MD (m) 122,96 122,96 123,02 156,98 159,04 304,80 572,96 s	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45313,2 42501,3 39428,9	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,551 1,554 1,574 1,574 1,675 1,812	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4, 4,
	Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<u>marγ - Greer</u> <u>MD</u> (m) 0.03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 <b>s</b> <b>L = Connectior</b>	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45313,2 42501,3 39428,9	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,551 1,554 1,574 1,574 1,675 1,812	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4, 4,
	EB = Envelope Burst	<u>marγ - Greer</u> <u>MD</u> (m) 0.03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 <b>s</b> <b>L = Connectior</b>	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45313,2 42501,3 39428,9	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,551 1,554 1,574 1,574 1,675 1,812	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4, 4,
	EB = Envelope Burst	<u>marγ - Greer</u> <u>MD</u> (m) 0.03 24,96 122,96 123,02 158,98 159,04 304,80 572,96 <b>s</b> <b>L = Connectior</b>	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0	20" Surface Cas (psi) 46510,4 46401,9 45983,6 45982,9 45314,3 45313,2 42501,3 39428,9	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	Burst 1,533 1,537 1,551 1,551 1,554 1,574 1,574 1,675 1,812	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3; 3; 3; 3; 3; 3; 4; 4,
	Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - Greer MD (m) 123,96 122,96 123,02 158,98 159,04 304,80 572,96 s L = Connectior = Compressior	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 1 Leak, B = Connec	20" Surface Casi VME Stress (psi) 46510,4 46401,9 45983,6 45983,6 45982,9 45313,2 42601,3 39428,9 Strength Strength St	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029 anection Fracture,	Envelope N/A N/A N/A N/A N/A N/A N/A J = Connection Ju	Burst 1,533 1,537 1,551 1,552 1,574 1,574 1,675 1,875 1,875 1,812 Imp-out, Y = Conr	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3; 3; 3; 3; 3; 3; 4; 4,
	EB = Envelope Burst	nary - Greer MD (m) 123,96 122,96 123,02 158,98 159,04 304,80 572,96 s L = Connectior = Compressior	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 1 Leak, B = Connec	20" Surface Casi VME Stress (psi) 46510,4 46401,9 45983,6 45983,6 45982,9 45313,2 42601,3 39428,9 Strength Strength St	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029 anection Fracture,	Envelope N/A N/A N/A N/A N/A N/A N/A J = Connection Ju	Burst 1,533 1,537 1,551 1,552 1,574 1,574 1,675 1,875 1,875 1,812 Imp-out, Y = Conr	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4, 4,
	Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - Greer MD (m) 123,96 122,96 123,02 158,98 159,04 304,80 572,96 s L = Connectior = Compressior	1Cement #1 - 2 Yield Strength (psi) 80000,0 80000,0 80000,0 80000,0 80000,0 80000,0 1 Leak, B = Connec	20" Surface Casi VME Stress (psi) 46510,4 46401,9 45983,6 45983,6 45982,9 45313,2 42601,3 39428,9 Strength Strength St	Triaxial 1,720 1,724 1,740 1,740 1,740 1,765 1,765 1,878 2,029 anection Fracture,	Envelope N/A N/A N/A N/A N/A N/A N/A J = Connection Ju	Burst 1,533 1,537 1,551 1,552 1,574 1,574 1,675 1,875 1,875 1,812 Imp-out, Y = Conr	100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	3, 3, 3, 3, 3, 3, 4, 4,

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factor:	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	80000,0	6012,2	D 13,306	N/A	100+	100+	13,31
	1	24,96	80000,0	5773,0	D 13,858	N/A	100+	100+	13,96
	1	122,96	80000,0	4833, 1	D 16,553	N/A	100+	100+	17,31
	1	123,02	80000,0	4832,5	D 16,555	N/A	100+	100+	17,31
	1	158,98	80000,0	4487,8	D 17,826	N/A	100+	93,195	18,98
	1	159,04	80000,0	4487,2	D 17,828	N/A	100+	93,159	18,98
	1	304,80	80000,0	3089,2	D 25,897	N/A	100+	48,606	31,15
	1	572,96	80000,0	800,0	D 100+	N/A	100+	25,856	100
	1	572,96	80000,0	800,0	D 100+	N/A	100+	25,856	100
) l	1 Burst and Axial Flags		80000,0	800,0	D 100+	N/A	100+	25,856	100
1	1 Burst and Axial Flags Default = Pipe Body, L								
0 1	Default = Pipe Body, L								100 Connection
0 1 1 2 3	Default = Pipe Body, L Axial Flags	_ = Connection	ı Leak, B = Connec						
0   1   2 3   4	Default = Pipe Body, L	_ = Connection	ı Leak, B = Connec						
0 1 2 3 4 5	Default = Pipe Body, L Axial Flags Default = Tension, M =	_ = Connection	ı Leak, B = Connec						
1 2 3 4 5 6	Default = Pipe Body, L Axial Flags Default = Tension, M = Friaxial Flags	_ = Connection = Compression	i Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection Ju	mp-out, Y = Con		
0 E 1 C 2 3 A 4 E 5 6 7 E	Default = Pipe Body, L Axial Flags Default = Tension, M =	_ = Connection = Compression	i Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection Ju	mp-out, Y = Con		
0 I 1 I 2 3 4 4 I 5 6 7 I 8	Default = Pipe Body, L Axial Flags Default = Tension, M = Friaxial Flags	_ = Connection = Compression	i Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection Ju	mp-out, Y = Con		

String Section 1 1	MD	Yield Strength	VME Stress		Ahsol	ute Safety Factors	5	
1	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	0,03	80000,0	8195,3	D 9,762	N/A	100+	100+	9,7
1	24,96	80000,0	7998,6	D 10,002	N/A	100+	100+	10,0
	122,96	80000,0	7225,7	D 11,072	N/A	100+	100+	11,4
1	123,02	80000,0	7225.2	D 11.072	N/A	100+	100+	11,4
1	158,98	80000,0	6941,8	D 11,524	N/A	100+	93,178	12,0
1	159,04	80000,0	6941,3	D 11,525	N/A	100+	93,142	12,0
1	304,80	80000,0	5791,7	D 13,813	N/A	100+	48,605	15,1
1	572,96	80000,0	3676,8	D 21,758	N/A	100+	25,856	29,6
Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall : Envelope Flags EB = Envelope Bursi	I = Compressior and Positive Be	nding OR No Bend	ling, D = Outer wall			· ·	nection Yield, C = (	Connection
afety Factor Sumr				ate Casing				
String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	s	
String Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	(m) 0,03	(psi) 110000,0	(psi) 14685,8	7,490	Envelope N/A	Burst 14,796	Collapse 100+	C 6,6
	(m) 0,03 24,96	(psi) 110000,0 110000,0	(psi) 14685,8 14478,9	7,490 7,597	Envelope N/A N/A	Burst 14,796 14,796	Collapse 100+ 100+	C 6,6 C 6,8
	(m) 0,03 24,96 122,99	(psi) 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4	7,490 7,597 8,045	Envelope N/A N/A N/A	Burst 14,796 14,796 14,795	Collapse 100+ 100+ 100+	C 6,6 C 6,6 C 7,3
	(m) 0,03 24,96 122,99 304,80	(psi) 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3	7,490 7,597 8,045 9,001	Envelope N/A N/A N/A N/A	Burst 14,796 14,796 14,795 14,795 14,796	Collapse 100+ 100+ 100+ 100+ 100+	C 6,6 C 6,6 C 7,5 C 8,4
	(m) 0,03 24,96 122,99 304,80 572,96	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5	7,490 7,597 8,045 9,001 10,769	Envelope N/A N/A N/A N/A N/A	Burst 14,796 14,796 14,795 14,795 14,796 14,796	Collapse 100+ 100+ 100+ 100+ 100+ 100+	C 6,6 C 6,6 C 7,3 C 8,4 C 11,0
	(m) 24,96 122,99 304,80 572,96 573,02	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5 10214,1	7,490 7,597 8,045 9,001 10,769 10,769	Envelope N/A N/A N/A N/A N/A	Burst 14,796 14,796 14,795 14,796 14,796 14,796	Collapse 100+ 100+ 100+ 100+ 100+ 100+	C 6,6 C 6,8 C 7,3 C 8,4 C 11,0 C 11,0
	(m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5 10214,1 9958,0	7,490 7,597 8,045 9,001 10,769 10,769 11,046	Envelope N/A N/A N/A N/A N/A N/A	Burst 14,796 14,795 14,795 14,796 14,796 14,796 14,796	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+	C 6,6 C 6,8 C 7,3 C 8,4 C 11,0 C 11,0 C 11,0
	(m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5 10214,1 9958,0 8072,2	7,490 7,597 8,045 9,001 10,769 10,769 11,046 13,627	Envelope N/A N/A N/A N/A N/A N/A N/A	Burst 14,796 14,795 14,795 14,796 14,796 14,796 14,796 14,795	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	C 6, C 6, C 7, C 8, C 11, C 11, C 11, C 11, C 18,
	(m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5 10214,1 9958,0 8072,2 6879,5	7,490 7,597 8,045 9,001 10,769 10,769 11,046 13,627 15,990	Envelope N/A N/A N/A N/A N/A N/A N/A N/A	Burst 14,796 14,795 14,795 14,796 14,796 14,796 14,796 14,795 14,795	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	C 6, C 6, C 7, C 8, C 11, C 11, C 11, C 11, C 18, C 42,
	(m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5 10214,5 10214,1 9958,0 8072,2 6879,5 6731,4	7,490 7,597 8,045 9,001 10,769 10,769 11,046 13,627 15,990 16,341	Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	Burst 14,796 14,795 14,795 14,796 14,796 14,796 14,796 14,796 14,796 14,796	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	C 6, C 6, C 7, C 8, C 11, C 11, C 11, C 11, C 18, C 42, C 6, C 6,
	(m) 0,03 24,96 122,99 304,80 573,92 609,60 914,40 1219,20 1299,97 1300,03	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5 10214,1 9958,0 8072,2 6679,5 6731,4 6731,3	7,490 7,597 8,045 9,001 10,769 11,046 13,627 15,990 16,341	Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	Burst 14,796 14,796 14,796 14,796 14,796 14,796 14,796 14,796 14,796	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	C 6, C 6, C 7, C 8, C 11, C 11, C 11, C 18, C 42, C 66, C 66, C 66,
	(m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97	(psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	(psi) 14685,8 14478,9 13673,4 12220,3 10214,5 10214,5 10214,1 9958,0 8072,2 6879,5 6731,4	7,490 7,597 8,045 9,001 10,769 10,769 11,046 13,627 15,990 16,341	Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	Burst 14,796 14,795 14,795 14,796 14,796 14,796 14,796 14,796 14,796 14,796	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	C 6, C 6, C 7, C 8, C 11, C 11, C 11, C 11, C 18, C 42, C 6, C 6,

254

## File: Vertical Exploration Well Design, v1

Date/Time: March 01, 2018 02:57:11 PM Page: 17 of 28

<u>S</u> a	afety Factor Sumn	nary - Press	<u>ureTest #1 - 1</u> 3	3 3/8" Intermed	iate Casing				
	String	MD	Yield Strength	VME Stress		Abs	olute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	57305,3	1,920	N/A	1,720	100+	3,707
2	1	24,96	110000,0	57302,2	1,920	N/A	1,720	100+	3,743
3	1	122,99	110000,0	57299,0	1,920	N/A	1,720	100+	3,891
4	1	304,80	110000,0	57331,7	1,919	N/A	1,720	100+	4,198
5	1	533,19	110000,0	57447,3	N 1,915	N/A	1,720	100+	4,652
6	1	572,96	110000,0	57486,3	N 1,913	N/A	1,720	100+	4,710
7	1	573,02	110000,0	57483,3	N 1,914	N/A	1,720	100+	4,719
8	1	609,60	110000,0	57519,3	N 1,912	N/A	1,720	100+	4,781
9	1	914,40	110000,0	57961,9	N 1,898	N/A	1,720	100+	5,367
10	1	1219,20	110000,0	58616,6	N 1,877	N/A	1,720	100+	6,101
11	1	1299,97	110000,0	58820,4	N 1,870	N/A	1,720	100+	6,327
12	1	1300,03	110000,0	58408,1	1,883	N/A	1,720	100+	C 7,435
13	1	1524,00	110000,0	60690,0	1,812	N/A	1,666	100+	C 8,316
14	1	1527,96	110000,0	60729,9	N 1,811	N/A	1,665	100+	C 8,332
15									

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Safety Factor Summary - LostReturnsWithMudDrop #1 - 13 3/8" Intermediate Casing

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	11923,7	D 9,225	N/A	100+	100+	C 9,224
2	1	24,96	110000,0	12051,6	9,127	N/A	100+	56,186	C 9,449
3	1	122,99	110000,0	12902,9	8,525	N/A	100+	11,414	C 10,450
4	1	304,80		15640,6	7,033	N/A	100+	4,612	C 13,00
5	1	572,96	110000,0	20009,4	5,497	N/A	100+	2,638	C 20,34
5	1	573,02	110000,0	20008,9	5,498	N/A	100+	2,638	C 20,34
7	1	609,60	110000,0	19697,3	5,585	N/A	100+	2,636	C 22,04
3	1	914,40	110000,0	16385,8	6,713	N/A	100+	2,754	C 72,218
Э	1	1219,20	110000,0	13286,3	8,279	N/A	100+	2,887	CM 56,47
0	1	1299,97	110000,0	12529,8	8,779	N/A	100+	2,924	CM 38,35
11	1	1300,03	110000,0	8879,8	12,388	N/A	100+	4,001	CM 56,74
12	1	1524,00	110000,0	7373,6	14,918	N/A	100+	4,110	CM 28,41
13	1	1527,96	110000,0	7350,5	14,965	N/A	100+	4,112	CM 28,19
14									
15	Burst and Axial Flags								
16	Default = Pipe Body,	L = Connectio	n Leak, B = Connec	tion Burst, F = Cor	nnection Fracture,	J = Connection Ju	ımp-out, Y = Con	nection Yield, C = 0	Connection
17									
18	Axial Flags								
19	Default = Tension, M	= Compressio	n						
20									
21	Triaxial Flags								
22	Default = Inner Wall a	nd Positive Be	ending OR No Bend	ling, D = Outer wal	l safety factor, N =	Negative Bending			
23									
24	Envelope Flags								

24 Envelope Flags 25 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Conventional Well Design

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	41400,3	2,657	N/A	2,466	100+	3,56
	1	24,96	110000,0	41340,5	2,661	N/A	2,466	100+	3,5
	1	122,99	110000,0	41117,0	2,675	N/A	2,466	100+	3,7
	1	304,80	110000,0	40753,5	2,699	N/A	2,466	100+	4,0
	1	572,96	110000,0	40341,7	2,727	N/A	2,466	100+	4,5
	1	573,02	110000,0	40341,7	2,727	N/A	2,466	100+	4,5
	1	609,60	110000,0	40297,2	2,730	N/A	2,466	100+	4,6
	1	914,40	110000,0	40038,3	2,747	N/A	2,466	100+	5,3
	1	1219,20	110000,0	39980,2	2,751	N/A	2,466	100+	6,4
	1	1299,97	110000,0	39998,7	2,750	N/A	2,466	100+	C 6,8
	1	1300,03	110000,0	39998,7	2,750	N/A	2,466	100+	C 6,8
	1	1524,00	110000,0	38719,4	2,841	N/A	2,552	100+	C 8,1
	1	1527,96	110000,0	38686,1	N 2,843	N/A	2,554	100+	C 8,1
	Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags FB = Envelope Burst	nd Positive Be	nding OR No Bend		safety factor, N =	Negative Bending			
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst	nd Positive Be , EC = Envelope	nding OR No Bend e Collapse, N/A = n	o ISO Connection	• •	Negative Bending	1		
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Sumr	nd Positive Be , EC = Envelope nary - OverF	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8"	o ISO Connection	• •				
T	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	nd Positive Be , EC = Envelope nary - OverF MD	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8'' Yield Strength	o ISO Connection	asing	Abso	ute Safety Factors		Avial
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Sumr	nd Positive Be , EC = Envelope nary - OverF MD (m)	nding OR No Bend e Collapse, N/A = n Qull #1 - 13 3/8" Yield Strength (psi)	o ISO Connection	asing Triaxial	Absol	lute Safety Factors Burst │	Collapse	Axial
1	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	nd Positive Be , EC = Envelope nary - OverF MD (m) 0,03	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8'' Yield Strength (psi) 110000,0	o ISO Connection	asing Triaxial D 6,602	Absol Envelope N/A	ute Safety Factors Burst 100+	Collapse 100+	C 6,6
	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	nd Positive Be , EC = Envelope nary - OverF MD (m) (m) 0,03 24,96	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8'' Yield Strength (psi) 110000,0 110000,0	o ISO Connection	asing Triaxial D 6,602 D 6,696	Abso Envelope N/A N/A	ute Safety Factors Burst 100+ 100+	Collapse 100+ 100+	C 6,6 C 6,7
1	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	and Positive Be , EC = Envelope nary - OverF MD (m) 0.03 24.96 122.99	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0	o ISO Connection Intermediate C VME Stress (psi) 16661,4 16428,8 15514,2	asing Triaxial D 6,602 D 6,696 D 7,090	Abso Envelope N/A N/A N/A	lute Safety Factors Burst   100+ 100+ 100+	Collapse 100+ 100+ 100+	C 6,6 C 6,7 C 7,2
	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be and Positive Be mary - OverF MD (m) 0.03 24,96 122,99 304,80	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0	o ISO Connection	asing Triaxial D 6,602 D 6,696 D 7,090 D 7,961	Abso Envelope N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+	Collapse 100+ 100+ 100+ 59,817	C 6,6 C 6,7 C 7,2 C 8,3
	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	and Positive Be , EC = Envelope MD (m) (m) 24,96 122,99 304,80 572,96	nding OR No Bend e Collapse, N/A = n 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	o ISO Connection VME Stress (psi) 16661,4 16428,8 15514,2 13818,2 11316,4	asing Triaxial D 6,602 D 6,696 D 7,090 D 7,961 D 9,720	Absol Envelope N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+	Collapse 100+ 100+ 59,817 31,888	C 6,6 C 6,7 C 7,2 C 8,3 C 10,8
1	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be and Positive Be mary - OverF MD (m) 0,03 24,96 122,99 304,80 572,96 573,02	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0	o ISO Connection Intermediate C VME Stress (psi) 16661,4 16428,8 15514,2 13818,2 11316,4 11315,8	Triaxial D 6,602 D 6,696 D 7,961 D 9,720 D 9,721	Absol Envelope N/A N/A N/A N/A N/A N/A	lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+	Collapse 100+ 100+ 59,817 31,888 31,885	C 6,6 C 6,7 C 7,2 C 8,3 C 10,8 C 10,8
	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be and Positive Be mary - OverF MD (m) 0.03 24.96 122.99 304.80 572.96 573.02 609.60	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0	Disc Connection	asing Triaxial D 6,602 D 6,696 D 7,090 D 7,961 D 9,720 D 9,721 D 10,023	Abso Envelope N/A N/A N/A N/A N/A N/A N/A N/A	lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	Collapse 100+ 100+ 59,817 31,888 31,885 29,980	C 6,6 C 6,7 C 7,2 C 8,3 C 10,8 C 10,8 C 10,8 C 11,3
1	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be hary - OverF MD (m) (m) 24.96 572.96 572.96 573.02 609.60 914.40	nding OR No Bend e Collapse, N/A = n 2ull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0	o ISO Connection VME Stress (psi) 16661,4 16428,8 16514,2 13818,2 11316,4 11315,8 10974,7 8131,1	asing Triaxial D 6,602 D 6,696 D 7,990 D 7,961 D 9,720 D 9,721 D 9,720 D 9,721 D 10,023 D 13,528	Absol Envelope N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	Collapse 100+ 100+ 59,817 31,888 31,885 29,980 20,020	C 6,6 C 6,7 C 7,2 C 8,3 C 10,8 C 10,8 C 10,8 C 11,3 C 17,5
	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be and Positive Be mary - OverF MD (m) 0.03 24,96 122,99 304,80 573,92 609,60 914,40 1219,20	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	o ISO Connection	Triaxial         D 6,602           D 6,696         D 7,090           D 7,961         D 9,720           D 9,721         D 10,023           D 13,528         D 2,803	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	Collapse 100+ 100+ 59,817 31,888 31,885 29,980 20,020 15,032	C 6,6 C 6,7 C 7,2 C 8,3 C 10,8 C 10,8 C 10,8 C 11,3 C 17,5 C 39,3
1	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	nd Positive Be <u>EC = Envelope</u> <u>MD</u> (m) 0,03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	o ISO Connection VME Stress (psi) 16661,4 16428,8 15514,2 13818,2 11316,4 11315,8 10974,7 8131,1 5287,6 4534,1	asing Triaxial D 6,602 D 6,696 D 7,990 D 7,991 D 9,720 D 9,721 D 10,023 D 13,528 D 20,803 D 24,261	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	Lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	Collapse 100+ 100+ 59,817 31,888 31,885 29,980 20,020 15,032 14,101	C 6,6 C 6,7 C 7,2 C 8,3 C 10,8 C 10,8 C 10,8 C 11,3 C 17,5 C 39,3 C 58,6
1	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be And Positive Be MD (m) (m) 24.96 572.96 573.02 609.60 914.40 1219.20 1299.97 1300.03	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	Disc Connection	Triaxial D 6,602 D 6,602 D 7,961 D 9,720 D 9,721 D 10,023 D 13,528 D 20,803 D 24,261 D 24,264	Envelope K/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	Collapse 100+ 100+ 59,817 31,888 31,885 29,980 20,020 15,032 14,101 14,100	C 6,6 C 6,7 C 7,2 C 8,3 C 10,8 C 10,8 C 10,8 C 10,8 C 11,3 C 17,5 C 39,3 C 58,6 C 58,6
1	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be and Positive Be mary - OverF MD (m) 0.03 24,96 122,99 304,80 572,96 573,02 609,60 914,40 1219,20 1299,97 1300,03 1371,60	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	Disc Connection	asing Triaxial D 6,602 D 6,696 D 7,090 D 9,720 D 9,720 D 9,720 D 9,720 D 13,528 D 20,803 D 24,261 D 24,264 D 24,454	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	Collapse 100+ 100+ 59,817 31,885 31,885 29,980 20,020 15,032 14,101 14,100 13,366	C 6,6 C 6,7 C 7,2 C 8,3 C 10,6 C 10,6 C 10,6 C 11,3 C 17,5 C 39,3 C 58,6 C 58,6 C 58,6 C 10
	Default = Tension, M Triaxial Flags Default = Inner Wall & Envelope Flags EB = Envelope Burst Ifety Factor Sumr String	And Positive Be And Positive Be MD (m) (m) 24.96 572.96 573.02 609.60 914.40 1219.20 1299.97 1300.03	nding OR No Bend e Collapse, N/A = n Pull #1 - 13 3/8" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	Disc Connection	Triaxial D 6,602 D 6,602 D 7,961 D 9,720 D 9,721 D 10,023 D 13,528 D 20,803 D 24,261 D 24,264	Envelope K/A N/A N/A N/A N/A N/A N/A N/A N/A N/A N	Lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	Collapse 100+ 100+ 59,817 31,888 31,885 29,980 20,020 15,032 14,101 14,100	C 6,6 C 6,7 C 7,2 C 8,3 C 10,6 C 10,6 C 10,6 C 11,5 C 17,5 C 39,3 C 58,6 C 58,6

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 19
 Axial Flags

 20
 Default = Tension, M = Compression

 21
 Traxial Flags

 22
 Traxial Flags

 23
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 24
 E

 25
 Envelope Flags

 26
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Conventional Well Design

### File: Vertical Exploration Well Design, v1

Date/Time: March 01, 2018 02:57:12 PM Page: 19 of 28

18	afety Factor Summ	nary - Runni	ingHole #1 - 13	3 3/8" Intermed	iate Casing				
	String	MD	Yield Strength	VME Stress		Ab	solute Safety Facto	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	16954,7	D 6,488	N/A	100+	100+	6,488
2	1	24,96	110000,0	16773,0	D 6,558	N/A	100+	100+	C 6,577
3	1	122,99	110000,0	16059,0	D 6,850	N/A	100+	100+	C 6,957
4	1	304,80	110000,0	14734,8	D 7,465	N/A	100+	59,772	C 7,794
5	1	572,96	110000,0	12781,4	D 8,606	N/A	100+	31,858	C 9,473
6	1	573,02	110000,0	12781,0	D 8,607	N/A	100+	31,855	C 9,473
7	1	609,60	110000,0	12514,6	D 8,790	N/A	100+	29,951	C 9,760
8	1	914,40	110000,0	10294,4	D 10,685	N/A	100+	20,001	C 13,055
9	1	1219,20	110000,0	8074,3	D 13,623	N/A	100+	15,019	C 19,706
10	1	1299,97	110000,0	7486,0	D 14,694	N/A	100+	14,090	C 22,782
11	1	1300,03	110000,0	7485,5	D 14,695	N/A	100+	14,089	C 22,785
12	1	1524,00	110000,0	5854,1	D 18,790	N/A	100+	12,026	C 40,178
13	1	1527,96	110000,0	5825,2	D 18,883	N/A	100+	11,994	C 40,729
14									
15	<b>Burst and Axial Elago</b>								

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String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	0,03	110000,0	29095,9	3,781	N/A	3,443	100+	5,620
1	24,96	110000,0	28715,7	3,831	N/A	3,489	100+	5,702
1	122,99	110000,0	27221,4	4,041	N/A	3,684	100+	6,052
1	304,80	110000,0	24451,4	4,499	N/A	4,107	100+	C 6,828
1	572,96	110000,0	20369,5	5,400	N/A	4,947	100+	C 8,423
1	573,02	110000,0	20368,6	5,400	N/A	4,947	100+	C 8,423
1	609,60	110000,0	19812,4	5,552	N/A	5,089	100+	C 8,700
1	914,40	110000,0	15185,0	7,244	N/A	6,687	100+	C 11,988
1	1219,20	110000,0	10584,2	10,393	N/A	9,747	100+	C 19,271
D 1	1299,97	110000,0	9374,4	11,734	N/A	11,092	100+	C 22,969
1 1	1300,03	110000,0	8896,3	12,365	N/A	11,093	100+	C 49,433
2 1	1378,00	110000,0	8353,6	13,168	N/A	11,803	100+	C 86,721
3 1	1524,00	110000,0	7411,9	14,841	N/A	13,409	100+	100+
4 1	1527,96	110000,0	7387,7	N 14,890	N/A	13,458	100+	100+
5								
6 Burst and Axial Flags								
7 Default = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Coni	nection Yield, C = C	Connection
B								
9 Axial Flags								
Default = Tension, M	= Compression	า						
1								
2 Triaxial Flags								
	nd Positive Be	nding OR No Bend	ling, D = Outer wall	salety factor, N =	· Negative benuing			
1	20			a statut faatan Na	Nogotivo Ponding			

File	: Vertical Explorat	ion Well De	sign, v1			Date/Time: Mar	ch 01, 2018 C	02:57:12 PM Pa	age: 20 of 28
Sa	fety Factor Summ	nary - Initial	Conditions - 9	5/8" Intermediat	e Casing				
	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	ŝ	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	24101,6	4,564	N/A	21,800	100+	4,261
2	1	24,96	110000,0	23883,7	4,606	N/A	21,800	100+	4,308
3	1	122,99	110000,0	23027,8	4,777	N/A	21,800	100+	4,504
4	1	304,80	110000,0	21444,0	5,130	N/A	21,800	100+	4,917
5	1	609,60	110000,0	18802,1	5,850	N/A	21,800	100+	5,810
6	1	914,40	110000,0	16184,1	6,797	N/A	21,800	100+	7,101
7	1	1219,20	110000,0	13603,8	8,086	N/A	21,800	100+	9,130
8	1	1524,00	110000,0	11087,5	9,921	N/A	21,800	100+	12,779
9	1	1527,96	110000,0	11055,0	9,950	N/A	21,800	100+	12,847
10	1	1528,02	110000,0	11055,2	9,950	N/A	21,800	100+	12,847
11	1	1828,80	110000,0	8691,0	12,657	N/A	21,800	100+	C 21,291
12	1	2133,60	110000,0	6547,2	16,801	N/A	21,800	59,463	C 63,766
13	1	2349,98	110000,0	5349,3	20,563	N/A	21,800	41,489	100+
14	1	2350,04	110000,0	5349,4	20,563	N/A	21,800	41,487	100+
15	1	2438,40	110000,0	5141,2	21,396	N/A	20,857	41,211	CM 64,085
16	1	2541,00	110000,0	5105,7	21,545	N/A	19,860	40,894	CM 38,262
17	1	2690,96	110000,0	4634,5	N 23,735	N/A	21,677	28,299	CM 24,076
18									
10									

 18
 Image: Constant Axial Flags

 20
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 21
 Axial Flags

 23
 Default = Tension, M = Compression

 24
 Friaxial Flags

 25
 Triaxial Flags

 26
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 27
 28

 28
 Envelope Flags

 29
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

### Safety Factor Summary - DisplaceToGas #1 - 9 5/8" Intermediate Casing

	String	MD	Yield Strength	VME Stress		Ab	solute Safety Facto	ors	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	58724,4	1,873	N/A	1,716	100+	3,293
2	1	24,96	110000,0	58254,9	1,888	N/A	1,730	100+	3,321
3	1	122,99	110000,0	56409,7	1,950	N/A	1,787	100+	3,436
4	1	304,80	110000,0	52989,5	2,076	N/A	1,904	100+	3,672
5	1	609,60	110000,0	47262,1	2,327	N/A	2,138	100+	4,148
6	1	914,40	110000,0	41545,8	2,648	N/A	2,438	100+	4,767
7	1	1219,20	110000,0	35846,1	3,069	N/A	2,836	100+	5,602
8	1	1524,00	110000,0	30172,2	3,646	N/A	3,389	100+	6,792
9	1	1527,96	110000,0	30098,5	3,655	N/A	3,398	100+	6,811
10	1	1528,02	110000,0	30097,5	3,655	N/A	3,398	100+	6,811
11	1	1828,80	110000,0	24542,3	4,482	N/A	4,210	100+	8,625
12	1	2133,60	110000,0	18995,4	5,791	N/A	5,556	100+	11,812
13	1	2349,98	110000,0	15158,0	7,257	N/A	7,187	100+	16,014
14	1	2350,04	110000,0	24556,8	4,479	N/A	4,099	100+	C 23,155
15	1	2438,40	110000,0	23330,8	4,715	N/A	4,328	100+	C 32,483
16	1	2590,80	110000,0	21255,1	5,175	N/A	4,790	100+	C 96,513
17	1	2690,96	110000,0	18373,8	N 5,987	N/A	5,577	100+	100+
18									

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# File: Vertical Exploration Well Design, v1

Date/Time: March 01, 2018 02:57:12 PM Page: 21 of 28

	Safety Factor Summ	nary - Press	ureTest #1 - 9	5/8" Intermedi	ate Casing				
	String	MD	Yield Strength	VME Stress		Ab	solute Safety Facto	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	58200,9	1,890	N/A	1,758	100+	2,863
2	1	24,96	110000,0	58156,7	1,891	N/A	1,758	100+	2,884
3	1	122,99	110000,0	57990,5	1,897	N/A	1,758	100+	2,970
4	1	304,80	110000,0	57716,0	1,906	N/A	1,758	100+	3,144
5	1	609,60	110000,0	57355,6	1,918	N/A	1,758	100+	3,487
6	1	914,40	110000,0	57121,9	1,926	N/A	1,758	100+	3,914
7	1	1219,20	110000,0	57016,6	1,929	N/A	1,758	100+	4,460
8	1	1524,00	110000,0	57040,5	1,928	N/A	1,758	100+	5,183
9	1	1527,96	110000,0	57041,6	1,928	N/A	1,758	100+	5,194
10	D 1	1528,02	110000,0	57041,6	1,928	N/A	1,758	100+	5,194
1	1 1	1828,80	110000,0	57208,2	N 1,923	N/A	1,758	100+	6,116
1:	2 1	2133,60	110000,0	57597,7	N 1,910	N/A	1,758	100+	7,155
1:	3 1	2349,98	110000,0	57995,5	N 1,897	N/A	1,758	100+	8,137
14		2350,04	110000,0	68595,7	1,604	N/A	1,484	100+	7,296
1	5 1	2438,40	110000,0	69139,9	1,591	N/A	1,476	100+	7,784
10	6 1	2665,99	110000,0	70573,9	1,559	N/A	1,455	100+	9,345
1	7 1	2690,96	110000,0	69165,0	N 1,590	N/A	1,485	100+	9,812
18	3								

 18
 19
 Burst and Axial Flags

 20
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 21
 Axial Flags

 23
 Default = Tension, M = Compression

 24
 Triaxial Flags

 25
 Triaxial Flags

 26
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 27
 28

 28
 Envelope Flags

 29
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Safety Factor Summary - LostReturnsWithMudDrop #1 - 9 5/8" Intermediate Casing

	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factor	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	110000,0	22099,0	D 4,978	N/A	100+	100+	4,978
2	1	24,96	110000,0	22140,1	4,968	N/A	100+	100+	5,042
3	1	122,99	110000,0	22431,3	4,904	N/A	100+	25,492	5,311
4	1	304,80	110000,0	23490,7	4,683	N/A	100+	10,363	5,896
5	1	609,60	110000,0	26505,9	4,150	N/A	100+	5,260	7,229
6	1	914,40	110000,0	24140,9	4,557	N/A	100+	5,051	9,342
7	1	1219,20	110000,0	21458,1	5,126	N/A	100+	4,982	13,199
8	1	1524,00	110000,0	18863,6	5,831	N/A	100+	4,914	C 22,481
9	1	1527,96	110000,0	18830,3	5,842	N/A	100+	4,913	C 22,690
10	1	1528,02	110000,0	18830,3	5,842	N/A	100+	4,913	C 22,690
11	1	1828,80	110000,0	16399,4	6,708	N/A	100+	4,846	C 75,783
12	1	2133,60	110000,0	14133,7	7,783	N/A	100+	4,757	CM 55,276
13	1	2349,98	110000,0	12704,3	8,658	N/A	100+	4,685	CM 24,812
14	1	2350,04	110000,0	3493, 3	31,489	N/A	100+	14,350	CM 88,518
15	1	2438,40	110000,0	2456,4	44,782	N/A	100+	15,184	CM 50,644
16	1	2590,80	110000,0	1229,5	89,470	N/A	100+	16,875	CM 29,983
17	1	2665,99	110000,0	1339,3	82,129	N/A	74,833	17,857	CM 24,738
18	1	2690,96	110000,0	1100,0	D 100+	N/A	100+	13,296	CM 22,011
19									
20	Burst and Axial Flag								
21	Default = Pipe Body	, L = Connectior	n Leak, B = Connec	tion Burst, F = Cor	nnection Fracture	, J = Connection J	ump-out, Y = Cor	nnection Yield, C = 0	Connection
22									
23	Axial Flags								
24 25	Default = Tension, N	a - compression	•						
25 26	Triaxial Flags								
20	Default = Inner Wall	and Desitive De	nding OD No Bong		and the factor N	Nonativo Dondina	_		
28	Deraun - Inner Wan	and Fositive Be	nuing OR No Bend	ing, D - Outer wan	salely ractor, N	- Negauve Bending	4		

29 Envelope Flags 30 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	64699,4	1,700	N/A	1,627	100+	2,26
	1	24,96	110000,0	64631,9	1,702	N/A	1,627	100+	2,27
	1	122,99	110000,0	64373,4	1,709	N/A	1,627	100+	2,32
	1	304,80	110000,0	63922,8	1,721	N/A	1,627	100+	2,434
	1	609,60	110000,0	63253,1	1,739	N/A	1,627	100+	2,635
	1	914,40	110000,0	62693,9	1,755	N/A	1,627	100+	2,872
	1	1219,20	110000,0	62248,0	1,767	N/A	1,627	100+	3,155
	1	1524,00	110000,0	61918,1	1,777	N/A	1,627	100+	3,500
	1	1527,96	110000,0	61914,5	1,777	N/A	1,627	100+	3,505
0	1	1528,02	110000,0	61914,6	1,777	N/A	1,627	100+	3,505
1	1	1828,80	110000,0	61705,9	1,783	N/A	1,627	100+	3,931
2	1	2133,60	110000,0	61612,5	1,785	N/A	1,627	100+	4,482
3	1	2286,00	110000,0	61610,6	1,785	N/A	1,627	100+	4,820
4	1	2349,98	110000,0	61618,8	1,785	N/A	1,627	100+	4,978
5	1	2350,04	110000,0	61618,9	1,785	N/A	1,627	100+	4,978
6	1	2438,40	110000,0	61850,4	1,778	N/A	1,621	100+	5,213
7	1	2541,00	110000,0	62135,4	1,770	N/A	1,615	100+	5,516
8	1	2690,96	110000,0	61777,8	1,781	N/A	1,626	100+	6,028
9									
0 B	urst and Axial Flags								
	efault = Pipe Body, L =	Connection	Leak, B = Connec	tion Burst, F = Cor	nnection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = (	Connection
2									

25 26 Triaxial Flags 27 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 28 29 Envelope Flags 30 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	27176,4	D 4,048	N/A	100+	100+	4,048
2	1	24,96	110000,0	26954,3	D 4,081	N/A	100+	100+	4,090
3	1	122,99	110000,0	26081,5	D 4,218	N/A	100+	100+	4,266
	1	304,80	110000,0	24462,7	D 4,497	N/A	100+	89,800	4,634
	1	609,60	110000,0	21748,7	D 5,058	N/A	100+	45,489	5,420
;	1	914,40	110000,0	19034,7	D 5,779	N/A	100+	30,693	6,527
	1	1219,20	110000,0	16320,7	D 6,740	N/A	100+	23,278	8,202
3	1	1524,00	110000,0	13606,7	D 8,084	N/A	100+	18,816	11,033
)	1	1527,96	110000,0	13571,0	D 8,106	N/A	100+	18,769	11,083
0	1	1528,02	110000,0	13571,2	D 8,105	N/A	100+	18,768	11,083
1	1	1828,80	110000,0	10892,7	D 10,098	N/A	100+	15,830	16,847
2	1	1981,20	110000,0	9535,7	D 11,536	N/A	100+	14,678	C 22,874
3	1	2133,60	110000,0	8178,7	D 13,450	N/A	100+	13,689	C 35,621
4	1	2349,98	110000,0	6251,8	D 17,595	N/A	100+	12,501	M 100+
5	1	2350,04	110000,0	6251,9	D 17,595	N/A	100+	12,501	M 100+
6	1	2438,40	110000,0	5464,7	D 20,129	N/A	100+	12,066	100+
7	1	2541,00	110000,0	4551,2	D 24,170	N/A	100+	11,579	CM 72,757
8	1	2690,96	110000,0	3215,5	D 34,210	N/A	100+	10,933	CM 34,315
9									
	st and Axial Flags								
21 Defa	ult = Pipe Body, I	. = Connection	Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
22									
	l Flags								
	ult = Tension, M	Compression	1						
25									
	xial Flags								
27 Defa	ult = Inner Mall a	nd Booitivo Bo	nding OR No Bend	ing D = Outor wall	cofety factor N =				

28 29 Envelope Flags 30 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Stri		MD	Yield Strength	VME Stress			ute Safety Factors		
Sec	ion	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	110000,0	26660,9	D 4,126	N/A	100+	100+	4,12
	1	24,96	110000,0	26498,4	D 4,151	N/A	100+	100+	4,16
	1	122,99	110000,0	25859,4	D 4,254	N/A	100+	100+	4,3
	1	304,80	110000,0	24674,4	D 4,458	N/A	100+	89,725	4,5
	1	609,60	110000,0	22687,7	D 4,848	N/A	100+	45,332	5,1
	1	914,40	110000,0	20700,9	D 5,314	N/A	100+	30,518	5,9
	1	1219,20	110000,0	18714,2	D 5,878	N/A	100+	23,100	6,9
	1	1524,00	110000,0	16727,5	D 6,576	N/A	100+	18,641	8,4
	1	1527,96	110000,0	16701,6	D 6,586 D 6,586	N/A N/A	100+ 100+	18,595	8,4
	1	1528,02 1828,80	110000,0 110000,0	16701,2 14740,7	D 6,586 D 7,462	N/A N/A		18,594 15,661	8,4 10,6
	-	2133,60	110000,0	12754,0	D 7,462 D 8,625	N/A N/A	100+ 100+	13,527	14,3
		2349,98	110000,0	11343,7	D 9,697	N/A N/A	100+	12,345	14,3
	1	2349,98			D 9,697	N/A N/A			19,1
_		2350,04	110000,0 110000,0	11343,3 10767,3	D 9,697 D 10,216	N/A N/A	100+ 100+	12,345 11,922	C 22,2
	1	2690,96	110000,0	9121.0	D 12,060	N/A N/A	100+	10.864	C 22,2 C 40,7
	•	2050,50	110000,0	5121,0	D 12,000	19/75	100+	10,004	0 40,7
Default = Axial Flag Default = Triaxial F Default = Envelope	gs Tension, M : lags Inner Wall a Flags	= Compressior nd Positive Be	nding OR No Benc	tion Burst, F = Con ling, D = Outer wall			<u> </u>	nection Yield, C = C	Connection
Default = Axial Flaq Default = Triaxial F Default = Envelope EB = Env	Pipe Body, I gs Tension, M : lags Inner Wall a Flags elope Burst,	= Compressior nd Positive Be EC = Envelop	nding OR No Benc e Collapse, N/A = n	ling, D = Outer wall	safety factor, N =		<u> </u>	nection Yield, C = C	Connection
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope ary - Initial MD	nding OR No Benc e Collapse, N/A = n Conditions - 7'' Yield Strength	ing, D = Outer wall to ISO Connection Production Linu VME Stress	safety factor, N = <u>Pr</u>	• Negative Bending	ute Safety Factors		
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelop ary - Initial MD (m)	nding OR No Benc e Collapse, N/A = n Conditions - 7'' Yield Strength (psi)	ing, D = Outer wall to ISO Connection Production Line (psi)	safety factor, N = Ef Triaxial	Negative Bending Absol	ute Safety Factors Burst	Collapse	Axial
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope nary - Initial MD (m) 2685,04	nding OR No Bence e Collapse, N/A = n <u>Conditions - 7''</u> Yield Strength (psi) 11000,0	ing, D = Outer wall to ISO Connection Production Line VME Stress (psi) 52244,5	safety factor, N = Er Triaxial 2,105	Negative Bending Absol	ute Safety Factors Burst 100+	Collapse 1,677	Axial M 4,9
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope ary - Initial MD (m) 2685,04 2680,96	nding OR No Benc e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 110000,0 110000,0	ing, D = Outer wall o ISO Connection VME Stress (psi) 52244,5 52214,2	safety factor, N = Er Triaxial 2,105 2,107	Negative Bending	ute Safety Factors Burst 100+ 100+	Collapse 1,677 1,677	Axial M 4,9 M 4,9
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope ary - Initial MD (m) 2685,04 2680,96 2681,02	nding OR No Bence e Collapse, N/A = n <u>Conditions - 7"</u> Yield Strength (psi) 110000,0 110000,0 110000,0	Ing, D = Outer wall to ISO Connection Production Line VME Stress (psi) 52244,5 52214,2 52214,0	safety factor, N = <u>er</u> Triaxial 2,105 2,107 2,107	Negative Bending	ute Safety Factors Burst 100+ 100+ 100+	Collapse 1,677 1,677 1,677	Axial M 4,9 M 4,9 M 4,9 M 4,9
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope (m) 2685,04 2690,96 2690,96 2691,02 2743,20	nding OR No Benc e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 110000,0 110000,0 110000,0	ing, D = Outer wall o ISO Connection Production Line (psi) 52244,5 52244,5 52244,0 51951,0	safety factor, N = <u>Pr</u> Triaxial 2,105 2,107 2,107 2,117	Envelope N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+	Collapse 1.677 1.677 1.677 1.678	Axial M 4,9 M 4,9 M 4,9 M 4,9
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope tary - Initial MD (m) 2685,04 2690,96 2691,02 2743,20 3023,01	nding OR No Benc e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0	ling, D = Outer wall to ISO Connection Production Line (psi) 52244.5 52214.0 51951.0 5083.4	safety factor, N = er Triaxial 2,105 2,107 2,107 2,117 2,172	Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+	Collapse 1.677 1.677 1.677 1.678 1.678 1.685	Axial M 4,9 M 4,9 M 4,9 M 4,8 M 4,2
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope (m) (m) (2685,04 2680,96 2691,02 2743,20 3023,01 3048,00	nding OR No Bence e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0	ing, D = Outer wall to ISO Connection Production Linu VME Stress (psi) 52214,2 52214,2 52214,0 51951,0 50633,4 50642,9	safety factor, N = <u>Pr</u> Triaxial 2,105 2,107 2,107 2,172 2,172	E Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+	Collapse 1,677 1,677 1,677 1,678 1,678 1,685	Axial M 4,9 M 4,9 M 4,9 M 4,8 M 4,2 M 4,2
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope (m) (m) (2695,04 2691,02 2743,20 3023,01 3048,00 3150,99	nding OR No Benc e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 11000,0 110000,0 110000,0 110000,0	ing, D = Outer wall o ISO Connection Production Linu VME Stress (psi) 52244,5 52214,0 51951,0 50633,4 50632,9 50690,3	safety factor, N = Er Triaxial 2,105 2,107 2,107 2,117 2,172 2,172 2,172 2,172 2,172	Negative Bending	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+	Collapse 1,677 1,677 1,677 1,678 1,678 1,682 1,682 1,670	Axial M 4,9 M 4,9 M 4,8 M 4,2 M 4,2 M 4,2 M 4,2
Default = Axial Flag Default = Triaxial F Default = Envelope EB = Env Cafety Fac	Pipe Body, I rs Tension, M lags Inner Wall a Flags elope Burst, <u>ctor Summ</u>	= Compression nd Positive Be EC = Envelope (m) (m) (2685,04 2680,96 2691,02 2743,20 3023,01 3048,00	nding OR No Bence e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0	ing, D = Outer wall to ISO Connection Production Linu VME Stress (psi) 52214,2 52214,2 52214,0 51951,0 50633,4 50642,9	safety factor, N = <u>Pr</u> <u>Triaxial</u> 2,105 2,107 2,107 2,172 2,172	E Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+	Collapse 1,677 1,677 1,677 1,678 1,678 1,685	Axial M 4,9 M 4,9 M 4,9 M 4,8 M 4,2 M 4,2
Default = Axial Flaq Default = Triaxial F Default = Envelope EB = Env Strick	Pipe Body, I Tension, M : lags linner Wall a Flags elope Burst, ctor Summ ion 1 1 1 1 1 1 1 1 1 1 1 1 1	= Compression nd Positive Be EC = Envelope (m) (m) (2695,04 2691,02 2743,20 3023,01 3048,00 3150,99	nding OR No Benc e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 11000,0 110000,0 110000,0 110000,0	ing, D = Outer wall o ISO Connection Production Linu VME Stress (psi) 52244,5 52214,0 51951,0 50633,4 50632,9 50690,3	safety factor, N = Er Triaxial 2,105 2,107 2,107 2,117 2,172 2,172 2,172 2,172 2,172	Negative Bending	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+	Collapse 1,677 1,677 1,677 1,678 1,678 1,682 1,682 1,670	Axial M 4,9 M 4,9 M 4,8 M 4,2 M 4,2 M 4,2 M 4,2
Default = Axial Flaq Default = Triaxial F Default = Envelope EB = Env Stri Sect	Pipe Body, I Js Tension, M : lags Inner Wall a Flags elope Burst, ctor Summ 1 1 1 1 1 1 1 1 1 1 1 1 1	= Compression nd Positive Be EC = Envelope (m) 2685.04 2690.96 2691.02 2743.20 3023.01 3048.00 3150.99 3172.97	nding OR No Bence e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	ling, D = Outer wall o ISO Connection Production Line VME Stress (psi) 52244,5 52214,0 51951,0 50642,9 50640,3 50702,3	safety factor, N = Ef Triaxial 2,105 2,107 2,107 2,117 2,172 2,172 2,172 2,170 2,170	E Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	Collapse 1,677 1,677 1,677 1,678 1,685 1,682 1,682 1,682 1,682	Axial M 4,9 M 4,9 M 4,8 M 4,2 M 4,2 M 4,2 M 4,2 M 4,2 M 4,2 M 4,2 M 3,9
Default = Axial Flaq Default = Triaxial F Default = Envelope EB = Env Stri Sect	Pipe Body, I Js Tension, M : lags Inner Wall a Flags elope Burst, ctor Summ 1 1 1 1 1 1 1 1 1 1 1 1 1	= Compression nd Positive Be EC = Envelope (m) 2685.04 2690.96 2691.02 2743.20 3023.01 3048.00 3150.99 3172.97	nding OR No Bence e Collapse, N/A = n Conditions - 7" Yield Strength (psi) 110000,0 110000,0 110000,0 110000,0 110000,0 110000,0	ing, D = Outer wall o ISO Connection Production Linu VME Stress (psi) 52244,5 52214,0 51951,0 50633,4 50632,9 50690,3	safety factor, N = Ef Triaxial 2,105 2,107 2,107 2,117 2,172 2,172 2,172 2,170 2,170	E Negative Bending Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100+	Collapse 1,677 1,677 1,677 1,678 1,685 1,682 1,682 1,682 1,682	Axial M 4,5 M 4,5 M 4,7 M 4,7

16 Triaxial Flags
17 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
18
19 Envelope Flags
20 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	s	-
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1 2685,04		4896,7	22,464	N/A	33,722	19,020	M 11,72
	1 2690,96		5007,3	21,968	N/A	32,923	19,317	M 11,67
	1 2691,02	110000,0	17493,7	6,288	N/A	6,376	100+	M 19,93
	1 2743,20	110000,0	14296,1	7,694	N/A	8,122	100+	M 15,42
	1 3048,00		8034,3	13,691	N/A	38,691	17,121	M 8,18
	1 3150,99	110000,0	7944,8	13,846	N/A	100+	11,899	M 7,29
						100+	44 997	NA 7 44
	1 3172,97	110000,0	8066,3	N 13,637	N/A	100+	11,337	IVI 7, 14
	1 3172,97	110000,0	8066,3	N 13,637	N/A	100+	11,557	IVI 7, 12
Burst and A	ial Flags							,
Default = Pip								,
Default = Pip	ial Flags							,
Default = Pip	ial Flags e Body, L = Connectio	n Leak, B = Connec						
Default = Pip Axial Flags Default = Ter	ial Flags	n Leak, B = Connec						,
Default = Pip Axial Flags Default = Tei	ial Flags e Body, L = Connectio sion, M = Compressio	n Leak, B = Connec						M 7,12
Default = Pip Axial Flags Default = Ter Triaxial Flag	ial Flags e Body, L = Connectio sion, M = Compressio	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	imp-out, Y = Con		,
Default = Pip Axial Flags Default = Tei Triaxial Flag Default = Inn	ial Flags e Body, L = Connectio sion, M = Compressio	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	imp-out, Y = Con		,
Default = Pip Axial Flags Default = Ter Triaxial Flag	ial Flags e Body, L = Connectio sion, M = Compressio er Wall and Positive B	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	imp-out, Y = Con		,

Conventional Well Design

	ety Factor Summ String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	2685,04	110000,0	5030,4	21,867	N/A	100+	10,453	M 42,02
	1	2690,96	110000,0	4963,0	22,164	N/A	100+	10,459	M 40,97
	1	2691,02	110000,0	4963,0	22,164	N/A	100+	10,459	M 40,97
	1	2743,20	110000,0	4376,5	25,134	N/A	100+	10,509	M 33,60
	1	3048,00	110000,0	1100,0	100+	N/A	100+	10,665	M 16,40
	1	3150,99	110000,0	1100,0	100+	N/A	100+	10,180	M 13,98
			440000.0	4400.0	100	<b>N1/A</b>	400	10.000	14 40 55
	urst and Axial Flags efault = Pipe Body, I		110000,0 Leak, B = Connec	1100,0 tion Burst, F = Con	100+ nection Fracture,	J = Connection Ju	100+ mp-out, Y = Con	10,083 nection Yield, C = C	
De As		L = Connection	Leak, B = Connec						
De Ax De Tr De	efault = Pipe Body, I kial Flags	L = Connection	Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con		M 13,55

	String	MD	Yield Strength	VME Stress	Absolute Safety Factors						
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial		
1	1	2685,04	110000,0	6397,1	D 17,195	N/A	100+	12,135	100+		
2	1	2690,96	110000,0	6344,7	D 17,337	N/A	100+	12,108	100+		
3	1	2691,02	110000,0	6344,9	D 17,337	N/A	100+	12,108	100+		
4	1	2743,20	110000,0	5890,1	D 18,675	N/A	100+	11,877	M 97,965		
5	1	3048,00	110000,0	3234,9	D 34,005	N/A	100+	10,690	M 24,137		
6	1	3150,99	110000,0	2337,6	D 47,057	N/A	100+	10,340	M 19,238		
7	1	3172,97	110000,0	2145,9	D 51,261 N/A 100+ 10,269 M						
8		· · · · ·			· /			, , , , , , , , , , , , , , , , , , ,			

 Burst and Axial Flags
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection Derault = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jur
 Avial Flags
 Default = Tension, M = Compression
 Au
 To Triaxial Flags
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending
 Converse Flags

17 18 Envelope Flags 19 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Sa	fety Factor Sun	nmary - Runn	ingHole #1 - 7'	' Production Lir	ner						
	String	MD	Yield Strength	VME Stress		Absolute Safety Factors					
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial		
1	1	2685,04	110000,0	13815,0	D 7,962	N/A	100+	11,862	15,825		
2	1	2690,96	110000,0	13778,5	D 7,983	N/A	100+	11,838	15,944		
3	1	2691,02	110000,0	13778,1	D 7,984	N/A	100+	11,838	15,945		
4	1	2743,20	110000,0	13457,0	D 8,174	N/A	100+	11,631	17,070		
5	1	3048,00	110000,0	11581,0	D 9,498	N/A	100+	10,562	29,032		
6	1	3150,99	110000,0	10947,0	D 10,048	N/A	100+	10,247	38,041		
7	1	3172,97	110000,0	10811,8	D 10,174	N/A	100+	10,182	40,737		
0											

 9
 Burst and Axial Flags

 9
 Burst and Axial Flags

 10
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 12
 Axial Flags

 13
 Default = Tension, M = Compression

 14
 14

 15
 Triaxial Flags

 16
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 17
 18

 18
 Envelope Flags

 19
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

Safety Factor Sum	mary - Thole	eak #1 - 7" Prod	uction Liner						
String	MD MD	Yield Strength	VME Stress			Absolute Safet	v Factors		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst		apse	Axial
1	2685,04	110000,0	3208,1	D 34,288		I/A	100+	12,135	M 10,9
1	2690,96	110000,0	3282,1	33,515		I/A	100+	12,201	M 10,
1	2691,02	110000,0	3282,2	33,514	N	I/A	100+	12,202	M 10,
1	2743,20	110000,0	3958,7	27,787		I/A	100+	12,811	M 10,
1	3048,00	110000,0	8328,6	13,208			30,190	18,092	M 8,
1	3150,99	110000,0	9744,8	11,288			23,517	21,021	M 7,
1	3172,97	110000,0	10049,1	N 10,946	N	I/A	22,458	21,772	M 7,
Burst and Axial Flag Default = Pipe Body Axial Flags Default = Tension, N Triaxial Flags	L = Connectior	1					Y = Connectio	n Yield, C =	Connection
Envelope Flags EB = Envelope Burs	t, EC = Envelop		ISO Connection	1	- Negauve Bei	inding			
MD		Hooke's	Bucklir		non	Thermal	Total		Buckled
Тор	Base	Law (m)	(m)	(n		(m)	(m)		Length (m)
0,03			000	0,000	0,000	0,00		0,000	3
lovement Summa	ry - <u>LostR</u> etu	urnsWithWater #1							
MD	(m)	Hooke's	Bucklin	ng Ball		Thermal	Total		Buckled
Тор	Base	Law (m)	(m)	(n	1)	(m)	(m)	0.005	Length (m)
0,03	12	3,00 -0,	017	0,000	0,016	0,00	01	0,000	
ovement Summa	ry - Pressure								
MD		Hooke's	Bucklir			Thermal	Total		Buckled
Top 0,03	Base 12	Law (m) 3,00 0,	(m) 005	(n 0,000	-0,005	(m) 0,0(	(m) 00	0,000	Length (m) 12
ovement Summa	rv - LostRetu	ırnsWithMudDro	o #1 - 30'' Co	nductor Casino	1				
MD		Hooke's	Bucklir			Thermal	Total		Buckled
Тор	Base	Law (m)	(m)	С (n	1)	(m)	(m)		Length (m)
0,03	12		021	0,000	0,020	0,00	D1	0,000	
ovement Summa	ry - <u>Green</u> Ce	ement #1 - 30" C	onductor Cas	sing					
MD		Hooke's	Bucklin			Thermal	Total		Buckled
Тор	Base	Law (m)	(m)	(n	1)	(m)	(m)		Length (m)
0,03	12	3,00 0,	015	0,000	0,000	0,00	00	0,015	3
ovement Summa						<b>T</b> he sum 1			Durit
MD		Hooke's	Bucklin			Thermal	Total		Buckled
Top	Base	Law (m)	(m) 001	(n 0,000	1) 0.000	(m) 0,00	(m)	0,001*	Length (m)
0,03	12	3,00 0,	001	0,000	0,000	0,00		0,001	
* Surface displacem	ent due to picku	ıp (+) or slackoff (-)							
ovement Summa MD		Hole #1 - 30'' Co Hooke's	onductor Casi Bucklir		non	Thermal	Total		Buckled
Top	Base	Law (m)	(m)	ig bail (n		(m)	(m)		Length (m)
			No results	available for this lo	ad case				
ovement Summa	ry - Initial Co	nditions - 20" Su	urface Casing						
MD	(m)	Hooke's	Bucklir	ng Ball	non	Thermal	Total		Buckled

Ι.	Movement Summa	ry - Initial Condi	tions - 20" Surfac	e Casing				
Г	MD	(m)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
	Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1	0,03	123,00	0,000	0,000	0,000	0,000	0,000	0,00
								,

Conventional Well Design

		n Well Design, v			Date/Time	: March 01, 2018	02:57:13 PM	Page: 26 of 28
Movement St	<u>1mmary - MD (m)</u> 0.03	Base 123.00	<u>41 - 20'' Surface</u> Hooke's Law (m) 0.035	Casing Buckling (m) -0,002	Balloon (m) -0.034	Thermal (m) 0,000	Total (m) 0.000	Buckled Length (m) 123,00
	0,03	123,00	0,035	-0,002	-0,034	0,000	0,000	123,00
Movement St		LostReturnsW		20" Surface Cas		_		
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
1	0,03	123,00	-0,012	0,000	0,010	0,001	0,000	0,00
Movement S	ummary - MD (m)	GreenCement	#1 - 20" Surface Hooke's	e Casing Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1	0,03	123,00	0,028	0,000	0,000	0,000	0,028	0,00
Movement S		OverPull #1 -	20'' Surface Cas Hooke's	ing Buckling	Balloon	Thermal	Total	Buckled
Тор	MD (m)	Base	Law (m)	(m)	(m)	(m)	(m)	Lenath (m)
1 2 3 * Surface dis	0,03 placement o	123,00 due to pickup (+) o	0,010	0,000	0,000	0,000	0,010*	0,00
				On sin s				
Iviovement Si	<u>Immary -</u> MD (m)	RunningHole #	<u>+1 - 20" Surface</u> Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top 1 2 3 4 5		Base	Law (m)	(m) No results available fo	(m) r this load case	(m)	(m)	Length (m)
Movement St	ummary - MD (m) 0,03	Initial Conditio Base 1300,00	ns - 13 3/8" Inte Hooke's Law (m) 0,000	rmediate Casing Buckling (m) 0,000	Balloon (m) 0,000	Thermal (m) 0,000	Total (m) 0,000	Buckled Length (m) 0,00
Movement S		PressureTest	#1 - 13 3/8" Inte					
Top	MD (m) 0,03	Base 1300,00	Hooke's Law (m) 0,574	Buckling (m) -0,005	Balloon (m) -0,570	Thermal (m) 0,000	Total (m) 0,000	Buckled Length (m) 776,96
Movement St	ummary -	LostReturnsW	ithMudDrop #1 -	13 3/8" Intermed	diate Casing			
Tan	MD (m)	Base	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top 1	0,03	1300,00	Law (m) -0,196	(m) 0,000	(m) 0,195	(m) 0,001	(m) 0,000	Length (m) 0,00
Movement St		GreenCement		ermediate Casing				
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
1	0,03	1300,00	0,250	0,000	0,000	0,000	0,250	0,00
Movement Su		OverPull #1 -	13 3/8" Intermed					
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
1 2	0,03	1300,00	0,123	0,000	0,000	0,000	0,123*	0,00
ourrace urs	pracement	act to prenup (+) 0	i sidokoli (-)					

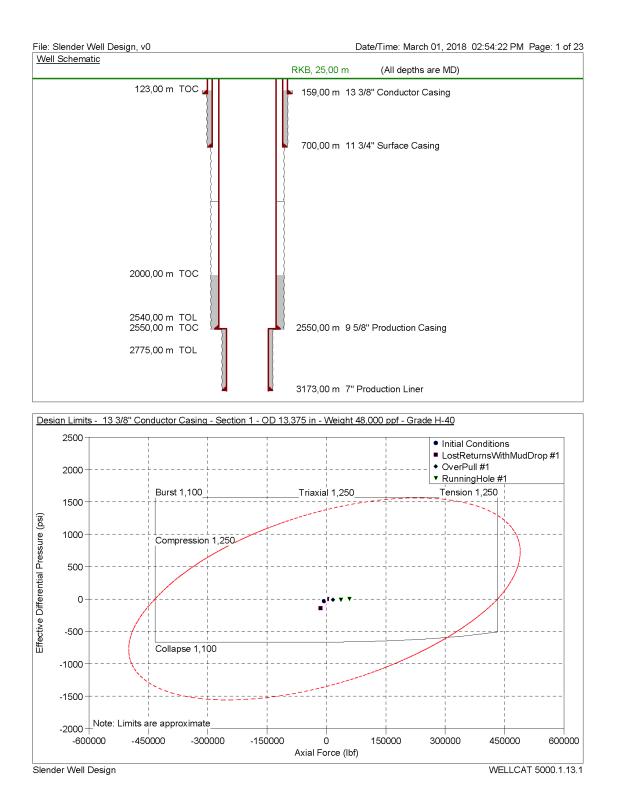
Conventional Well Design

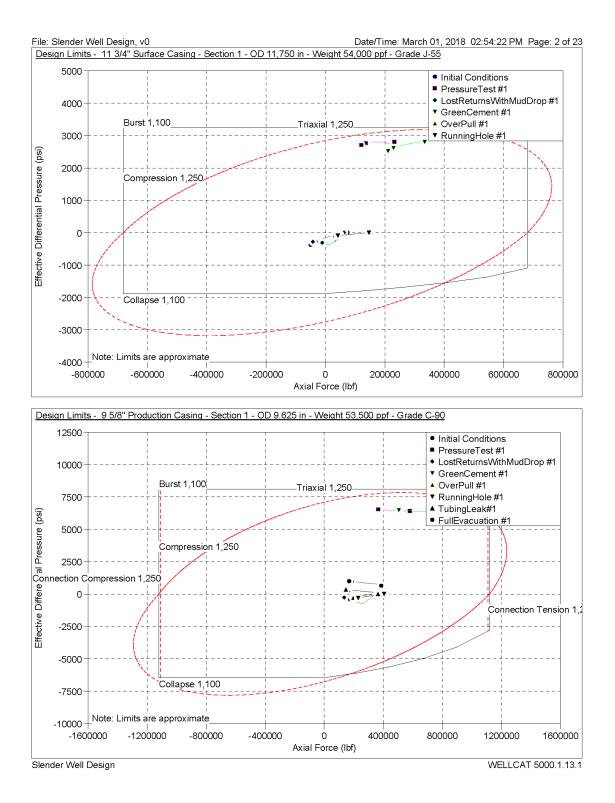
	•	n Well Design, v		una diata Casina	Date/Till	e: March 01, 2018	02.01.1011	1 uge. 27 of
lovement St		RunningHole #	Hooke's	ermediate Casing Buckling	Balloon	Thermal	Total	Buckled
Тор	MD (m)	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
-				No results available fo				<b>J</b> ( )
/lovement Si		OilKick #1 - 13						<b>D</b>
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
	0,03	1300,00	0,136	0,000	-0,136	0,000	0,000	(
/lovement Si	ummary -	Initial Condition	ns - 95/8" Inter	mediate Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0,03	Base 2350,00	Law (m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	(m) 0,000	Length (m)
	0,03	2330,00	0,000	0,000	0,000	0,000	0,000	
lovement Si	ummarγ - MD (m)	DisplaceToGa	<u>s #1 - 95/8'' Int</u> Hooke's	termediate Casing Buckling	1 Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
	0,03	2350,00	0,593	0,000	-0,594	0,001	0,000	- · · (
Novement Si		PressureTest #		mediate Casing				
	MD (m)	Page	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0.03	Base 2350,00	Law (m) 0,988	(m) -0,002	(m) -0,986	(m) 0,000	(m) 0,000	Length (m) 59
	0,00	2000,00	0,000	0,002	0,000	0,000	5,000	
lovement Si	ummary - MD (m)	LostReturnsW	thMudDrop #1 Hooke's	- 9 5/8" Intermed Buckling	iate Casing Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
	0,03	2350,00	-0,292	0,000	0,291	0,001	0,000	
lovement Si		GreenCement		rmediate Casing				
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
Тор	0,03	2350,00	0,715	0,000	0,000	0,000	0,715	Lengur (III)
lovement Si	ummary -	OverPull #1 -	9 5/8" Intermed	iate Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0,03	Base 2350,00	Law (m) 0,288	(m) 0,000	(m) 0,000	(m) 0,000	(m) 0,288*	Length (m)
* Surface dis		lue to pickup (+) o		0,000	0,000	0,000	0,200	
lovement Si	ummarv -	RunningHole #	1 - 95/8" Inter	mediate Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
_				No results available fo	r this load case			
lovement S	Immany	Initial Condition	ns - 7" Product	ion Liner				
iovernent ot	<u>anninarγ</u> - MD (m)	miliar Condition	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор		Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)

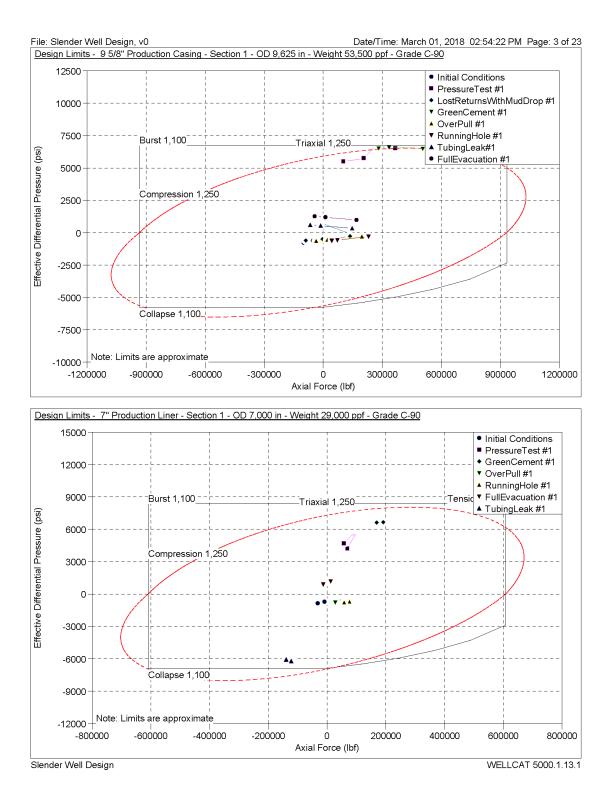
Conventional Well Design

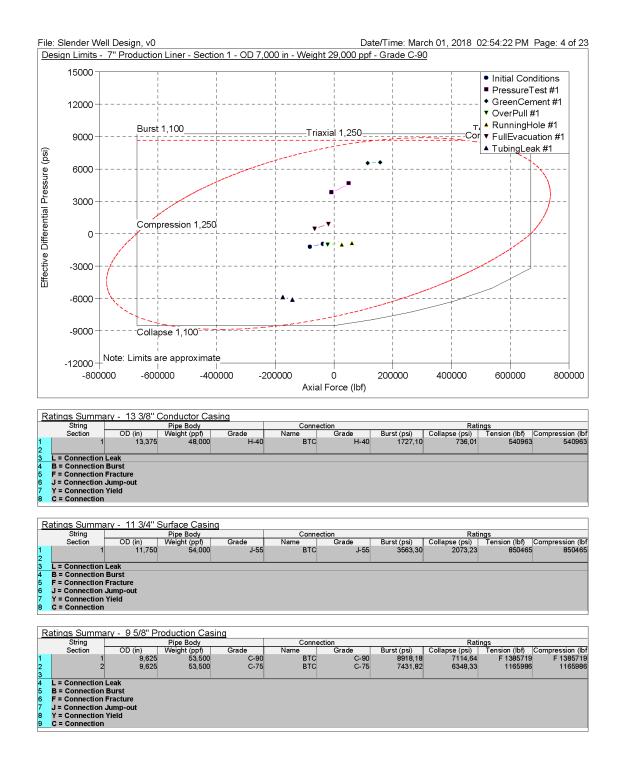
File: Vertical Exploration	n Well Design,	v1		Date/Ti	me: March 01, 20	18 02:57:13 P	M Page: 28 of 2
Movement Summary -	DisplaceToGa	as #1 - 7" Pro	duction Liner				
MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1							5
2							
2 3 4 5			No length changes - F	Pipe is fully cemented	1		
Movement Summary -	GreenCemen						
MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1							• • • •
2 3 4 5			No length changes - F	Pipe is fully cemented	ł		
5							
Movement Summary -	OverPull #1 -						
MD_(m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
2 3 4 5			No length changes - F	Pipe is fully cemented	1		
Movement Summary -	RunningHole						-
MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top 1	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
2 3 4 5			No length changes - F	Pipe is fully cemented	1		
Movement Summary -	TbgLeak #1 -	7" Productio					
MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1 2 3			No length changes - F	Pipe is fully cemented	1		• • /
4 5				, ,			

# 5.2.3.2 Slender Well Design









e: Slen								aco mino. Ma	rch 01, 2018	02.01.2211011	-
		<ul> <li>7" Producti</li> </ul>									
	String		Pipe Body		Co	nnection			Rat	ings	
Se	ection	OD (in) W	/eight (ppf)	Grade	Name	Gra	de	Burst (psi)	Collapse (psi)	Tension (lbf) C	Compression (II
	1	7,000	29,000	C-90	B	тс	C-90	9180,00	7579,34	760448	76044
	2	7,000	32,000	C-90		тс	C-90	B 9519,00		838558	83855
-		7,000	02,000	0-00		10	0-00	0.0010,00	, 0070,40	000000	00000
1 = 00	nnection Leal	L							l		
B = Co	onnection Bur	st									
F = Cor	onnection Frac	cture									
	nnection Jum										
	onnection Yiel	a									
C = Co	onnection										
asing I	Load Sumr	nary - Initial	Conditions - 1	13 3/8" Cor	nductor Ca	asing					
	String	MD	Axial Force	Dogleg		Torque	Frict	ion Force 1	emperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100f	5	(ft-lbf)		(lbf/ft)	(°F)	Internal	External
0	A	0,03			0,00	0,0		0,0	50,00	0,05	0,0
4											
/	1	24,96	1477	7	0,00	0,	וכ	0,0	46,92	38,30	38,3
	1	122,96	-650	6	0,00	0,		0,0	35,00	188,62	188,
	i	123,02			0,00	0,		0,0	35,00	188,72	188,
		123,02	-000								
	1	158,98	-632	5	0,00	0,	J	0,0	37,40	243,84	265,
							-	-			
		<u>mary - LostR</u> MD	eturnsWithMu Axial Force	<u>- dDrop #1</u> Dogleg	<u>13 3/8" (</u>	<u>Conducto</u> Torque			emperature	Drasaura	(===i)
	String			Logleg						Pressure Internal	(psi)
S	Section	(m)	(lbf)	(°/100f	)	(ft-lbf)		(lbf/ft)	(°F)		External
/	1	0,03	758	3	0.00	0,	וכ	0.0	50,00	0,00	0,
/	1	24,96	3656	8	0,00	0,	h	0,0	50,00	0,00	38,
/											
<u>/                                     </u>	1	122,96	-1177		0,00	0,		0,0	35,00	40,72	188,
/	1	123,02	-11929	9	0,00	0,	וכ	0,0	35,00	40,83	188,
<u>/                                      </u>											
		150 00	16079				n .	0.0	37.40	105 15	243
	1	158,98		B	0,00	0,	ו	0,0	37,40	105,15	243,
		nary - OverF		B 3" Conduct	0,00 or Casing	0,1					243, (psi)
S	String	nary - OverF MD	2ull #1 - 13 3/8 Axial Force	B 3" Conduct Dogleg	0,00 or Casing	0,i 1 Torque	Frict	ion Force	emperature	Pressure	(psi)
S		nary - OverF MD (m)	Pull #1 - 13 3/8 Axial Force (lbf)	8 <u>3'' Conduct</u> Dogleg (°/100ff	o,oo or Casing	0, Torque (ft-lbf)	Frict	ion Force	emperature(°F)	Pressure	(psi) External
S	String	<u>narγ - OverF</u> MD (m) 0,03	Pull #1 - 13 3/8 Axial Force (lbf) 41724	B <u>3" Conduct</u> Dogleg (°/100 <del>f</del> 4	0,00 or Casing 1 0,00	0, Torque (ft-lbf) 0,	Frict	tion Force 1 (lbf/ft) 0,0	emperature (°F) 50,00	Pressure Internal 0,05	(psi) External 0,
S	String	narγ - OverF MD (m) 0,03 24,96	Pull #1 - 13 3/8 Axial Force (lbf) 4172 37796	B <u>3" Conduct</u> Dogleg (°/100 <del>f</del> 4	0,00 or Casing 0,00 0,00	0, 1 Torque (ft-lbf) 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0	emperature (°F) 50,00 46,92	Pressure Internal 0,05 38,30	(psi) External 0, 38,
S	String	narγ - OverF MD (m) 0,03 24,96	Pull #1 - 13 3/8 Axial Force (lbf) 4172 37796	8 <u>3'' Conduct</u> Dogleg (°/100 <del>f</del> 4 6	0,00 or Casing 0,00 0,00	0, 1 Torque (ft-lbf) 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0	emperature (°F) 50,00 46,92	Pressure Internal 0,05 38,30	(psi) External 0, 38,
S	String Section 1 1 1	nary - OverF MD (m) 24,96 122,96	Pull #1 - 13 3/8 Axial Force (lbf) 3779 2236	8 <u>3" Conduct</u> Dogleg (°/100fi 4 6 3	0,00 or Casing 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00	Pressure Internal 0,05 38,30 188,62	(psi) External 0. 38. 188.
S	String Section 1 1	narγ - OverF MD (m) 24,96 122,96 123,02	Pull #1 - 13 3/8 Axial Force (lbf) 41729 2236 2235	B Dogleg (°/100f 6 3 4	0,00 or Casino 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0	emperature	Pressure Internal 0,05 38,30 188,62 188,71	(psi) External 0 38 188 188
S	String Section 1 1 1	nary - OverF MD (m) 24,96 122,96	Pull #1 - 13 3/8 Axial Force (lbf) 41729 2236 2235	B Dogleg (°/100f 6 3 4	0,00 or Casing 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00	Pressure Internal 0,05 38,30 188,62	(psi) External 38 188 188
S	String Section 1 1 1	narγ - OverF MD (m) 24,96 122,96 123,02	Pull #1 - 13 3/8 Axial Force (lbf) 41729 2236 2235	B Dogleg (°/100f 6 3 4	0,00 or Casino 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0	emperature	Pressure Internal 0,05 38,30 188,62 188,71	(psi) External 0 38 188 188
S	String Section 1 1 1 1 1	nary - OverF MD (m) 0.03 24,96 122,96 122,90 128,98	Pull #1 - 13 3/8 Axial Force (bf) 4172 3779 2236 2235 1669	8 <u>3" Conduct</u> Dogleç (°/100# 4 4 4 4	0,00 or Casing 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0	emperature	Pressure Internal 0,05 38,30 188,62 188,71	(psi) External 0,
s Si Casing I	String Section 1 1 1 1 1 1 1 Load Sumn	nary - OverF MD (m) 0,03 22,96 122,96 123,02 158,99 nary - Runni	Pull #1 - 13 3/8 Axial Force (lbf) 4172 2236 2236 2235 1669 ngHole #1 - 1	B <u>3" Conduct</u> Dogleg (°/100# 4 5 3 4 4 4 3 3 3/8" Cor	0,00 or Casino 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0,	Frict	ion Force ((bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 35,00 37,40	Pressure Internal 0,05 38,30 188,62 188,71 243,84	(psi) External 0 38 188 188 243
Sing I	String Section 1 1 1 1 1 1 1 1 <u>Load Sumr</u> String	nary - OverF MD (m) 0,03 122,96 122,96 123,02 158,98 nary - Runni MD	Pull #1 - 13 3/k Axial Force (lbf) 4172 2236 2235 1669 ngHole #1 - 1 Axial Force	B <u>3" Conduct</u> Dogleg (°/100f 4 5 3 4 4 4 <u>3</u> 3/8" Cor Dogleg	0,00 or Casino 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 46,92 35,00 35,00 37,40	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure	(psi) External 0 188 188 243 (psi)
s si casing I	String Section 1 1 1 1 1 1 1 1 Load Sumr	narγ - OverF MD (m) 122,96 123,02 158,99 narγ - Runni MD (m)	Pull #1 - 13 3/8 Axial Force (lbf) 4172 3779 2236 2235 1669 ngHole #1 - 1 Axial Force (lbf)	B <u>B</u> Dogleg (°/100f 4 5 3 4 4 <u>3</u> 3 3 3 3 3 3 3 3 8 Cor 0 9 2 2 1 0 1 1 0 1 0 1 0 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0,00 or Casino 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (bf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature	Pressure Internal 0.05 38,30 188,62 188,71 243,84 Pressure Internal	(psi) External 0 38 198 243 243 (psi) External
asing I	String Section 1 1 1 1 1 1 1 1 <u>Load Sumr</u> String	nary - OverF MD (m) 0,03 122,96 122,96 123,02 158,98 nary - Runni MD	Pull #1 - 13 3/8 Axial Force (lbf) 4172 3779 2236 2235 1669 ngHole #1 - 1 Axial Force (lbf)	B <u>B</u> Dogleg (°/100f 4 5 3 4 4 <u>3</u> 3 3 3 3 3 3 3 3 8 Cor 0 9 2 2 1 0 1 1 0 1 0 1 0 1 0 1 1 0 1 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1	0,00 or Casino 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 46,92 35,00 35,00 37,40	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure	(psi) External 0 188 188 243 (psi)
s si casing I	String           3ection           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           String           Section           1	nary - OverF MD (m) 0,03 122,90 122,90 128,99 128,99 128,99 129,00 156,00 109,00 100,000 109,000 100,00000000	Pull #1 - 13 3// Axial Force (lbf) 4172 3779 2236 2235 1669 ngHole #1 - 1 Axial Force (lbf) 5825	B <u>3" Conduct</u> Dogleg (°/100f 6 3 4 4 <u>3</u> 3/8" Cor Dogleg (°/100f 2	0,00 or Casinc 0,00 0,00 0,00 0,00 0,00 0,00 0,00 ductor Ca 1 0,00	0, 1 1 1 1 1 1 1 1 1 1 1 1 1	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 ion Force 1 (lbf/t) 0,0	emperature (°F) 35,00 35,00 37,40 °emperature (°F) 50,00	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05	(psi) External 0 388 188 243 (psi) External 0
asing I	String           3ection           1           1           1           1           1           1           1           1           1           1           1           1           1           2           5tring           Section           1           1	nary - OverF MD (m) 0,03 122,96 123,02 158,99 nary - Runni MD (m) 0,03 24,96	Pull #1 - 13 3/8 Axial Force (lb1) 2236 2235 1669 ngHole #1 - 1 Axial Force (lb1) 5825 5484	B <u>B</u> <u>Dogles</u> (°/100f 6 3 4 4 4 <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u>	0,00 or Casinc 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 ion Force 1 (bf/ft) 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30	(psi) External 38 188 188 243 (psi) External 0 38
s si casing I	String           3ection           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           String           Section           1	nary - OverF MD (m) 0,03 24,96 122,96 123,02 158,98 nary - Runni MD (m) 0,03 24,96 122,96	Pull #1 - 13 3/8 Axial Force (lbf) 4172 3779 2236 2235 1669 ngHole #1 - 1 Axial Force (lbf) 5825 5484 4144	B <u>3" Conduct</u> Dogleg (°/100# 4 4 3 3 <u>3 (8" Cor</u> <u>0 Cor</u> <u>0 Cor</u> <u>0 Cor</u> <u>2</u> 2 2	0,00 or Casinc 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 (lbf/t) 0,0 0,0 0,0	emperature (°F) 35,00 35,00 35,00 37,40 emperature (°F) (°F) (°F) (°S) 46,92 35,00	Pressure 0.05 38,30 188,62 188,71 243,84 Pressure Internal 0.05 38,30 188,62	(psi) External 0 38 188 243 (psi) External 0 38 188 243
asing I	String           3ection           1           1           1           1           1           1           1           1           1           1           1           1           1           2           5tring           Section           1           1	nary - OverF MD (m) 0,03 24,96 122,96 123,02 158,98 nary - Runni MD (m) 0,03 24,96 122,96	Pull #1 - 13 3/8 Axial Force (lbf) 4172 3779 2236 2235 1669 ngHole #1 - 1 Axial Force (lbf) 5825 5484 4144	B <u>3" Conduct</u> Dogleg (°/100# 4 4 3 3 <u>3 (8" Cor</u> <u>0 Cor</u> <u>0 Cor</u> <u>0 Cor</u> <u>2</u> 2 2	0,00 or Casinc 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 (lbf/t) 0,0 0,0 0,0	emperature (°F) 35,00 35,00 35,00 37,40 emperature (°F) (°F) (°F) (°S) 46,92 35,00	Pressure 0.05 38,30 188,62 188,71 243,84 Pressure Internal 0.05 38,30 188,62	(psi) External 0 38 188 243 (psi) External 0 38 188 188
asing I	String           Section           1           1           1           1           1           1           1           1           1           1           1           1           1           1           String           Section           1           1           1	nary - OverF MD (m) 122.96 123.02 158.99 nary - Runni MD (m) 0.03 24.96 122.96 122.96 122.90	2ull #1 - 13 3// Axial Force (lbf) 4172 3779 2235 2235 1669 1669 1669 1669 1669 1669 464 4143	B <u>3" Conduct</u> Dogleg (°/100f 3 4 4 <u>3 3/8" Con</u> <u>Dogleg</u> (°/100f 2 2 2 3	0,00 or Casino 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 (lbf/ft) 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71	(psi) External 186 186 186 243 (psi) External 0 36 186 188 188
asing I	String           Section           1           1           1           1           1           1           1           1           1           1           1           1           1           1           String           Section           1           1           1	nary - OverF MD (m) 0,03 24,96 122,96 123,02 158,98 nary - Runni MD (m) 0,03 24,96 122,96	2ull #1 - 13 3// Axial Force (lbf) 4172 3779 2235 2235 1669 1669 1669 1669 1669 1669 464 4143	B <u>3" Conduct</u> Dogleg (°/100f 3 4 4 <u>3 3/8" Con</u> <u>Dogleg</u> (°/100f 2 2 2 3	0,00 or Casinc 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 (lbf/t) 0,0 0,0 0,0	emperature (°F) 35,00 35,00 35,00 37,40 emperature (°F) (°F) (°F) (°S) 46,92 35,00	Pressure 0.05 38,30 188,62 188,71 243,84 Pressure Internal 0.05 38,30 188,62	(psi) External 186 186 186 243 (psi) External 0 36 186 188 188
s si casing I	String           Section           1           1           1           1           1           1           1           1           1           1           1           1           1           1           String           Section           1           1           1	nary - OverF MD (m) 122.96 123.02 158.99 nary - Runni MD (m) 0.03 24.96 122.96 122.96 122.90	2ull #1 - 13 3// Axial Force (lbf) 4172 3779 2235 2235 1669 1669 1669 1669 1669 1669 464 4143	B <u>3" Conduct</u> Dogleg (°/100f 3 4 4 <u>3 3/8" Con</u> <u>Dogleg</u> (°/100f 2 2 2 3	0,00 or Casino 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,00	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 (lbf/ft) 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71	(psi) External 188 188 188 243 (psi) External 0 38 188 188 188
casing I	String Section 1 1 1 1 1 1 <u>Load Sumr</u> String Section 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 0,03 122,96 122,96 123,02 158,99 nary - Runni MD (m) 0,03 24,96 122,96 122,96 122,90 123,02 158,99	Pull #1 - 13 3// Axial Force (lbf) 4172 2236 2235 1669 ngHole #1 - 1 Axial Force (lbf) 5425 5484 4144 4144 4143 36511	B 3" Conduct Dogleg (°/100f 6 3 4 4 3 3/8" Cor Dogleg (°/100f 2 2 2 3 9 9 1 3/4" Sur	0,00 or Casinc 0,00 0	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 50,00 46,92 35,00 35,00 37,40	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71	(psi) External 188 188 243 (psi) External 0 38 188 188
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s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 0,03 122,96 122,90 123,02 158,99 nary - Runni MD (m) 0,03 24,96 122,96 123,02 158,99 nary - Initial MD (m)	2ull #1 - 13 3/k Axial Force (lbf) 2235 1669 ngHole #1 - 1 Axial Force (lbf) 5484 4144 4143 36513 Conditions - 1 Axial Force (lbf) 7415	B <u>3" Conduct</u> Dogleg (°/100f 4 4 <u>3 3/8" Con</u> Dogleg (°/100f 2 2 3 9 9 <u>11 3/4" Sur</u> Dogleg (°/100f 1	0,00 or Casinc 0,00 0	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 37,40 °emperature (°F) 50,00	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71 243,84 243,84 Pressure Internal	(psi) External 188 243 (psi) External 0 38 188 243 (psi) External 0 8 243 0 8 188 243 0 8 189 188 243 0 8 189 189 0 8 189 189 189 189 243 0 189 189 189 189 189 189 189 189 189 189
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 122,96 122,02 158,98 nary - Runni MD (m) 0,03 123,02 158,98 123,02 158,98 123,02 158,98 nary - Initial MD (m) 0,03 24,96	Pull #1 - 13 3/8 Axial Force (bf) 4172 3779 2236 2236 2235 1669 1669 5825 5484 4144 4143 36511 Conditions - 1 Axial Force (bf) 7415 6873	B <u>3" Conduct</u> Dogleg (*/100# 4 4 3 3 <u>3 3/8" Cor</u> <u>3 3/8" Cor</u> <u>0 008</u> (*/100# <u>1 3/4" Sur</u> <u>0 008</u> <u>0 009</u> <u>0 00</u>	0,00 or Casinc 0,00 0	(f-lbf) Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (bf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) 50,00 46,92	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 44,68	(psi) External 188 189 243 (psi) External 0 388 188 243 (psi) External 0 444
s sing I s sing I s sing I s sasing I	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 0,03 123,02 123,02 158,98 nary - Runni MD (m) 0,03 24,96 122,96 122,96 nary - Initial MD (m) 0,03 24,96 122,96	2ull #1 - 13 3// Axial Force (lbf) 4172 3779 2236 2235 2235 1669 1669 5425 5484 4144 4144 4143 36511 Conditions - 1 Axial Force (lbf) 7415 6973 5237	B <u>3" Conduct</u> Dogleg (°/100f 4 <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u>	0,00 or Casinc 0,00 0	0, Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) 50,00 46,92 35,00	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 44,68 220,06	(psi) External 0 388 188 243 (psi) External 0 38 188 243 (psi) External 0 44 220
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 0,03 122,96 123,02 158,99 nary - Runni MD (m) 0,03 24,96 122,96 123,02 158,99 nary - Initial MD (m) 0,03 24,96 122,96 123,02 122,96 122,96 122,96 122,96	2ull #1 - 13 3/2 Atial Force (lbf) 4172 3779 2236 2235 1669 1669 1669 1669 1669 1669 1669 1669 5825 5484 4143 36513 Conditions - 1 Axial Force (lbf) 7415 6973 5236'	B <u>3" Conduct</u> Doglec (*/100# 4 4 <u>3 3/8" Con</u> <u>3 3/8" Con</u> <u>0 00000000000000000000000000000000000</u>	0,00 or Casino 0,00 0	(ft-lbf) Torque (ft-lbf) Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) 50,00 46,92 35,00 35,00	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 188,62 188,71 243,84 Pressure Internal 0,05 44,68 220,06 220,16	(psi) External 188 243 (psi) External 0 388 188 243 (psi) External 0 44 220 220
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 0,03 122,96 123,02 158,99 nary - Runni MD (m) 0,03 24,96 122,96 123,02 158,99 nary - Initial MD (m) 0,03 24,96 122,96 123,02 122,96 122,96 122,96 122,96	2ull #1 - 13 3/2 Atial Force (lbf) 4172 3779 2236 2235 1669 1669 1669 1669 1669 1669 1669 1669 5825 5484 4143 36513 Conditions - 1 Axial Force (lbf) 7415 6973 5236'	B <u>3" Conduct</u> Doglec (*/100# 4 4 <u>3 3/8" Con</u> <u>3 3/8" Con</u> <u>0 00000000000000000000000000000000000</u>	0,00 or Casino 0,00 0	(ft-lbf) Torque (ft-lbf) Torque (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) 50,00 46,92 35,00 35,00	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 188,62 188,71 243,84 Pressure Internal 0,05 44,68 220,06 220,16	(psi) External 188 243 (psi) External 0 388 188 243 (psi) External 0 44 220 220
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 0,03 24,96 122,02 158,99 nary - Runni MD (m) 0,03 24,96 122,96 123,02 158,99 nary - Initial MD (m) 0,03 24,96 123,02 158,99 nary - Initial	Pull #1 - 13 3// Axial Force (lbf) 4172 2335 2235 2235 1669 1669 (lbf) 5425 5484 4144 4143 36511 Conditions - 1 Axial Force (lbf) 7415 6973 6373 6373 6237 5236	B <u>3" Conduct</u> Dogleg (°/100f 4 4 <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u>	0,00 or Casinc 0,000 0,00	(ft-lbf) (ft	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) (°F) (°F) (°F) (°F) (°F) (°F) (°F)	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 44,68 220,06 220,16 224,48	(psi) External 0 38 188 243 (psi) External 0 38 188 243 (psi) External 0 44 4 220 220 220 220
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 122,96 123,02 158,99 nary - Runni MD (m) 0,03 24,96 122,96 123,02 158,99 nary - Initial MD (m) 0,03 24,96 122,96 122,96 123,02 158,99 122,96 123,02 158,99 159,04	2ull #1 - 13 3/4 Axial Force (lb1) 22365 22355 1669 1669 1669 1669 1669 1669 1669 16	B <u>3" Conduct</u> Dogleg (°/100f 4 4 3 <u>3 3/8" Cor</u> <u>3 3/8" Cor</u> <u>0 00000000000000000000000000000000000</u>	0,00 or Casino 0,00 0	0, Torque (ft-lbf) (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 44,68 220,06 220,16 224,48 284,459	(psi) External 0 388 188 243 (psi) External 0 38 188 243 (psi) External 0 44 220 220 220 226 226 226 226
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) (m) 122,96 122,96 122,96 123,92 158,99 (m) (m) (m) (m) 0,03 24,96 123,02 158,99 mary - Initial MD (m) 0,03 24,96 123,02 158,99 123,02 158,99 123,02 158,99 (m) (m) 0,03 24,96 123,02 158,99 (m) (m) (m) 0,03 24,96 123,02 158,99 (m) (m) (m) 0,03 24,96 122,96 123,92 158,99 (m) (m) (m) (m) (m) (m) (m) (m) (m) (m)	Pull #1 - 13 3// Axial Force (lbf)           4172: 3779           2236: 2235: 1669           ngHole #1 - 1           Axial Force (lbf)           5484: 4144: 4143: 36511           Conditions - 1           Axial Force (lbf)           7415           6973: 5236: 4598: 4598: 2015	B <u>3" Conduct</u> Dogleg (*/100# 4 4 <u>3 3/8" Cor</u> <u>3 3/8" Cor</u> <u>3 3/8" Cor</u> <u>1 3/4" Sur</u> <u>2</u> 2 3 9 <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>5 6</u>	0,00 or Casinc 0,000 0,00	(f-lbf) Torque (ft-lbf) (ft-lbf	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 37,40 *emperature (°F) 50,00 46,92 35,00 37,40 ************************************	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,71 243,84 Pressure Internal 0,05 44,68 220,06 220,16 224,48 224,59 545,45	(psi) External 0 38 188 188 243 (psi) External 0 38 188 243 (psi)
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) (m) 122,96 122,96 122,96 123,92 158,99 (m) (m) (m) (m) 0,03 24,96 123,02 158,99 mary - Initial MD (m) 0,03 24,96 123,02 158,99 123,02 158,99 123,02 158,99 (m) (m) 0,03 24,96 123,02 158,99 (m) (m) (m) 0,03 24,96 123,02 158,99 (m) (m) (m) 0,03 24,96 122,96 123,92 158,99 (m) (m) (m) (m) (m) (m) (m) (m) (m) (m)	Pull #1 - 13 3// Axial Force (lbf)           4172: 3779           2236: 2235: 1669           ngHole #1 - 1           Axial Force (lbf)           5484: 4144: 4143: 36511           Conditions - 1           Axial Force (lbf)           7415           6973: 5236: 4598: 4598: 2015	B <u>3" Conduct</u> Dogleg (*/100# 4 4 <u>3 3/8" Cor</u> <u>3 3/8" Cor</u> <u>3 3/8" Cor</u> <u>1 3/4" Sur</u> <u>2</u> 2 3 9 <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>1 3/4" Sur</u> <u>5 6</u>	0,00 or Casino 0,00 0	(f-lbf) Torque (ft-lbf) (ft-lbf	Frict	ion Force 1 (lbf/t) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 37,40 *emperature (°F) 50,00 46,92 35,00 37,40 ************************************	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,71 243,84 Pressure Internal 0,05 44,68 220,06 220,16 224,48 224,59 545,45	(psi) External 0 388 188 243 (psi) External 0 388 188 243 (psi) External 0 444 220 243 0 444 222 243 0 44 222 243 0 44 222 243 0 44 222 243 0 8 188 188 188 243 188 188 243 188 243 188 243 188 188 243 243 188 243 243 243 243 243 243 243 243 243 243
s Si Casing I Si Si Si Si Si Si Si Si Si Si Si Si Si	String Section 1 1 1 1 1 1 1 String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	nary - OverF MD (m) 122,96 123,02 158,99 nary - Runni MD (m) 0,03 24,96 122,96 123,02 158,99 nary - Initial MD (m) 0,03 24,96 122,96 122,96 123,02 158,99 122,96 123,02 158,99 159,04	2ull #1 - 13 3// Axial Force (lbf) 4172 3779 2236 2235 2235 2235 1669 1669 5425 5484 4144 4144 4143 36511 Conditions - 1 Axial Force (lbf) 7415 6973 5237 5236 4598 4598 4598 2015	B <u>3" Conduct</u> Dogleg (°/100f 4 <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u> <u>3</u>	0,00 or Casino 0,00 0	0, Torque (ft-lbf) (ft-lbf) 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,	Frict	ion Force 1 (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	emperature (°F) 50,00 46,92 35,00 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40 emperature (°F) 50,00 46,92 35,00 37,40	Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 38,30 188,62 188,71 243,84 Pressure Internal 0,05 44,68 220,06 220,16 224,48 284,459	(psi) External 188 243 (psi) External 0 38 188 243 (psi) External 0 44 220 220 220 226 226 226 226

ng ion 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	MD (m) 24.96 122.96 123.02 158.98 159.04 304.80 609.60 699.97 revent Bucklir	Axial Force (lbf) 229370 224952 207590 206331 200976 203798 181558 134663 120404 g = 45763 lbf	3/4" Surface Cas Dogleg (*/100 R) 0,07 0,08 0,10 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,4 0,5 0,8 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Friction Force (lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	Temperature	Pressure Internal 2800,05 2836,60 2980,24 2980,33 3033,00 3033,09 3246,75	(psi) External 44 220 220 271 227 442
ion 1 1 1 1 1 1 1 1 1 1 1 1 1	(m) 0,03 24,96 122,96 123,02 158,98 159,04 304,80 609,60 699,97 Prevent Bucklin	(ibf) 229370 224952 207590 206331 200976 203798 181558 134663 120404 ig = 45763 lbf	(°/100π) 0,07 0,08 0,10 0,00 0,00 0,00 0,00 0,00 0,00	(ft-lbf) 0,4 0,5 0,8 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 50,00 46,92 35,00 35,00 37,40 37,40 47,12	Internal 2800,05 2836,60 2980,24 2980,33 3033,00 3033,09 3246,75	External 4 220 221 27 22
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	0.03 24.96 122,96 123,02 158,98 159,04 304,80 609,60 609,97 revent Bucklir	229370 224952 207590 206331 200976 203788 181558 134663 120404 g = 45763 lbf	0,07 0,08 0,10 0,00 0,00 0,00 0,00 0,00	0,4 0,5 0,8 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	50,00 46,92 35,00 35,00 37,40 37,40 47,12	2800,05 2836,60 2980,24 2980,33 3033,00 3033,09 3246,75	4 22 22 27 27 22
ad Summa	24,96 122,96 123,02 158,98 159,04 304,80 609,60 699,97 Prevent Bucklin Ary - LostRe MD	224952 207590 206331 200976 203798 181558 134663 120404 g = 45763 lbf	0,08 0,10 0,00 0,00 0,00 0,00 0,00	0,5 0,8 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	46,92 35,00 35,00 37,40 37,40 47,12	2836,60 2980,24 2980,33 3033,00 3033,09 3246,75	4 22 22 27 22
ad Summa	122,96 123,02 158,98 159,04 304,80 609,60 699,97 revent Bucklin ary - LostRe MD	207590 206331 200976 203798 181558 134663 120404 g = 45763 lbf	0,10 0,00 0,00 0,00 0,00 0,00	0,8 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0	35,00 35,00 37,40 37,40 47,12	2980,24 2980,33 3033,00 3033,09 3246,75	22 22 27 22
ad Summa	123,02 158,98 159,04 304,80 609,60 699,97 Prevent Bucklin ary - LostRe	206331 200976 203798 181558 134663 120404 g = 45763 lbf	0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0	35,00 37,40 37,40 47,12	2980,33 3033,00 3033,09 3246,75	22 27 22
ad Summa	158,98 159,04 304,80 609,60 699,97 Prevent Bucklin ary - LostRe MD	200976 203798 181558 134663 120404 g = 45763 lbf	0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0	37,40 37,40 47,12	3033,00 3033,09 3246,75	27 22
ad Summa	159,04 304,80 609,60 699,97 Prevent Bucklin ary - LostRe MD	203798 181558 134663 120404 g = 45763 lbf	0,00 0,00 0,00	0,0 0,0 0,0	0,0 0,0 0,0	37,40 47,12	3033,09 3246,75	22
ad Summa	304,80 609,60 699,97 Prevent Bucklin ary - LostRe MD	181558 134663 120404 g = 45763 lbf	0,00 0,00	0,0 0,0	0,0 0,0	47,12	3246,75	
ad Summa	609,60 699,97 Prevent Bucklin ary - LostRe MD	134663 120404 g = 45763 lbf	0,00	0,0	0,0			44
ad Summa	699,97 Prevent Bucklin ary - LostRe MD	120404 g <b>= 45763 lbf</b>					3693.51	93
ad Summa	Prevent Bucklin ary - LostRe MD	ig = 45763 lbf		· · · ·	0,0	73,40	3825,97	112
ad Summa	ary - LostRe MD					`		
ng	MD							
			)rop #1 - 11 3/4"					( ))
1 1 1		Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
1	(m)	(lbf)	(°/100ft) 0.00	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	0,03	63116		0,0	0,0	50,00	0,00	4
	24,96	58697	0,00	0,0	0,0	50,00	0,00	4.
4	122,96 123,02	41335 40077	0,00 0.00	0,0 0,0	0,0 0,0	35,00 35,00	0,00 0,00	22 22
1		40077 30934	0,00	0,0	0,0		0,00	22
1	158,98					37,40		
1	159,04	34610 5085	0,00 0,00	0,0	0,0 0,0	37,40	0,00	22
4	304,80 609,60	-31371	0,00	0,0 0,0	0,0	47,11 67,40	82,36 714,93	44 93
1								93
	055,97	-424/1	0,00	0,0	0,0	73,42	507,40	112
ng ion 1	MD (m) 0,03	Axial Force (lbf) 334470	Dogleg (°/100ft) 0,00	Torque (ft-lbf) 0,0	Friction Force (lbf/ft) 0,0	Temperature (°F) 50,00	Internal 2800,05	External
1								4.
1							3020,05	220
1								22
1								29
1	159,04					37,40		29
1	304,80					47,12		60
1								129 153
		210100	0,00	0,0	0,0		1001,02	
								(psi) External
1						50.00		External
1						46.92		4
1								22
1								22
1								28
1								28
1								28 54
1								109
1	699,97	30624	0,00	0,0	0,0	73,40	1252,62	125
					Friction Force	Tomporature	Drace	(nei)
								(psi) External
1	0.03		0.00			50.00		External
1								4
1	122.96							22
1								22
1	158,98	122631	0,00	0,0	0,0	35,00	284,48	22
1	158,98	122631	0,00	0,0	0,0	37,40	284,48	28
	304,80	100830					204,59	
4	JUH.0U			0.0	0.0	17 12		E.4
1	609,60	55264	0,00 0,00	0,0 0,0	0,0 0,0	47,12 67,44	545,45 1090,91	54 109
	ng ion 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1         699,97           ad Summary - GreenComg         MD           ion         (m)           1         24,96           1         123,02           1         159,94           1         159,94           1         304,80           1         609,97           ad Summary - OverPuting         MD           ion         (m)           1         24,96           1         1699,97	1         699,97         -42471           ad Summary - GreenCement #1 - 11         Axial Force         (b)           ion         (m)         Axial Force           1         24,96         330427           1         24,96         330427           1         24,96         330427           1         122,96         312630           1         158,98         306312           1         159,94         300311           1         304,80         280475           1         699,97         210465           ad Summary - OverPull #1 - 11 3/4"         Axial Force           ion         (m)         Axial Force           ion         (m)         Axial Force           ion         (m)         123,02           1         24,96         150211           1         123,02         132849           1         123,02         132849           1         159,04         126460           1         304,80         100635           1         699,97         30624           ad Summary - RunningHole #1 - 111         130,98           1         609,60         46635 <t< td=""><td>1         699,97         -42471         0,00           ad Summary - GreenCement #1 - 11 3/4" Surface Ca         Dogleg           ion         (m)         (lbf)         ('100h)           1         24,96         330052         0,00           1         24,96         330052         0,00           1         122,96         312690         0,00           1         123,02         312690         0,00           1         158,98         306312         0,00           1         158,98         306312         0,00           1         159,04         306301         0,00           1         699,97         210465         0,00           1         699,97         210465         0,00           1         699,97         210465         0,00           1         24,96         150211         0,00           1         24,96         150211         0,00           1         123,02         132849         0,00           1         123,02         132849         0,00           1         123,02         132849         0,00           1         159,04         126460         0,00</td><td>1         699,97         -42471         0,00         0,0           ad Summary - GreenCement #1 - 11 3/4" Surface Casing ng         MD         Axial Force         Dogleg         Torque           1         0,03         334470         0,00         0,0         0,0           1         24,96         330052         0,00         0,0           1         24,96         330052         0,00         0,0           1         122,96         312690         0,00         0,0           1         123,02         312690         0,00         0,0           1         158,98         306312         0,00         0,0           1         58,98         306312         0,00         0,0           1         58,98         306312         0,00         0,0           1         58,98         306312         0,00         0,0           1         609,97         210465         0,00         0,0           1         609,97         210465         0,00         0,0           1         0,03         154629         0,00         0,0           1         24,96         150211         0,00         0,0           1         <t< td=""><td>1         699,97         -42471         0,00         0,0         0,0           ad Summary - GreenCement #1 - 11 3/4" Surface Casing           ng         MD         Axial Force         Dogleg         Torque         Friction Force           1         0,03         334470         0,00         0,0         0,0         0,0           1         24,96         330052         0,00         0,0         0,0         0,0           1         122,96         312690         0,00         0,0         0,0         0,0           1         123,02         312679         0,00         0,0         0,0         0,0           1         158,98         306301         0,00         0,0         0,0         0,0           1         609,60         226475         0,00         0,0         0,0         0,0           1         609,97         210465         0,00         0,0         0,0         0,0           1         24,96         150211         0,00         0,0         0,0         0,0           1         24,96         150211         0,00         0,0         0,0         0,0           1         123,02         132849         0,0</td><td>1         699,97         -42471         0.00         0.0         0.0         73,42           ad Summary - GreenCement #1 - 11 3/4" Surface Casing           ng         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         ("F)           1         0.03         334470         0.00         0.0         0.0         0.0         50,00           1         24.96         330052         0.00         0.0         0.0         35,00           1         122.96         312680         0.00         0.0         0.0         35,00           1         158,98         306312         0.00         0.0         0.0         37,40           1         304,80         280475         0.00         0.0         0.0         37,40           1         699,97         210465         0.00         0.0         0.0         67,44           1         699,97         210465         0.00         0.0         0.0         73,40           ad Summary - OverPull #1 - 11 3/4" Surface Casing           remperature           (bf)         Torque         Friction Force         Temperature         ('F)</td><td>1         699,97         -42471         0.00         0.0         0.0         73,42         907,46           ad Summary - GreenCement #1 - 11 3/4" Surface Casing ng MD         Axial Force         Dogleg         Torque (lbf)         Friction Force (lbf/ft)         Temperature (lbf/ft)         Pressure Internal           1         0.03         334470         0.00         0.0         0.0         50.00         2800.05           1         24,96         330052         0.00         0.0         0.0         35,00         3202.05           1         123,02         312679         0.00         0.0         0.0         35,00         3202.05           1         159,04         306301         0.00         0.0         0.0         37,40         3084.59           1         599,97         210465         0.00         0.0         0.0         73,40         3084.59           1         699,97         210465         0.00         0.0         0.0         73,40         3080.91           1         0.03         154629         0.00         0.0         0.0         73,40         4052.62           Attal Force         Dogleg         Torque         Friction Force         Temperature</td></t<></td></t<>	1         699,97         -42471         0,00           ad Summary - GreenCement #1 - 11 3/4" Surface Ca         Dogleg           ion         (m)         (lbf)         ('100h)           1         24,96         330052         0,00           1         24,96         330052         0,00           1         122,96         312690         0,00           1         123,02         312690         0,00           1         158,98         306312         0,00           1         158,98         306312         0,00           1         159,04         306301         0,00           1         699,97         210465         0,00           1         699,97         210465         0,00           1         699,97         210465         0,00           1         24,96         150211         0,00           1         24,96         150211         0,00           1         123,02         132849         0,00           1         123,02         132849         0,00           1         123,02         132849         0,00           1         159,04         126460         0,00	1         699,97         -42471         0,00         0,0           ad Summary - GreenCement #1 - 11 3/4" Surface Casing ng         MD         Axial Force         Dogleg         Torque           1         0,03         334470         0,00         0,0         0,0           1         24,96         330052         0,00         0,0           1         24,96         330052         0,00         0,0           1         122,96         312690         0,00         0,0           1         123,02         312690         0,00         0,0           1         158,98         306312         0,00         0,0           1         58,98         306312         0,00         0,0           1         58,98         306312         0,00         0,0           1         58,98         306312         0,00         0,0           1         609,97         210465         0,00         0,0           1         609,97         210465         0,00         0,0           1         0,03         154629         0,00         0,0           1         24,96         150211         0,00         0,0           1 <t< td=""><td>1         699,97         -42471         0,00         0,0         0,0           ad Summary - GreenCement #1 - 11 3/4" Surface Casing           ng         MD         Axial Force         Dogleg         Torque         Friction Force           1         0,03         334470         0,00         0,0         0,0         0,0           1         24,96         330052         0,00         0,0         0,0         0,0           1         122,96         312690         0,00         0,0         0,0         0,0           1         123,02         312679         0,00         0,0         0,0         0,0           1         158,98         306301         0,00         0,0         0,0         0,0           1         609,60         226475         0,00         0,0         0,0         0,0           1         609,97         210465         0,00         0,0         0,0         0,0           1         24,96         150211         0,00         0,0         0,0         0,0           1         24,96         150211         0,00         0,0         0,0         0,0           1         123,02         132849         0,0</td><td>1         699,97         -42471         0.00         0.0         0.0         73,42           ad Summary - GreenCement #1 - 11 3/4" Surface Casing           ng         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         ("F)           1         0.03         334470         0.00         0.0         0.0         0.0         50,00           1         24.96         330052         0.00         0.0         0.0         35,00           1         122.96         312680         0.00         0.0         0.0         35,00           1         158,98         306312         0.00         0.0         0.0         37,40           1         304,80         280475         0.00         0.0         0.0         37,40           1         699,97         210465         0.00         0.0         0.0         67,44           1         699,97         210465         0.00         0.0         0.0         73,40           ad Summary - OverPull #1 - 11 3/4" Surface Casing           remperature           (bf)         Torque         Friction Force         Temperature         ('F)</td><td>1         699,97         -42471         0.00         0.0         0.0         73,42         907,46           ad Summary - GreenCement #1 - 11 3/4" Surface Casing ng MD         Axial Force         Dogleg         Torque (lbf)         Friction Force (lbf/ft)         Temperature (lbf/ft)         Pressure Internal           1         0.03         334470         0.00         0.0         0.0         50.00         2800.05           1         24,96         330052         0.00         0.0         0.0         35,00         3202.05           1         123,02         312679         0.00         0.0         0.0         35,00         3202.05           1         159,04         306301         0.00         0.0         0.0         37,40         3084.59           1         599,97         210465         0.00         0.0         0.0         73,40         3084.59           1         699,97         210465         0.00         0.0         0.0         73,40         3080.91           1         0.03         154629         0.00         0.0         0.0         73,40         4052.62           Attal Force         Dogleg         Torque         Friction Force         Temperature</td></t<>	1         699,97         -42471         0,00         0,0         0,0           ad Summary - GreenCement #1 - 11 3/4" Surface Casing           ng         MD         Axial Force         Dogleg         Torque         Friction Force           1         0,03         334470         0,00         0,0         0,0         0,0           1         24,96         330052         0,00         0,0         0,0         0,0           1         122,96         312690         0,00         0,0         0,0         0,0           1         123,02         312679         0,00         0,0         0,0         0,0           1         158,98         306301         0,00         0,0         0,0         0,0           1         609,60         226475         0,00         0,0         0,0         0,0           1         609,97         210465         0,00         0,0         0,0         0,0           1         24,96         150211         0,00         0,0         0,0         0,0           1         24,96         150211         0,00         0,0         0,0         0,0           1         123,02         132849         0,0	1         699,97         -42471         0.00         0.0         0.0         73,42           ad Summary - GreenCement #1 - 11 3/4" Surface Casing           ng         MD         Axial Force         Dogleg         Torque         Friction Force         Temperature         ("F)           1         0.03         334470         0.00         0.0         0.0         0.0         50,00           1         24.96         330052         0.00         0.0         0.0         35,00           1         122.96         312680         0.00         0.0         0.0         35,00           1         158,98         306312         0.00         0.0         0.0         37,40           1         304,80         280475         0.00         0.0         0.0         37,40           1         699,97         210465         0.00         0.0         0.0         67,44           1         699,97         210465         0.00         0.0         0.0         73,40           ad Summary - OverPull #1 - 11 3/4" Surface Casing           remperature           (bf)         Torque         Friction Force         Temperature         ('F)	1         699,97         -42471         0.00         0.0         0.0         73,42         907,46           ad Summary - GreenCement #1 - 11 3/4" Surface Casing ng MD         Axial Force         Dogleg         Torque (lbf)         Friction Force (lbf/ft)         Temperature (lbf/ft)         Pressure Internal           1         0.03         334470         0.00         0.0         0.0         50.00         2800.05           1         24,96         330052         0.00         0.0         0.0         35,00         3202.05           1         123,02         312679         0.00         0.0         0.0         35,00         3202.05           1         159,04         306301         0.00         0.0         0.0         37,40         3084.59           1         599,97         210465         0.00         0.0         0.0         73,40         3084.59           1         699,97         210465         0.00         0.0         0.0         73,40         3080.91           1         0.03         154629         0.00         0.0         0.0         73,40         4052.62           Attal Force         Dogleg         Torque         Friction Force         Temperature

	Slender Well De		Conditions - 95	/8" Production (	Casing		larch 01, 2018		<u> </u>
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	352018	0,00	0,0	0,0	50,00	0,06	0
+	1	24,96 122,99	347640 330434	0,00	0,0 0,0	0,0	46,92 35,00	53,19 262.04	53 262
	-	304,80	298523	0,00	0,0	0,0	47,12	262,04 649,35	262 649
		609,60	245023	0,00	0,0	0,0	67,44	1298,70	1298
	1	699,97	229161	0,00	0,0	0,0	73,46	1491,23	1491
	i	700,03	229150	0,00	0,0	0,0	73,47	1491,36	1491
	i	914,40	191523	0,00	0.0	0,0	87,66	1948,05	1948
	1	1219,20	138023	0,00	0,0	0,0	107,98	2597,40	2597
	1	1249,95	132622	0,00	0,0	0,0	110,03	2662,95	2662
	2	1250,02	132612	0,00	0,0	0,0	110,04	2663,08	2663
	2	1524.00	84523	0.00	0,0	0,0	128,30	3246,75	3246
	2 2	1828,80	31023	0,00	0,0	0,0	148,62	3896,10	3896
	2	1999,98	973	0,00	0,0	0,0	160,03	4260,77	4260
	2	2000,04	973	0,00	0,0	0,0	160,04	4260,90	4260
	2	2133,60	-22477	0,00	0,0	0,0	168,94	4545,45	4568
	2	2400,00	-69237	0,00	0,0	0,0	186,70	5112,99	5181
	2 2	2438,40	-75977	0,00	0,0	0,0	189,16	5194,80	5284
	2	2549,96	-95565	0,00	0,0	0,0	196,60	5432,48	558
as	ing Load Summ						<del>-</del> .		( B
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	
	Section	(m) 0,03	(lbf) 580549	(°/100ft) 0.00	(ft-lbf) 0.0	(lbf/ft) 0,0	(°F) 50,00	Internal 6400,04	External (
	4	24,96	576171	0,00	0,0	0,0	46,92	6436,60	36
+	1	122,99	558964	0,00	0,0	0,0	35,00	6580,28	174
	-	304,80	527054	0,00	0,0	0,0	47,12	6846,75	432
		609,60	473554	0,00	0,0	0,0	67.44	7293.51	432
		699,97	457692	0,00	0,0	0,0	73,46	7425,96	993
		700,03	457681	0,00	0,0	0,0	73,40	7426,05	993
	1	914,40	420054	0,00	0,0	0,0	87,66	7740,26	1298
-	1	1219,20	366554	0,00	0,0	0.0	107,98	8187,01	1730
	1	1249,95	361153	0,00	0,0	0,0	110,03	8232,11	1774
	2	1249,95	361142	0,00	0,0	0,0	110,03	8232,20	1774
	2	1371,60	339804	0,00	0,0	0,0	118,14	8410,39	1947
	2	1524,00	313054	0,00	2,6	0,0	128,30	8633,76	2163
	2	1676,40	286304	0,22	7,5	0,0	138,46	8857,14	2380
	2	1828,80	259554	0,66	13,8	0,0	148,62	9080,52	2596
	2	1981,20	232804	0,89	21,3	0,0	158,78	9303,90	2812
	2	1999,98	229504	0,03	22,3	0,0	160,03	9331,41	2839
	2	2000,04	195534	0,00	0,0	0,0	160,03	9331,50	379
	2 2	2133,60	171241	0,00	0,0	0,0	168,94	9527,27	404
	2	2400,00	122987	0.00	0.0	0,0	186,70	9917,74	456
	2	2438,40	116483	0,00	0,0	0,0	189,16	9974,02	4634
	2	2549,96	98093	0,00	0,0	0,0	196,60	10137,55	484
				0,00	0,0	0,0	100,00	10107,00	
A	dditional Pickup to	Prevent Bucklin	ng = 98395 lbf						
as	ing Load Summ <sub>String</sub>	narγ - LostRe MD	eturnsWithMudD Axial Force	rop #1 - 9 5/8" Dogleg	Production C	asing Friction Force	Temperature	Pressure	(nsi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	353424	0,00	0,0	0,0	50,00	0,00	(
	1	24,96	349047	0,00	0,0	0,0	50,00	0,00	3
	1	122,99	331840	0,00	0,0	0,0	35,00	0,00	174
		304,80	299930	0,00	0,0	0,0	47,11	0,00	43
	1	000.00	246430	0,00	0,0	0,0	67,40	167,53	865
	1	609,60		0,00	0,0	0,0	73,42	380,75	993
	1 1 1	699,97	230567			0.0	73,43	380,90	993
	1 1 1 1	699,97 700,03	230557	0,00	0,0				129
	1 1 1 1	699,97 700,03 914,40	230557 192930	0,00 0,00	0,0	0,0	87,70	892,39	
	1 1 1 1	699,97 700,03 914,40 1219,20	230557 192930 139430	0,00 0,00 0,00	0,0 0,0	0,0 0,0	108,00	1619,67	173
	1 1 1 1 1	699,97 700,03 914,40 1219,20 1249,95	230557 192930 139430 134029	0,00 0,00 0,00 0,00	0,0 0,0 0,0	0,0 0,0 0,0	108,00 110,04	1619,67 1693,09	1730 1774
	1 1 1 1 1 2	699,97 700,03 914,40 1219,20 1249,95 1250,02	230557 192930 139430 134029 134018	0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0	108,00 110,04 110,05	1619,67 1693,09 1693,23	1730 1774 1774
	1 1 1 1 1 2 2	699,97 700,03 914,40 1219,20 1249,95 1250,02 1524,00	230557 192930 139430 134029 134018 85930	0,00 0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0	108,00 110,04	1619,67 1693,09 1693,23 2346,94	1730 1774 1774
	1 1 1 1 2 2 2 2	699,97 700,03 914,40 1219,20 1249,95 1250,02 1524,00 1828,80	230557 192930 139430 134029 134018 85930 32430	0,00 0,00 0,00 0,00 0,00 0,00 0,00	0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0	108,00 110,04 110,05 128,29 148,59	1619,67 1693,09 1693,23 2346,94 3074,21	1730 1774 1774 2163 2590
	1 1 1 1 2 2 2 2	699,97 700,03 914,40 1219,20 1249,95 1250,02 1524,00 1828,80 1999,98	230557 192930 139430 134029 134018 85930 32430 2380	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	108,00 110,04 110,05 128,29 148,59 159,99	1619,67 1693,09 1693,23 2346,94 3074,21 3482,63	1730 1774 1774 2163 2596 2839
	1 1 1 2 2 2 2 2 2	699,97 700,03 914,40 1219,20 1249,95 1250,02 1524,00 1828,80	230557 192930 139430 134029 134018 85930 32430 2380 -5101	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0	108,00 110,04 110,05 128,29 148,59	1619,67 1693,09 1693,23 2346,94 3074,21 3482,63 3482,78	1730 1774 1774 2163 2596 2839
	1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	699,97 700,03 914,40 1219,20 1249,95 1250,02 1524,00 1828,80 1999,98 2000,04 2133,60	230557 192930 139430 134029 134018 85930 32430 2380 -5101 -25141	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	108,00 110,04 110,05 128,29 148,59 159,99 160,00 168,89	1619,67 1693,09 1693,23 2346,94 3074,21 3482,63 3482,78 3801,48	1730 1774 1774 2163 2596 2839 3791 4048
	1 1 1 2 2 2 2 2 2 2 2 2 2 2 2	699,97 700,03 914,40 1219,20 1249,95 1250,02 1524,00 1828,80 1999,98 2000,04 2133,60 2400,00	230557 192930 139430 134029 134018 85930 32430 2380 -5101 -25141 -65000	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	108,00 110,04 110,05 128,29 148,59 159,99 160,00 168,89 186,63	1619,67 1693,09 1693,23 2346,94 3074,21 3482,63 3482,78 3801,48 4437,13	1730 1774 1774 2163 2596 2839 3791 4048 4560
	1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	699,97 700,03 914,40 1219,20 1249,95 1250,02 1524,00 1828,80 1999,98 2000,04 2133,60	230557 192930 139430 134029 134018 85930 32430 2380 -5101 -25141	0,00 0,00 0,00 0,00 0,00 0,00 0,00 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	108,00 110,04 110,05 128,29 148,59 159,99 160,00 168,89	1619,67 1693,09 1693,23 2346,94 3074,21 3482,63 3482,78 3801,48	1730 1774 2163 2590 2839 379 4044

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File	: Slender Well D	esign, v0				Date/Time: N	1arch 01, 2018	02:54:24 PM	Page: 8 of 23
Ca	sing Load Sumn	nary - Green	Cement #1 - 9 5	5/8" Production	Casing				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressur	e (psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) –	Internal	External
1	1	0,03	718183	0,00	0,0	0,0	50,00	6400,06	0,06
2	1	24,96	713805	0,00	0,0	0,0	46,92	6453,19	53, 19
3	1	122,99	696599	0,00	0,0	0,0	35,00	6662,04	262,04
4	1	304,80	664688	0,00	0,0	0,0	47,12	7049,35	649,35
5	1	609,60	611188	0,00	0,0	0,0	67,44	7698,70	1298,70
6	1	699,97	595326	0,00	0,0	0,0	73,46	7891,23	1491,23
7	1	700,03	595315	0,00	0,0	0,0	73,47	7891,36	1491,36
8	1	914,40	557688	0,00	0,0	0,0	87,66	8348,05	1948,05
9	1	1219,20	504188	0,00	0,0	0,0	107,98	8997,40	2597,40
10	1	1249,95	498787	0,00	0,0	0,0	110,03	9062,95	2662,95
11	2	1250,02	498777	0,00	0,0	0,0	110,04	9063,08	2663,08
12	2	1371,60	477438	0,00	0,0	0,0	118,14	9322,07	2922,08
13	2	1524,00	450688	0,00	0,0	0,0	128,30	9646,75	3246,75
14	2	1676,40	423938	0,00	0,0	0,0	138,46	9971,42	3571,43
15	2	1828,80	397188	0,00	0,0	0,0	148,62	10296,10	3896,10
16	2	1981,20	370438	0,00	0,0	0,0	158,78	10620,78	4220,78
17	2	1999,98	367138	0,00	0,0	0,0	160,03	10660,77	4260,77
18	2	2000,04	367138	0,00	0,0	0,0	160,04	10660,89	4260,90
19	2	2133,60	343688	0,00	0,0	0,0	168,94	10945,45	4568,22
20	2	2286,00	316938	0,00	0,0	0,0	179,10	11270,13	4918,87
21	2	2400,00	296928	0,00	0,0	0,0	186,70	11512,99	5181,17
22	2	2438,40	290188	0,00	0,0	0,0	189,16	11594,80	5284,57
23	2	2549,96	270600	0,00	0,0	0,0	196,60	11832,49	5585,01

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	413118	0,00	0,0	0,0	50,00	0,06	0,0
	1	24,96	408740	0,00	0,0	0,0	46,92	53,20	53,2
	1	122,99	391534	0,00	0,0	0,0	35,00	262,04	262,0
	1	304,80	359623	0,00	0,0	0,0	47,12	649,35	649,3
	1	609,60	306123	0,00	0,0	0,0	67,44	1298,70	1298,7
	1	699,97	290261	0,00	0,0	0,0	73,46	1491,23	1491,2
	1	700,03	290250	0,00	0,0	0,0	73,47	1491,36	1491,3
	1	914,40	252623	0,00	0,0	0,0	87,66	1948,05	1948,0
	1	1219,20	199123	0,00	0,0	0,0	107,98	2597,40	2597,4
	1	1249,95	193722	0,00	0,0	0,0	110,03	2662,95	2662,9
	2	1250,02	193712	0,00	0,0	0,0	110,04	2663,08	2663,0
2	2	1524,00	145623	0,00	0,0	0,0	128,30	3246,74	3246,7
3	2	1828,80	92123	0,00	0,0	0,0	148,62	3896,10	3896,1
L	2	1999,98	62073	0,00	0,0	0,0	160,03	4260,76	4260,7
5	2	2000,04	62073	0,00	0,0	0,0	160,04	4260,89	4260,8
5	2	2133,60	38623	0,00	0,0	0,0	168,94	4545,45	4545,4
7	2	2400,00	-8137	0,00	0,0	0,0	186,70	5112,99	5112,9
3	2	2438,40	-14877	0,00	0,0	0,0	189,16	5194,80	5194,8
)	2	2549,96	-34465	0,00	0,0	0,0	196,60	5432,48	5432,4

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	0,03	405103	0,00	0,0	0,0	50,00	0,06	0,0
	1	24,96	401551	0,00	0,0	0,0	46,92	53,20	53,2
	1	122,99	387591	0,00	0,0	0,0	35,00	262,04	262,0
	1	304,80	361702	0,00	0,0	0,0	47,12	649,35	649,3
	1	609,60	318297	0,00	0,0	0,0	67,44	1298,70	1298,7
	1	699,97	305428	0,00	0,0	0,0	73,46	1491,23	1491,2
	1	700,03	305419	0,00	0,0	0,0	73,47	1491,36	1491,3
	1	914,40	274892	0,00	0,0	0,0	87,66	1948,05	1948,0
	1	1219,20	231487	0,00	0,0	0,0	107,98	2597,40	2597,4
0	1	1249,95	227106	0,00	0,0	0,0	110,03	2662,95	2662,9
1	2	1250,02	227097	0,00	0,0	0,0	110,04	2663,08	2663,0
2	2	1524,00	188082	0,00	0,0	0,0	128,30	3246,74	3246,7
3	2	1828,80	144678	0,00	0,0	0,0	148,62	3896,10	3896,1
4	2	1999,98	120302	0,00	0,0	0,0	160,03	4260,76	4260,7
5	2	2000,04	120294	0,00	0,0	0,0	160,04	4260,89	4260,8
6	2	2133,60	101273	0.00	0.0	0.0	168,94	4545,45	4545,4
7	2	2400,00	63336	0,00	0,0	0,0	186,70	5112,99	5112,9
3	2	2438,40	57868	0,00	0,0	0,0	189,16	5194,80	5194,8
э	2	2549,96	41980	0.00	0,0	0,0	196,60	5432,48	5432,4

	Slender Well D sing Load Sumr		Leak#1 - 9 5/8	" Production Ca	sing	2000/1000		02:54:24 PM P	
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	psi)
	Section 1	(m) 0,03	(lbf) 364417	(°/100ft) 0.00	(ft-lbf) 0.0	(lbf/ft) 0.0	(°F) 50,00	Internal 0.06	External (
	1	24,96	360040	0,00	0,0	0,0	46,92	53,20	(
	1	122,99	342833	0,00	0,0	0,0	35,00	262,04	143
	1	304,80	310922	0,00	0,0	0,0	47,12	649,35	496
	1	609,60 699,97	257422	0,00	0,0	0,0	67,44	1298,70 1491,23	1087
	1	700,03	241560 241550	0,00 0,00	0,0 0,0	0,0 0,0	73,46 73,47	1491,25	1262 1262
	1	914,40	203922	0,00	0,0	0,0	87,66	1948,05	167
	1	1219,20	150422	0,00	0,0	0,0	107,98	2597,40	226
	1	1249,95	145022	0,00	0,0	0,0	110,03	2662,95	232
	2	1250,02	145011	0,00	0,0	0,0	110,04	2663,08	232
	2 2	1524,00	96922	0,00	0,0	0,0	128,30	3246,74	285
	2	1828,80	43422	0,00	0,0	0,0	148,62	3896,10	345
-	2	1999,98	13373	0,00	0,0	0,0	160,03	4260,76	378
	2	2000,04 2133,60	21855 516	0,00 0,00	0,0 0,0	0,0 0.0	160,04 168,94	4260,89 4545,45	378 404
	2	2400,00	-41845	0,00	0,0	0,0	186,70	4545,45 5112,99	404
	2	2438,40	-47500	0,00	0,0	0,0	189,16	5194,80	463
	2	2549,96	-63423	0,00	0,0	0,0	196,60	5432,48	484
as		nary - FullEva		5/8" Production		Existion Esses	Tama anakuna	<b>D</b> ue e e e e e e e e e e e e e e e e e e	1)
	String Section	(m)	Axial Force (lbf)	Dogleg (°/100ft)	Torque (ft-lbf)	Friction Force (lbf/ft)	Temperature (°F)	Pressure ( Internal	External
	1	0,03	386170	0,00	0,0	0,0	50,00	633,76	External
	1	24,96	381793	0,00	0,0	0,0	46,92	686,89	
	1	122,99	364586	0,00	0,0	0,0	35,00	895,73	14
	1	304,80	332676	0,00	0,0	0,0	47,12	1283,04	49
	1	609,60	279176	0,00	0,0	0,0	67,44	1932,39	108
	1	699,97 700,03	263314 263303	0,00 0,00	0,0 0,0	0,0 0.0	73,46	2124,92	126
	1	914,40	263303	0,00	0,0	0,0	73,47 87,66	2125,05 2581,74	126 167
+	1	1219,20	172176	0,00	0,0	0,0	107,98	3231,09	226
	1	1249,95	166775	0,00	0,0	0,0	110,03	3296,64	2320
	2	1250,02	166764	0,00	0,0	0,0	110,00	3296,77	232
	2	1524,00	118676	0,00	0,0	0,0	128,30	3880,44	285
	2 2	1828,80	65176	0,00	0,0	0,0	148,62	4529,79	3450
	2	1999,98	35126	0,00	0,0	0,0	160,03	4894,45	378
	2	2000,04	43608	0,00	0,0	0,0	160,04	4894,58	378
	2	2133,60	22269	0,00	0,0	0,0	168,94	5179,14	404
	2	2400,00	-20092	0,00	0,0	0,0	186,70	5746,69	455
	2	2438,40 2549,96	-25747 -41669	0,00 0,00	0,0 0,0	0,0 0,0	189,16 196,60	5828,49 6066,18	463 484
as	ing Load Sumr	nary - Initial C	Conditions - 7"	Production Line					
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure (	
	Section 1	(m) 2540,02	(lbf) -8011	(°/100ft) 0,00	(ft-lbf) 0,0	(lbf/ft) 0.0	(°F) 196,00	Internal 6060,67	External 606
	1	2549,96	-8963	0,00	0,0	0,0	196,60	6084 39	608
	1	2550,02	-8963	0,00	0,0	0,0	196,60	6084,39 6084,53	608
	i	2743,20	-27345	0,00	0,0	0,0	209,48	6545,45	660
	1	2774,96	-30370	0,00	0,0	0,0	211,60	6621,25	669
	2	2775,02	-36117	0,00	0,0	0,0	211,60	6621,40	669
	2	3048,00	-64778	0,00	0,0	0,0	229,80	7272,72	742
		3172,97	-77902	0,00	0,0	0,0	238,10	7570,91	776
	2								
as	sing Load Sumr	nary - Pressu		Production Line		Friction Fores	Tomporature	Broosure	nci)
as	sing Load Sumr String	nary - Pressu MD	Axial Force		Torque	Friction Force	Temperature	Pressure (	psi) External
as	sing Load Sumr	nary - Pressu		Production Liner Dogleg (°/100ft) 0.11	Torque (ft-lbf) 0,2	Friction Force (lbf/ft) 0.0	(°F) —	Internal 10122,98	External
as	sing Load Sumr String	narγ - Pressu MD (m) 2540,02 2549,96	Axial Force (lbf)	Dogleg (°/100ft) 0,11 0,11	Torque (ft-lbf) 0,2 0,2	(lbf/ft)	(°F) 196,00 196,60	Internal 10122,98 10137,55	External 606 608
as	sing Load Sumr String	narγ - Pressu MD (m) 2540,02 2549,96 2550,02	Axial Force (lbf) 65266 64315 92334	Dogleg (°/100ft) 0,11 0,00	Torque (ft-lbf) 0,2 0,2 0,0	(lbf/ft) 0,0 0,0 0,0	(°F) 196,00 196,60 196,60	Internal 10122,98 10137,55 10137,64	External 606 608 484
as	sing Load Sumr String	mary - Pressu MD (m) 2540,02 2549,96 2550,02 2743,20	Axial Force (lbf) 65266 64315 92334 62945	Dogleg (°/100ft) 0,11 0,00 0,00	Torque (ft-lbf) 0,2 0,2 0,2 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0	(°F) 196,00 196,60 196,60 209,48	Internal 10122,98 10137,55 10137,64 10420,77	External 606 608 484 571
as	sing Load Sumr String Section 1 1 1 1 1 1	<u>marγ - Pressu</u> MD (m) 2540,02 2549,96 2550,02 2743,20 2774,96	Axial Force (lbf) 65266 64315 92334 62945 55219	Dogleg (°/100ft) 0,11 0,11 0,00 0,00 0,00	Torque (ft-lbf) 0,2 0,2 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0	(°F) 196,00 196,60 196,60 209,48 211,60	Internal 10122,98 10137,55 10137,64 10420,77 10467,34	External 606 608 484 571 598
as	sing Load Sumr String Section 1 1 1 1 1 2	marγ - Pressu MD (m) 2540,02 2549,96 2550,02 2743,20 2774,96 2775,02	Axial Force (lbf) 65266 64315 92334 62945 55219 47460	Dogleg (°/100ft) 0,11 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,2 0,2 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 196,00 196,60 196,60 209,48 211,60 211,60	Internal 10122,98 10137,55 10137,64 10420,77 10467,34 10467,43	External 606 608 484 571 598 598
<u>as</u>	string Load Summ String Section 1 1 1 1 1 2 2	MD (m) 2540,02 2549,96 2550,02 2743,20 2774,96 2775,02 3048,00	Axial Force (lbf) 65266 64315 92334 62945 55219 47460 7247	Dogleg (°/100ft) 0,11 0,00 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,2 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 196,00 196,60 209,48 211,60 211,60 229,80	Internal 10122,98 10137,55 10137,64 10420,77 10467,34 10467,43 10867,53	External 606 484 571 598 598 703
as	sing Load Sumr String Section 1 1 1 1 1 2	marγ - Pressu MD (m) 2540,02 2549,96 2550,02 2743,20 2774,96 2775,02	Axial Force (lbf) 65266 64315 92334 62945 55219 47460	Dogleg (°/100ft) 0,11 0,00 0,00 0,00 0,00 0,00	Torque (ft-lbf) 0,2 0,2 0,0 0,0 0,0 0,0 0,0	(lbf/ft) 0,0 0,0 0,0 0,0 0,0 0,0	(°F) 196,00 196,60 196,60 209,48 211,60 211,60	Internal 10122,98 10137,55 10137,64 10420,77 10467,34 10467,43	psi) External 6064 4844 5716 5985 5985 7030 7385

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Date/Time: March 01, 2018 02:54:25 PM Page: 10 of 23

2	Casing Load Sum	nmary - Green	Cement #1 - 7"	Production Line	er				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	2540,02	184213	0,00	0,0	0,0	196,00	12460,67	6060,67
2	1	2549,96	183262	0,00	0,0	0,0	196,60	12484,39	6084,39
3	1	2550,02	183262	0,00	0,0	0,0	196,60	12484,53	6084,54
4	1	2743,20	164880	0,00	0,0	0,0	209,48	12945,45	6604,72
5	1	2774,96	161854	0,00	0,0	0,0	211,60	13021,25	6690,27
6	2	2775,02	150553	0,00	0,0	0,0	211,60	13021,40	6690,43
7	2	3048,00	121892	0,00	0,0	0,0	229,80	13672,72	7425,49
8	2	3172,97	108769	0,00	0,0	0,0	238,10	13970,91	7762,02

	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
	1	2540,02	49344	0,00	0,0	0,0	196,00	6060,67	6060,67
2	1	2549,96	48393	0,00	0,0	0,0	196,60	6084,39	6084,39
3	1	2550,02	48393	0,00	0,0	0,0	196,60	6084,53	6084,53
<b>۱</b>	1	2743,20	30011	0,00	0,0	0,0	209,48	6545,44	6545,44
5	1	2774,96	26985	0,00	0,0	0,0	211,60	6621,25	6621,25
3	2	2775,02	21239	0,00	0,0	0,0	211,60	6621,40	6621,40
7	2	3048.00	-7423	0.00	0.0	0.0	229,80	7272,72	7272.72
3	2	3172.97	-20546	0.00	0,0	0.0	238,10	7570,91	7570,91

Ca	asing Load Summ	ary - Runnir	ngHole #1 - 7"	Production Line	r				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	e (psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F) —	Internal	External
1	1	2540,02	73369	0,00	0,0	0,0	196,00	6060,67	6060,67
2	1	2549,96	72623	0,00	0,0	0,0	196,60	6084,39	6084,39
3	1	2550,02	72619	0,00	0,0	0,0	196,60	6084,53	6084,53
4	1	2743,20	58134	0,00	0,0	0,0	209,48	6545,44	6545,44
5	1	2774,96	55752	0,00	0,0	0,0	211,60	6621,25	6621,25
6	2	2775,02	58091	0,00	0,0	0,0	211,60	6621,40	6621,40
7	2	3048,00	35501	0,00	0,0	0,0	229,80	7272,72	7272,72
8	2	3172,97	25159	0,00	0,0	0,0	238,10	7570,91	7570,91

Ca	sing Load Summ	ary - FullEva	acuation #1 - 7"	Production Lin	er				
	String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
	Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	1	2540,02	12197	0,00	0,0	0,0	196,00	7186,09	6060,64
2	1	2549,96	11246	0,00	0,0	0,0	196,60	7189,35	6074,75
3	1	2550,02	10948	0,00	0,0	0,0	196,60	7189,37	6084,50
4	1	2743,20	-8919	0,00	0,0	0,0	209,48	7252,75	6358,75
5	1	2774,96	-12189	0,00	0,0	0,0	211,60	7263,17	6403,85
6	2	2775,02	-18270	0,00	0,0	0,0	211,60	7263,19	6403,94
7	2	3048,00	-48738	0,00	0,0	0,0	229,80	7352,75	6791,48
8	2	3172,97	-62688	0,00	0,0	0,0	238,10	7393,75	6968,90

String	MD	Axial Force	Dogleg	Torque	Friction Force	Temperature	Pressure	(psi)
Section	(m)	(lbf)	(°/100ft)	(ft-lbf)	(lbf/ft)	(°F)	Internal	External
1	2540,02	-117118	0,00	0,0	0,0	196,00	0,07	6060,64
1	2549,96	-118070	0,00	0,0	0,0	196,60	23,79	6074,75
1	2550,02	-118180	0,00	0,0	0,0	196,60	23,94	6084,50
1	2743,20	-130884	0,00	0,0	0,0	209,48	484,85	6358,75
1	2774,96	-132975	0,00	0,0	0,0	211,60	560,65	6403,85
2	2775,02	-135564	0,00	0,0	0,0	211,60	560,80	6403,94
2	3048,00	-156201	0,00	0,0	0,0	229,80	1212,12	6791,48
2	3172,97	-165650	0,00	0,0	0,0	238,10	1510,31	6968,90

Slender Well Design

arcly r actor of		Conditions - 1	3 3/8" Conducto	r Casing				
String	MD	Yield Strength	VME Stress	roasing	Abso	lute Safety Factors	e	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1 0.03	40000.0	1383.1	D 28.921	N/A	100+	100+	28.9
	1 24,96	40000,0	1130,9	D 35,369	N/A	100+	100+	36,6
	1 122,96	40000,0	400,0	D 100+	N/A	100+	79,080	10
	1 123,02	40000,0	400,0	D 100+	N/A	100+	78,887	10
	1 152,40	40000,0	400,0	100+	N/A	100+	25,317	M 10
	1 158,98	40000,0	400,0	90,748	N/A	100+	21,982	M 85,5
	1 150,50	40000,0	440,8	50,748	19775	100+	21,302	W 05,
Burst and Axial	Flans				I			
	ody, L = Connection	Leak B = Conner	ction Burst E = Cor	nection Fracture	J = Connection Ju	imp-out Y = Con	nection Yield C = (	Connection
Berdan - Tipe B	ouy, E - connection	r Lean, D - Connes	unin Burst, 1 - 001	meetionninueture	o - oonneedon o	inp out, i – oon	needon neid, o -	Johneedon
Axial Flags								
	n, M = Compression							
Derault - Terisio	n, m = compression	•						
Triaxial Flags								
	Vall and Positive Be	nding OP No Ben	ding D = Outer wall	safety factor N :	Negative Rending			
Deradit - miler v	van and i ositive be	nuing on no ben	ang, D - Oater wan	survey factor, it	· Negative Denaing	•		
Envelope Flags								
	urot EC - Enuclon	- Collonaa N(A -						
EB = Envelope E	Burst, EC = Envelop	e Collapse, N/A = I	to ISO Connection					
			ID /// 40.0		<b>•</b> ·			
	<u>ummary - LostR</u>			8" Conductor	Casing			
String	MD	Yield Strength	VME Stress			lute Safety Factors		
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1 0,03	40000,0	561,3	D 71,269	N/A	100+	100+	71,3
	1 24,96	40000,0	1067,8	37,462	N/A	100+	19,210	M 10
	1 109,61	40000,0	3288,7	12,163	N/A	100+	4,838	M 55,9
	1 122,96	40000,0	3168,4	12,625	N/A	100+	4,910	M 45,
	1 123,02	40000,0	3165,0	12,638	N/A	100+	4,910	M 45,
	1 158,98	40000,0	2912,5	13,734	N/A	100+	5,116	M 35,
	1 100,00	40000,0	2012,0	13,734	11/2	1001	3,110	101 00,0
	Flags ody, L = Connectior	n Leak, B = Conne	ction Burst, F = Cor	nnection Fracture	J = Connection Ju	ımp-out, Y = Con	nection Yield, C = (	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags		1					nection Yield, C = (	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags	ody, L = Connectior n, M = Compressior	1					nection Yield, C = (	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags	ody, L = Connectior n, M = Compressior	1					nection Yield, C = (	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags	ody, L = Connectior n, M = Compressior	nding OR No Ben	ding, D = Outer wall				nection Yield, C = (	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags	ody, L = Connectior n, M = Compressior Vall and Positive Be	nding OR No Ben	ding, D = Outer wall				nection Yield, C = (	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags	ody, L = Connectior n, M = Compressior Vall and Positive Be	nding OR No Ben	ding, D = Outer wall				nection Yield, C = 6	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags	ody, L = Connectior n, M = Compressior Vall and Positive Be	nding OR No Ben	ding, D = Outer wall				nection Yield, C = i	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E	ody, L = Connectior n, M = Compression Vall and Positive Be Burst, EC = Envelop	nding OR No Ben e Collapse, N/A = I	ding, D = Outer wall	safety factor, N :			nection Yield, C = (	Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E	ody, L = Connectior n, M = Compression Vall and Positive Be Burst, EC = Envelop ummary - OverF	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8	ding, D = Outer wall	safety factor, N :	: Negative Bending	I		Connection
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E B = Envelope E Afety Factor String	ody, L = Connectior n, M = Compression Vall and Positive Be Burst, EC = Envelop Jummary - OverF MD	nding OR No Ben e Collapse, N/A = I Pull #1 - 13 3/8 Yield Strength	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress	safety factor, N =	: Negative Bending	I	s	
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E	ody, L = Connectior n, M = Compression Vall and Positive Be Burst, EC = Envelop Ummary - OverF MD (m)	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi)	ding, D = Outer wall no ISO Connection "Conductor Cas VME Stress (psi)	safety factor, N = sing Triaxial	Negative Bending	I lute Safety Factors Burst ∣	s Collapse	Axial
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E B = Envelope E Afety Factor String	ody, L = Connectior n, M = Compression Vall and Positive Be Burst, EC = Envelop <u>ummary - OverF</u> MD (m) 1 0,03	nding OR No Ben e Collapse, N/A = I Pull #1 - 13 3/8 Yield Strength (psi) 4000,0]	ding, D = Outer wall no ISO Connection "Conductor Cas VME Stress ((psi) 3085,1]	safety factor, N = sing Triaxial D 12,965	: Negative Bending Abso Envelope N/A	lute Safety Factors Burst 100+	s Collapse 100+	Axial 12,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E B = Envelope E Afety Factor String	ody, L = Connectior wall and Positive Be surst, EC = Envelop <u>ummary - Overf</u> MD (m) 1 0.03 1 24,96	nding OR No Ben e Collapse, N/A = 1 <u>Pull #1 - 13 3/8</u> Yield Strength (psi) 40000,0 40000,0	ding, D = Outer wall no ISO Connection "Conductor Case VME Stress (psi) 3085,1 2833,0	safety factor, N = sing Triaxial D 12,965 D 14,119	: Negative Bending Abso Envelope N/A N/A	lute Safety Factor Burst 100+ 100+	S Collapse 100+ 100+	Axial 12, 14,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E B = Envelope E Afety Factor String	ody, L = Connection n, M = Compression Vall and Positive Be surst, EC = Envelop ummarγ - OverF MD (m) 1 0.03 1 24.96 1 212.96	nding OR No Ben e Collapse, N/A = 1 Dull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0	ding, D = Outer wall no ISO Connection "Conductor Case VME Stress (psi) 0065,1 2833,0 1842,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713	E Negative Bending Abso Envelope N/A N/A N/A	lute Safety Factor Burst 100+ 100+ 100+	S Collapse 100+ 78,877	Axial 12, 14, 24,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E B = Envelope E Afety Factor String	ody, L = Connection vali and Positive Be Burst, EC = Envelop <u>ummary - OverF</u> (m) 1 0.03 1 22,96 1 122,96 1 123,02	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 4000,0 4000,0 4000,0	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,721	Envelope N/A N/A N/A N/A	lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838	Axial 12, 14, 24, 24,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E B = Envelope E Afety Factor String	ody, L = Connection n, M = Compression Vall and Positive Be surst, EC = Envelop ummarγ - OverF MD (m) 1 0.03 1 24.96 1 212.96	nding OR No Ben e Collapse, N/A = 1 Dull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0	ding, D = Outer wall no ISO Connection "Conductor Case VME Stress (psi) 0065,1 2833,0 1842,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713	E Negative Bending Abso Envelope N/A N/A N/A	lute Safety Factor Burst 100+ 100+ 100+	S Collapse 100+ 78,877	Axial 12, 14, 24, 24,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E afety Factor Si String Section	ody, L = Connectior n, M = Compression Vall and Positive Be Burst, EC = Envelop Ummary - Overf MD 1 0.03 1 24.96 1 122.96 1 123.02 1 158.98	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 4000,0 4000,0 4000,0	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,721	Envelope N/A N/A N/A N/A	lute Safety Factors Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838	
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E afety Factor St Section Burst and Axial	ody, L = Connectior , M = Compression Vall and Positive Be surst, EC = Envelop <u>Ummary - OverF</u> MD (m) 1 0.03 1 22.96 1 122.96 1 122.92 1 158.98 Flags	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6 14478,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	Envelope N/A N/A N/A N/A N/A	lute Safety Factor: Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12. 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E afety Factor St Section Burst and Axial	ody, L = Connectior n, M = Compression Vall and Positive Be Burst, EC = Envelop Ummary - Overf MD 1 0.03 1 24.96 1 122.96 1 123.02 1 158.98	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6 14478,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	Envelope N/A N/A N/A N/A N/A	lute Safety Factor: Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12. 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E afety Factor String Section Burst and Axial I Default = Pipe B	ody, L = Connectior , M = Compression Vall and Positive Be surst, EC = Envelop <u>Ummary - OverF</u> MD (m) 1 0.03 1 22.96 1 122.96 1 122.92 1 158.98 Flags	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6 14478,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	Envelope N/A N/A N/A N/A N/A	lute Safety Factor: Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12. 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E <u>afety Factor St</u> String Section Burst and Axial Default = Pipe B Axial Flags	ody, L = Connectior n, M = Compression Vall and Positive Be surst, EC = Envelop ummary - OverF MD (m) 1 0.03 1 24.96 1 122.96 1 123.02 1 158.98 Flags ody, L = Connectior	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0 1 Leak, B = Conner	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6 14478,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	Envelope N/A N/A N/A N/A N/A	lute Safety Factor: Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12. 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E afety Factor St String Section Burst and Axial Default = Pipe B Axial Flags	ody, L = Connectior , M = Compression Vall and Positive Be surst, EC = Envelop <u>Ummary - OverF</u> MD (m) 1 0.03 1 22.96 1 122.96 1 122.92 1 158.98 Flags	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0 1 Leak, B = Conner	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6 14478,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	Envelope N/A N/A N/A N/A N/A	lute Safety Factor: Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12. 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E <u>afety Factor St</u> String Section Burst and Axial Default = Pipe B Axial Flags	ody, L = Connectior n, M = Compression Vall and Positive Be surst, EC = Envelop ummary - OverF MD (m) 1 0.03 1 24.96 1 122.96 1 123.02 1 158.98 Flags ody, L = Connectior	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0 1 Leak, B = Conner	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6 14478,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	Envelope N/A N/A N/A N/A N/A	lute Safety Factor: Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12. 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E <u>afety Factor St</u> String Section Burst and Axial Default = Pipe B Axial Flags	ody, L = Connectior n, M = Compression Vall and Positive Be surst, EC = Envelop ummary - OverF MD (m) 1 0.03 1 24.96 1 122.96 1 123.02 1 158.98 Flags ody, L = Connectior	nding OR No Ben e Collapse, N/A = 1 Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0 1 Leak, B = Conner	ding, D = Outer wall no ISO Connection "Conductor Cass VME Stress (psi) 3085,1 2833,0 1842,2 1841,6 14478,2	safety factor, N = sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	Envelope N/A N/A N/A N/A N/A	lute Safety Factor: Burst 100+ 100+ 100+ 100+ 100+	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12 14, 24, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E Afety Factor String Section Burst and Axial Default = Pipe B Axial Flags Default = Tensio Triaxial Flags	ody, L = Connectior n, M = Compression Vall and Positive Be surst, EC = Envelop Ummary - OverF (m) 1 0.03 1 22.96 1 122.96 1 123.02 1 158.98 Flags ody, L = Connectior n, M = Compression	nding OR No Ben e Collapse, N/A = r Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0 40000,0 a Leak, B = Connec	ding, D = Outer wall no ISO Connection "Conductor Case VME Stress (psi)	sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	E Negative Bending Abso Envelope N/A N/A N/A N/A J = Connection Ju	I Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12. 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E Afety Factor String Section Burst and Axial Default = Pipe B Axial Flags Default = Tensio Triaxial Flags	ody, L = Connectior n, M = Compression Vall and Positive Be surst, EC = Envelop ummary - OverF MD (m) 1 0.03 1 24.96 1 122.96 1 123.02 1 158.98 Flags ody, L = Connectior	nding OR No Ben e Collapse, N/A = r Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0 40000,0 a Leak, B = Connec	ding, D = Outer wall no ISO Connection "Conductor Case VME Stress (psi)	sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	E Negative Bending Abso Envelope N/A N/A N/A N/A J = Connection Ju	I Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12: 14, 24, 32,
Default = Pipe B Axial Flags Default = Tensio Triaxial Flags Default = Inner V Envelope Flags EB = Envelope E afety Factor St String Section Burst and Axial Default = Pipe B Axial Flags Default = Tensio Triaxial Flags	ody, L = Connectior n, M = Compression Vall and Positive Be surst, EC = Envelop Ummary - OverF (m) 1 0.03 1 22.96 1 122.96 1 123.02 1 158.98 Flags ody, L = Connectior n, M = Compression	nding OR No Ben e Collapse, N/A = r Pull #1 - 13 3/8 Yield Strength (psi) 40000,0 40000,0 40000,0 40000,0 a Leak, B = Connec	ding, D = Outer wall no ISO Connection "Conductor Case VME Stress (psi)	sing Triaxial D 12,965 D 14,119 D 21,713 D 21,721 D 27,060	E Negative Bending Abso Envelope N/A N/A N/A N/A J = Connection Ju	I Burst 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	S Collapse 100+ 100+ 78,877 78,838 61,057	Axial 12: 14, 24, 32,

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	40000,0	4307,3	D 9,287	N/A	100+	100+	9,29
	1	24,96	40000,0	4093,4	D 9,772	N/A	100+	100+	9,87
	1	122,96	40000,0	3252,9	D 12,297	N/A	100+	78,667	13,06
	1	123,02	40000,0	3252,4	D 12,299	N/A	100+	78,628	13,06
	1	158,98	40000,0	2944,1	D 13,586	N/A	100+	60,896	14,82
	, po bould in the bould have							nection Yield, C = C	Johneedon
0 1 2	Axial Flags Default = Tension, M								
0 1 2 3 4	Axial Flags	= Compressior							
0 1 2 3 4 5	Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a	= Compressior							
0 1 2 3 4 5 6	Axial Flags Default = Tension, M Triaxial Flags	= Compression	nding OR No Bendi	ing, D = Outer wall					
)  0  1  2	Axial Flags								onneeu

	String	MD	Yield Strength	VME Stress			ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	55000,0	4795,4	D 11,469	N/A	100+	100+	11,47
	1	24,96	55000,0	4554,3	D 12,077	N/A	100+	100+	12,20
÷	1	122,96	55000,0	3606,9	D 15,249	N/A	100+	100+	16,24
	1	123,02	55000,0	3606,3	D 15,251	N/A	100+	100+	16,25
	1	158,98	55000,0	3360,9	16,365	N/A	100+	61,337	18,50
	1	159,04	55000,0	3360,4	16,367	N/A	100+	61,284	18,50
	1	304,80	55000,0	2494,7	22,047	N/A	100+	20,136	42,21
	1	457,20	55000,0	2031,2	27,078	N/A	100+	11,885	M 100
۱. I	1	609,60	55000,0	2798,2	19,656	N/A	100+	7,402	M 25,14
0	1	699,97	54910,7	3891,6	14,110	N/A	100+	5,544	M 17,04
11									
2	Burst and Axial Flags								
				tion Burst E = Cor				nection Yield C = C	
	Default = Pipe Body, L	. = Connection	Leak, B - Connec		mection racture,	J = Connection Ju	imp-out, i = con		connection
4	• •	. = Connection	Leak, B - Connec	alon Burst, r = oor	meetion racture,	J - Connection Ju	imp-out, 1 = Con		connection
	Axial Flags			din Burst, i – Goi	meetion racture,	J - Connection Ju	imp-out, 1 = con	needon neid, o - c	connection
4  5  6	• •			alon Burst, 1 – Gol	meetion racture,	J – Connection Ju	imp-out, i' – con		connection
4 5 6 7	Axial Flags Default = Tension, M =				inection racture,	J - Connection Ju	imp-out, 1 = con		connection
4 5 6 7 8	Axial Flags Default = Tension, M = Triaxial Flags	Compressior	<u>1</u>						connection
4  5  6  7  8	Axial Flags Default = Tension, M =	Compressior	<u>1</u>						
14 15 16 17 18 19 20	Axial Flags Default = Tension, M = Triaxial Flags Default = Inner Wall a	Compressior	<u>1</u>						Connection
14 15 16 17 18 19 20 21	Axial Flags Default = Tension, M = Triaxial Flags	: Compression	n ending OR No Benc	ling, D = Outer wal					connection

	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	55000,0	38985,0	N 1,411	N/A	1,273	100+	3,66
:	1	24,96	55000,0	38899,5	N 1,414	N/A	1,276	100+	3,73
	1	122,96	55000,0	38577,5	N 1,426	N/A	1,291	100+	4,02
	1	123,02	55000,0	38553,1	1,427	N/A	1,291	100+	4,12
	1	158,98	55000,0	38622,5	1,424	N/A	1,290	100+	4,23
	1	159,04	55000,0	39241,5	1,402	N/A	1,270	100+	4,17
'	1	304,80	55000,0	39432,8	1,395	N/A	1,271	100+	4,68
	1	609,60	55000,0	39347,8	1,398	N/A	1,290	100+	6,31
)	1	699,97	54910,7	38640,9	1,421	N/A	1,316	100+	7,05
0									
	Burst and Axial Flags	3							
1	Burst and Axial Flags Default = Pipe Body,		Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection Ju	ump-out, Y = Con	nection Yield, C = 0	Connection
1 2 3	Default = Pipe Body,		Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection Ju	ump-out, Y = Con	nection Yield, C = (	Connection
1 2 3 4	Default = Pipe Body, Axial Flags	L = Connection		tion Burst, F = Con	nection Fracture	, J = Connection Ju	ump-out, Y = Con	nection Yield, C = 0	Connection
1 2 3 4 5	Default = Pipe Body,	L = Connection		tion Burst, F = Con	nection Fracture	, J = Connection Ju	ump-out, Y = Con	nection Yield, C = 0	Connection
1 2 3 4 5 6	Default = Pipe Body, Axial Flags Default = Tension, M	L = Connection		tion Burst, F = Con	nection Fracture	e, J = Connection Ju	ump-out, Y = Con	nection Yield, C = C	Connection
1 2 3 4 5 6 7	Default = Pipe Body, Axial Flags Default = Tension, M Iriaxial Flags	L = Connection	1			·	. ,	nection Yield, C = (	Connection
1 2 3 4 5 6 7 8	Default = Pipe Body, Axial Flags Default = Tension, M	L = Connection	1			·	. ,	nection Yield, C = 0	Connection
1 2 3 4 5 6 7 8 9	Default = Pipe Body, Axial Flags Default = Tension, M Friaxial Flags Default = Inner Wall a	L = Connection	1			·	. ,	nection Yield, C = 0	Connection
1 2 3 4 5 6 7 8 9	Default = Pipe Body, Axial Flags Default = Tension, M Iriaxial Flags	L = Connection = Compression and Positive Be	nding OR No Bend	ing, D = Outer wall		·	. ,	nection Yield, C = 0	Connection

	String	MD	eturnsWithMud Yield Strength	VME Stress		Absol	ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	55000,0	4082,1	D 13,473	N/A	100+	100+	13,41
	1	24,96	55000.0	4198,0	13,102	N/A	100+	45,543	14,4
	1	122,96	55000,0	5371,4	10,239	N/A	100+	9,302	20,5
	1	123,02	55000,0	5306.0	10,366	N/A	100+	9,302	21,23
	1	158,98	55000,0	5802,3	9,479	N/A	100+	7,221	27,5
	1	159,04	55000,0	5132,3	10,716	N/A	100+	9,008	24,5
	1	255,00	55000,0	6353,5	8,657	N/A	100+	5,594	65,3
	1	304,80	55000,0	5964,4	9,221	N/A	100+	5,651	M 100
	1	609,60	55000,0	3024,1	18,187	N/A	100+	7,688	M 27,1
)	1	699,97	54910,3	2981,2	18,419	N/A	100+	7,327	M 20,0
	Burst and Axial Flag								<b>.</b>
	Default = Pipe Body,	L = Connection	Leak, B = Connec	tion Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = (	Connection
_	A set of the sec								
	Axial Flags								
	Default = Tension, M	= Compression	1						
1									
3									
	Triaxial Flags								
	Default = Inner Wall a	and Positive Be	nding OR No Bend	ling, D = Outer wall	safety factor, N =	Negative Bending			
-					safety factor, N =	Negative Bending			
) ?	Default = Inner Wall a Envelope Flags	, EC = Envelop	e Collapse, N/A = n Cement #1 - 1	o ISO Connection		Negative Bending			
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop nary - Greer MD	e Collapse, N/A = n Cement #1 - 1 Yield Strength	0 ISO Connection	Casing	Absol	ute Safety Factors		
) ?	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Sumn	, EC = Envelop narγ - Greer MD (m)	e Collapse, N/A = n Cement #1 - 1 Yield Strength (psi)	o ISO Connection	Casing Triaxial	Absol Envelope	ute Safety Factors Burst	Collapse	Axial
) ?	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop narγ - Greer MD (m) 0,03	e Collapse, N/A = n Cement #1 - 1 Yield Strength (psi) 55000,0	o ISO Connection           1 3/4" Surface (           VME Stress           (psi)           38737,7	Casing Triaxial 1,420	Absol	ute Safety Factors Burst   1,273	Collapse 100+	2,5
) ?	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop nary - Greer MD (m) 0,03 24,96	e Collapse, N/A = n Cement #1 - 1 Yield Strength (psi)	o ISO Connection	Casing Triaxial 1,420 1,420	Absol Envelope	ute Safety Factors Burst	Collapse	2,5
)   2	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop narγ - Greer MD (m) 0,03	e Collapse, N/A = n Cement #1 - 1 Yield Strength (psi) 55000,0	o ISO Connection           1 3/4" Surface (           VME Stress           (psi)           38737,7	Casing Triaxial 1,420	Absol Envelope N/A	ute Safety Factors Burst   1,273	Collapse 100+	Axial 2,54 2,5 2,7
)   2	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop nary - Greer MD (m) 0,03 24,96	e Collapse, N/A = n Cement #1 - 1 Yield Strength (psi) 55000,0 55000,0	0 ISO Connection 1 3/4" Surface ( VME Stress (psi) 38737.7 38725.4	Casing Triaxial 1,420 1,420	Absol Envelope N/A N/A	ute Safety Factors Burst 1,273 1,273	Collapse 100+ 100+	2,54 2,57 2,72
) ?	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop <u>MD</u> (m) 24,96 122,96	e Collapse, N/A = n 1Cement #1 - 1 Yield Strength (psi) 55000,0 55000,0	0 ISO Connection 1 3/4" Surface ( VME Stress (psi) 38737,7 38725,4 38691,6	Casing Triaxial 1,420 1,421	Absol Envelope N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273	Collapse 100+ 100+ 100+	2,54 2,51
)   2	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelope mary - Green MD (m) 0,03 24.96 122,96 123,02	e Collapse, N/A = n Cement #1 - 1 Yield Strength (psi) 5500,0 55000,0 55000,0 55000,0	0 ISO Connection 1 3/4" Surface ( VME Stress (psi) 38737,7 38735,4 38691,6 38691,4	Casing Triaxial 1,420 1,421 1,421 1,422	Absol Envelope N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,273	Collapse 100+ 100+ 100+ 100+ 100+	2,54 2,55 2,72 2,72
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelope MD (m) (m) 0,03 24,96 122,96 123,02 158,98	e Collapse, N/A = n <u>(Cement #1 - 1</u> Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0	o ISO Connection VME Stress (psi) 38737,7 38735,4 38691,6 38691,4 38691,4	Casing Triaxial 1,420 1,421 1,421 1,422 1,428	Absol Envelope N/A N/A N/A N/A N/A	ute Safety Factors Burst 1.273 1.273 1.273 1.273 1.273	Collapse 100+ 100+ 100+ 100+ 100+ 100+	2,5- 2,5 2,7 2,7 2,7 2,7 2,7
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop mary - Green MD (m) 0.03 24.96 122.96 123.02 158.98 159.04	e Collapse, N/A = n Cement #1 - 1 Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0 55000,0	o ISO Connection	Casing Triaxial 1,420 1,422 1,422 1,422 1,428	Absol Envelope N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278	Collapse 100+ 100+ 100+ 100+ 100+ 100+	2,5- 2,5 2,7 2,7 2,7 2,7 2,7 3,0
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop MD (m) (m) 122,96 122,96 123,02 158,98 159,04 304,80	e Collapse, N/A = n <u>iCement #1 - 1</u> Yield Strength (psi) 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0	1 3/4" Surface ( VME Stress (psi) 38735,7 38891,6 38691,6 38691,4 3861,2 38516,9 37828,5	Casing Triaxial 1,420 1,420 1,421 1,422 1,428 1,428 1,428 1,424	Absol Envelope N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278 1,278	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+	2,55 2,55 2,77 2,77 2,77 2,77 3,00 3,79
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelope MD (m) (m) 122,96 123,02 156,98 159,04 304,80 609,60	e Collapse, N/A = n <u>Vield Strength</u> (psi) 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0	o ISO Connection 1 3/4" Surface ( VME Stress (psi) 38737,7 38737,7 38737,7 38691,4 38691,4 38691,4 38516,9 37826,5 35994,0	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,454 1,528	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1.273 1.273 1.273 1.273 1.278 1.278 1.278 1.301 1.370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,5 2,5 2,7 2,7 2,7 2,7 2,7 3,0 3,7
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String	, EC = Envelop MD (m) (m) 122,96 122,96 123,02 156,98 159,04 304,80 609,60 699,97	e Collapse, N/A = n <u>Vield Strength</u> (psi) 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0	o ISO Connection 1 3/4" Surface ( VME Stress (psi) 38737,7 38737,7 38737,7 38691,4 38691,4 38691,4 38516,9 37826,5 35994,0	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,454 1,528	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1.273 1.273 1.273 1.273 1.278 1.278 1.278 1.301 1.370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,55 2,55 2,77 2,77 2,77 2,77 3,00 3,79
<u>Sa</u>	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1	, EC = Envelop mary - Greer MD (m) 0,03 24,96 122,96 122,96 122,96 122,96 123,02 156,98 155,04 304,80 609,60 609,97 S	e Collapse, N/A = n 1Cement #1 - 1 Yield Strength (psi) 55000,0 55000,	o ISO Connection	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,528 1,574	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278 1,278 1,270 1,370 1,370 1,370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,5- 2,5; 2,7; 2,7; 2,7; 2,7; 3,0; 3,7; 4,0;
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	, EC = Envelop mary - Greer MD (m) 0,03 24,96 122,96 122,96 122,96 122,96 123,02 156,98 155,04 304,80 609,80 609,97 S	e Collapse, N/A = n 1Cement #1 - 1 Yield Strength (psi) 55000,0 55000,	o ISO Connection	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,528 1,574	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278 1,278 1,270 1,370 1,370 1,370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,5- 2,5; 2,7; 2,7; 2,7; 2,7; 3,0; 3,7; 4,0;
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	, EC = Envelop mary - Greer MD (m) 0,03 24,96 122,96 122,96 122,96 122,96 123,02 156,98 155,04 304,80 609,80 609,97 S	e Collapse, N/A = n 1Cement #1 - 1 Yield Strength (psi) 55000,0 55000,	o ISO Connection	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,528 1,574	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278 1,278 1,270 1,370 1,370 1,370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,54 2,55 2,77 2,77 2,77 3,00 3,74 4,00
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	, EC = Envelop MD (m) (m) 122,96 122,96 123,02 158,98 159,04 304,80 609,60 699,97 s L = Connection	e Collapse, N/A = n (Cement #1 - 1 Yield Strength (psi) 55000,0 54910,7 54910,7 54910,7 54910,7 54910,7 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 54910,7 54910,	o ISO Connection	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,528 1,574	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278 1,278 1,270 1,370 1,370 1,370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,54 2,55 2,77 2,77 2,77 3,00 3,74 4,00
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	, EC = Envelop MD (m) (m) 122,96 122,96 123,02 158,98 159,04 304,80 609,60 699,97 s L = Connection	e Collapse, N/A = n (Cement #1 - 1 Yield Strength (psi) 55000,0 54910,7 54910,7 54910,7 54910,7 54910,7 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 54910,7 54910,	o ISO Connection	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,528 1,574	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278 1,278 1,270 1,370 1,370 1,370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,54 2,55 2,77 2,77 2,77 3,00 3,74 4,00
	Default = Inner Wall a Envelope Flags EB = Envelope Burst Ifety Factor Summ String Section 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	, EC = Envelop MD (m) (m) 122,96 122,96 123,02 158,98 159,04 304,80 609,60 699,97 s L = Connection	e Collapse, N/A = n (Cement #1 - 1 Yield Strength (psi) 55000,0 54910,7 54910,7 54910,7 54910,7 54910,7 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 55000,0 54910,7 54910,	o ISO Connection	Casing Triaxial 1,420 1,421 1,422 1,422 1,428 1,428 1,428 1,528 1,574	Absol Envelope N/A N/A N/A N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,273 1,273 1,273 1,273 1,278 1,278 1,278 1,278 1,270 1,370 1,370 1,370	Collapse 100+ 100+ 100+ 100+ 100+ 100+ 100+ 100	2,5- 2,5; 2,7; 2,7; 2,7; 2,7; 3,0; 3,7; 4,0;

21 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	3	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	55000,0	9999, 9	D 5,500	N/A	100+	100+	5,5
	1	24,96	55000,0	9758,8	D 5,636	N/A	100+	100+	5,6
	1	122,96	55000,0	8811,4	D 6,242	N/A	100+	100+	6,4
	1	123,02	55000,0	8810,8	D 6,242	N/A	100+	100+	6,4
	1	158,98	55000,0	8463,3	D 6,499	N/A	100+	94,181	6,7
	1	159,04	55000,0	8462,8	D 6,499	N/A	100+	94,146	6,7
	1	304,80	55000,0	7053,5	D 7,798	N/A	100+	49,625	8,4
	1	609,60	55000,0	4106,8	D 13,393	N/A	100+	25,299	18,2
	1	699,97	54910,7	3233,1	D 16,984	N/A	100+	22,130	27,7
D									
1 6	Burst and Axial Flags								
1	Burst and Axial Flags Default = Pipe Body, I		Leak, B = Connec	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	Imp-out, Y = Con	nection Yield, C = (	Connection
1 E 2 E 3	Default = Pipe Body, I		Leak, B = Connec	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	imp-out, Y = Coni	nection Yield, C = (	Connection
1 E 2 C 3 4 4	Default = Pipe Body, I Axial Flags	L = Connection	,	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	Imp-out, Y = Coni	nection Yield, C = 0	Connection
1 E 2 C 3 4 4 5 C	Default = Pipe Body, I	L = Connection	,	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	Imp-out, Y = Coni	nection Yield, C = C	Connection
1 E 2 C 3 4 <i>F</i> 5 C	Default = Pipe Body, I Axial Flags Default = Tension, M :	L = Connection	,	tion Burst, F = Con	nection Fracture,	, J = Connection Ju	Imp-out, Y = Coni	nection Yield, C = C	Connection
1 E 2 C 3 4 H 5 C 6 7 T	Default = Pipe Body, I Axial Flags Default = Tension, M = Iriaxial Flags	L = Connection = Compressior	1					nection Yield, C = (	Connection
2 [ 3 4 4 5 [ 6 7 1 8 [	Default = Pipe Body, I Axial Flags Default = Tension, M :	L = Connection = Compressior	1					nection Yield, C = 0	Connection
1 E 2 C 3 4 4 5 C 6 7 1 8 C 9	Default = Pipe Body, I Axial Flags Default = Tension, M Friaxial Flags Default = Inner Wall a	L = Connection = Compressior	1					nection Yield, C = (	Connection
1 E 2 C 3 4 4 5 C 6 7 1 8 C 9 E	Default = Pipe Body, I Axial Flags Default = Tension, M = Iriaxial Flags	L = Connectior = Compressior nd Positive Be	nding OR No Bend	ling, D = Outer wall				nection Yield, C = C	Connection

	afety Factor Sumi String	MD	Yield Strength	VME Stress		Abso	lute Safety Factor	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	55000,0	9467,2	D 5,810	N/A	100+	100+	5,81
	1	24,96	55000,0	9270,7	D 5,933	N/A	100+	100+	5,96
	1	122,96	55000,0	8498,6	D 6,472	N/A	100+	100+	6,64
	1	123,02	55000,0	8498,1	D 6,472	N/A	100+	100+	6,64
	1	158,98	55000,0	8215,0	D 6,695	N/A	100+	94,329	6,93
	1	159,04	55000,0	8214,5	D 6,695	N/A	100+	94,293	6,94
	1	304,80	55000,0	7066,1	D 7,784	N/A	100+	49,621	8,44
	1	609,60	55000,0	4664,8	D 11,790	N/A	100+	25,225	15,39
	1	699,97	54910,7	3952,9	D 13,891	N/A	100+	22,049	20,34
	Burst and Axial Flag Default = Pipe Body, Axial Flags Default = Tension, M	L = Connection	,	tion Burst, F = Cor	nection Fracture,	J = Connection J	ump-out, Y = Cor	nnection Yield, C = (	Connection
	Default = Pipe Body, Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall	L = Connectior	1					nnection Yield, C = C	Connection
2 3 4 5 7 8 9 9	Default = Pipe Body Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall Envelope Flags	L = Connectior I = Compressior and Positive Be	nding OR No Bend	ing, D = Outer wall				nnection Yield, C = C	Connection
2 5 5 7 8 9	Default = Pipe Body, Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall	L = Connectior I = Compressior and Positive Be	nding OR No Bend	ing, D = Outer wall				nnection Yield, C = C	Connection
	Default = Pipe Body Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall Envelope Flags	L = Connectior I = Compressior and Positive Be	nding OR No Bend	ing, D = Outer wall				nnection Yield, C = G	Connection
	Default = Pipe Body Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall Envelope Flags	L = Connectior I = Compressior and Positive Be	nding OR No Bend	ing, D = Outer wall				nnection Yield, C = C	Connection
	Default = Pipe Body, Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs	L = Connectior I = Compressior and Positive Be t, EC = Envelop	nding OR No Bend e Collapse, N/A = n	ing, D = Outer wall o ISO Connection	safety factor, N =			nnection Yield, C = C	Connection
	Default = Pipe Body, Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs afety Factor Summ	L = Connection I = Compression and Positive Be t, EC = Envelop mary - Initial	nding OR No Bend e Collapse, N/A = n Conditions - 9 9	ling, D = Outer wall to ISO Connection 5/8'' Production	safety factor, N =	Negative Bending	9		Connection
	Default = Pipe Body, Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs afety Factor Sumni String	L = Connectior I = Compression and Positive Be t, EC = Envelop MD	nding OR No Bend e Collapse, N/A = n <u>Conditions - 9 :</u> Yield Strength	ing, D = Outer wall to ISO Connection 5/8'' Production VME Stress	safety factor, N = Casing	: Negative Bending	a Jute Safety Factor	ŝ	
	Default = Pipe Body, Axial Flags Default = Tension, N Triaxial Flags Default = Inner Wall Envelope Flags EB = Envelope Burs afety Factor Summ	L = Connection I = Compression and Positive Be t, EC = Envelop mary - Initial	nding OR No Bend e Collapse, N/A = n Conditions - 9 9	ling, D = Outer wall to ISO Connection 5/8'' Production	safety factor, N =	Negative Bending	9		Axial F 3.92

1	1	0,03	90000,0	22642,8	D 3,975	N/A	100+	100+	F 3,938
2	1	24,96	90000,0	22414,3	D 4,015	N/A	100+	100+	F 3,988
3	1	122,99	90000,0	21516,4	D 4,183	N/A	100+	100+	F 4,195
4	1	304,80	90000,0	19851,1	D 4,534	N/A	100+	89,189	F 4,644
5	1	609,60	90000,0	17059,2	D 5,276	N/A	100+	45,392	F 5,658
6	1	699,97	89852,0	16231,4	D 5,536	N/A	100+	39,682	F 6,039
7	1	700,03	89851,9	16230,9	D 5,536	N/A	100+	39,679	F 6,040
В	1	914,40	89467,5	14267,3	D 6,271	N/A	100+	30,631	F 7,195
9	1	1219,20	88917,2	11475,4	D 7,749	N/A	100+	23,228	F 9,923
10	1	1249,95	88861,7	11193,5	D 7,939	N/A	100+	22,680	F 10,320
11	2	1250,02	74051,3	11193,0	D 6,616	N/A	100+	20,008	8,687
12	2	1524,00	73639,1	8683,5	D 8,480	N/A	100+	16,624	13,553
13	2 2 2 2 2 2 2 2	1828,80	73180,4	5891,6	D 12,421	N/A	100+	14,034	36,695
14	2	1999,98	72922,9	4323, 3	D 16,867	N/A	100+	12,918	M 100+
15	2	2000,04	72922,8	4323,5	D 16,867	N/A	100+	12,918	M 100+
16	2	2133,60	72721,9	3227,3	22,533	N/A	100+	11,579	M 50,329
17	2	2400,00	72321,0	1198,4	60,346	N/A	100+	9,581	M 16,249
18	2	2438,40	72265,5	1138,7	63,466	N/A	100+	9,141	M 14,796
19	2	2549,96	72097,6	1405,7	51,289	N/A	100+	8,061	M 11,735
20									
	Burst and Axial Flags								
	Default = Pipe Body, L =	Connection Le	ak, B = Connectio	n Burst, F = Conn	ection Fracture, J =	Connection Jump	-out, Y = Connec	tion Yield, C = Co	onnection
23									
	Axial Flags								
25 26	Default = Tension, M = C	ompression							
	Triaxial Flags								
	Default = Inner Wall and I	Booitivo Bondi		D = Outor wall o	of the factor N = Nor	otivo Bonding			
28 29	Deraun - miler wan and i	-ositive benati	ig OK NO Bending	, D - Outer wall s	arely factor, N = Neg	lauve bending			
	Envelope Flags								
	EB = Envelope Burst. EC	- Envelope Co	llance N/A = no l	Connection					
51	ED = Envelope Burst, EC	- Envelope Ct	mapse, m/A = 110 k	SO CONNECTION					

Sa	afety Factor Summ	nary - Press		5/8" Production	Casing				
	String	MD	Yield Strength	VME Stress			ute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	90000,0	59654,0	1,509	N/A	1,393	100+	F 2,38
	1	24,96	90000,0	59623,9	1,509	N/A	1,393	100+	F 2,40
	1	122,99	90000,0	59515,4	1,512	N/A	1,392	100+	F 2,48
	1	304,80	90000,0	59357,3	1,516	N/A	1,390	100+	F 2,63
	1	609,60	90000,0	59218,5	1,520	N/A	1,387	100+	F 2,92
	1	699,97	89852,0	59207,9	1,518	N/A	1,384	100+	F 3,02
	1	700,03	89851,9	59207,9	1,518	N/A	1,384	100+	F 3,02
	1	914,40	89467,5	59238,8	1,510	N/A	1,376	100+	F 3,28
	1	1219,20	88917,2	59418,2	1,496	N/A	1,365	100+	F 3,73
0	1	1249,95	88861,7	59445,1	1,495	N/A	1,364	100+	F 3,79
1	2	1250,02	74051,3	59445,1	1,246*	N/A	1,136	100+	3,19
2	2	1371,60	73868,4	59567,1	1,240*	N/A	1,133	100+	3,38
3	2	1524,00	73639,1	59796,2	N 1,231*	N/A	1,128	100+	3,57
4	2	1676,40	73409,8	60083,3	N 1,222*	N/A	1,123	100+	3,79
5	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	1828,80	73180,4	60434,8	N 1,211*	N/A	1,118	100+	4,04
6	2	1981,20	72951,1	60848,4	N 1,199*	N/A	1,114	100+	4,33
7	2	1999,98	72922,9	60906,1	N 1,197*	N/A	1,113	100+	4,37
8	2	2000,04	72922,8	51491,9	1,416	N/A	1,304	100+	5,80
9	2	2133,60	72721,9	51100,8	1,423	N/A	1,315	100+	6,60
0 1		2400,00	72321,0	50392,1	1,435	N/A	1,338	100+	9,14
1	2	2438,40	72265,5	50291,9	1,437	N/A	1,341	100+	9,65
2	2	2549,96	72097,6	50001,8	N 1,442	N/A	1,351	100+	11,43
3									
	* Safety factor < Desi	gn factor							
5									
	Burst and Axial Flags								
	Default = Pipe Body,	L = Connection	Leak, B = Connec	tion Burst, F = Cor	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = C	Connection
8									
	Axial Flags								
	Default = Tension, M	= Compression	1						
1									
2	Triaxial Flags								

34 35 Envelope Flags 36 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

S	tring	MD	Yield Strength	VME Stress		Absol	ute Safety Factors		
Se	ction	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	90000,0	22733,4	D 3,959	N/A	100+	100+	F 3,92
	1	24,96	90000,0	22642,1	3,975	N/A	100+	100+	F 3,97
	1	122,99	90000,0	22329,7	4,031	N/A	100+	37,120	F 4,17
	1	304,80	90000,0	21953,1	4,100	N/A	100+	15,150	F 4,62
	1	533,19	90000,0	21869,6	4,115	N/A	100+	8,777	F 5,33
	1	609,60	90000,0	20741,4	4,339	N/A	100+	9,308	F 5,62
	1	699,97	89853,2	19306,9	4,654	N/A	100+	10,209	F 6,00
	1	700,03	89853,1	19305,9	4,654	N/A	100+	10,210	F 6,00
	1	914,40	89466,5	15900,4	5,627	N/A	100+	13,327	F 7,14
	1	1219,20	88916,8	11225,4	7,921	N/A	100+	23,178	F 9,82
	1	1249,95	88861,3	10772,9	8,249	N/A	100+	25,022	F 10,21
	2	1250,02	74051,0	10772,0	6,874	N/A	100+	22,076	8,59
	2	1524,00	73639,2	7103,9	10,366	N/A	39,808	74,076	13,33
	2	1828,80	73181,1	5117,5	14,300	N/A	15,175	100+	35,10
	2	1999,98	72923,9	5919,0	12,320	N/A	11,234	100+	M 100
	2	2000,04	72923,8	5570,1	13,092	N/A	100+	8,869	100-
	2	2133,60	72723,0	4166,0	17,456	N/A	100+	9,190	M 44,99
	2	2400,00	72322,7	1453,8	49,747	N/A	100+	9,910	M 17,30
	2	2438,40	72265,0	1116,6	64,719	N/A	100+	10,024	M 15,94
	2	2549,96	72097,3	721,0	N 100+	N/A	100+	10,370	M 13,13

 24

 25
 Axial Flags

 26
 Default = Tension, M = Compression

 27
 Partial Flags

 28
 Triaxial Flags

 29
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 30
 1

 31
 Envelope Flags

 32
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	;	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	90000,0	61724,3	1,458	N/A	1,393	100+	F 1,93
2	1	24,96	90000,0	61655,8	1,460	N/A	1,393	100+	F 1,94
3	1	122,99	90000,0	61393,9	1,466	N/A	1,393	100+	F 1,99
4	1	304,80	90000,0	60940,4	1,477	N/A	1,393	100+	F 2,08
5	1	609,60	90000,0	60275,7	1,493	N/A	1,393	100+	F 2,26
3	1	699,97	89852,0	60102,1	1,495	N/A	1,391	100+	F 2,32
7	1	700,03	89851,9	60102,0	1,495	N/A	1,391	100+	F 2,32
3	1	914,40	89467,5	59734,0	1,498	N/A	1,385	100+	F 2,47
3	1	1219,20	88917,2	59319,1	1,499	N/A	1,377	100+	F 2,71
0	1	1249,95	88861,7	59284,4	1,499	N/A	1,376	100+	F 2,74
11	2	1250,02	74051,3	59284,3	1,249*	N/A	1,147	100+	2,31
12	2 2	1371,60	73868,4	59160,0	1,249*	N/A	1,144	100+	2,40
13	2	1524,00	73639,1	59033,4	1,247*	N/A	1,140	100+	2,54
14	2	1676,40	73409,8	58939,7	1,246*	N/A	1,137	100+	2,69
15	2	1828,80	73180,4	58878,8	1,243*	N/A	1,133	100+	2,86
16	2	1981,20	72951,1	58851,1	1,240*	N/A	1,129	100+	3,06
17	2	1999,98	72922,9	58850,0	1,239*	N/A	1,129	100+	3,09
18	2	2000,04	72922,8	58850,0	1,239*	N/A	1,129	100+	3,09
19	2 2 2 2 2	2133,60	72721,9	58645,4	1,240*	N/A	1,130	100+	3,29
20		2286,00	72492,5	58437,4	1,241*	N/A	1,131	100+	3,55
21	2	2400,00	72321,0	58299,7	1,241*	N/A	1,132	100+	3,78
22	2	2438,40	72265,5	58114,2	1,244*	N/A	1,135	100+	3,87
23	2	2549,96	72097,6	57581,0	1,252	N/A	1,144	100+	4,14
24									
25 * 26	Safety factor < Des	ign factor							

1 2	Default = Tension, M	= Compression							
	Triaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ing, D = Outer wall	safety factor, N =	Negative Bending	I		
5									
	Envelope Flags								
7	EB = Envelope Burst	, EC = Envelope	e Collapse, N/A = n	o ISO Connection					
-									
Sa	afety Factor Sumn	hary - OverP	'ull #1 - 95/8" F	Production Casi	na				
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors		
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	90000,0	26572,9	D 3,387	N/A	100+	100+	F
	1	24,96	90000,0	26344,4	D 3,416	N/A	100+	100+	F
	1	122,99	90000,0	25446.5	D 3,537	N/A	100+	100+	F
	1	304.80	90000.0	23781.2	D 3,784	N/A	100+	87,236	F
	1	609,60	90000.0	20989.3	D 4,288	N/A	100+	44,478	F 4
	1	699,97	89852,0	20161,5	D 4,457	N/A	100+	38,901	F 4
	1	700,03	89851,9	20161,0	D 4,457	N/A	100+	38,898	F 4
	1	914.40	89467.5	18197.4	D 4,917	N/A	100+	30,060	F (
	1	1219,20	88917,2	15405,5	D 5,772	N/A	100+	22,826	F
)	1	1249,95	88861,7	15123,6	D 5.876	N/A	100+	22,290	E C
1	2	1250.02	74051,3	15123,1	D 4,897	N/A	100+	19,542	Ę
2	2	1524.00	73639,1	12613.6	D 5,838	N/A	100+	16,267	7
3	2	1828,80	73180,4	9821,7	D 7,451	N/A	100+	13,758	12
Ļ.	2	1999,98	72922,9	8253,4	D 8,835	N/A	100+	12,677	18
5		2000,04	72922,8	8253,6	D 8,835	N/A	100+	12,677	18
6	2	2133,60	72721,9	7029,7	D 10,345	N/A	100+	11,950	29
7	2	2400,00	72321,0	4589,5	D 15,758	N/A	100+	10,709	
3	2 2 2 2 2 2	2438,40	72265,5	4237,8	D 17,052	N/A	100+	10,535	M 75
9	2	2549,96	72097,6	3215.5	D 22,422	N/A	100+	10,059	M 32
			, .		,				

22 Jonual = Lipe E E 2, 2 24 Axial Flags 25 Default = Tension, M = Compression 26 Triaxial Flags 27 Triaxial Flags 28 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 29 Solution - Solutio

Slender Well Design

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Facto	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	90000,0	26057,3	D 3,454	N/A	100+	100+	F 3,422
	1	24,96	90000,0	25882,0	D 3,477	N/A	100+	100+	F 3,452
	1	122,99	90000,0	25192,9	D 3,572	N/A	100+	100+	F 3,577
	1	304,80	90000,0	23915,0	D 3,763	N/A	100+	87,167	F 3,833
5	1	609,60	90000,0	21772,4	D 4,134	N/A	100+	44,288	F 4,355
3	1	699,97	89852,0	21137,1	D 4,251	N/A	100+	38,698	F 4,531
7	1	700,03	89851,9	21136,7	D 4,251	N/A	100+	38,695	F 4,531
3	1	914,40	89467,5	19629,8	D 4,558	N/A	100+	29,840	F 5,013
)	1	1219,20	88917,2	17487,2	D 5,085	N/A	100+	22,599	F 5,916
0	1	1249,95	88861,7	17270,9	D 5,145	N/A	100+	22,063	F 6,027
11	2	1250,02	74051,3	17270,5	D 4,288	N/A	100+	19,270	5,072
2	2	1524,00	73639,1	15344,7	D 4,799	N/A	100+	15,998	6,091
13	2	1828,80	73180,4	13202,1	D 5,543	N/A	100+	13,499	7,868
4	2	1999,98	72922,9	11998,9	D 6.077	N/A	100+	12,424	9,429
15	2	2000.04	72922,8	11998,4	D 6.078	N/A	100+	12,424	9,430
16	2	2133,60	72721,9	11059,5	D 6,575	N/A	100+	11,703	11,170
17	2	2400,00	72321,0	9186,9	D 7,872	N/A	100+	10,500	17,763
8	2	2438,40	72265,5	8917,0	D 8,104	N/A	100+	10,347	19,426
9	2	2549,96	72097,6	8132,7	D 8,865	N/A	100+	9,930	26,716
20		(	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	Ý I			· · · · · · · · · · · · · · · · · · ·	· · ·
21	Burst and Axial Flags		,						
	Default = Pipe Body,		Leak, B = Connec	tion Burst. F = Con	nection Fracture	. J = Connection Ju	Imp-out, Y = Co	nnection Yield. C :	Connection
10	·····,		,	-,		,	• • • • • •	, -	

26 27 Triaxial Flags 28 Default = Inner Wali and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 29 30 Envelope Flags 31 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Abso	olute Safety Factors	s	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	0,03	90000,0	23440,0	D 3,840	N/A	100+	100+	F 3,804
2	1	24,96	90000,0	22934,7	3,924	N/A	100+	100+	F 3,850
3	1	122,99	90000,0	21712,7	4,145	N/A	75,321	100+	F 4,043
4	1	304,80	90000,0	19885,1	4,526	N/A	58,190	100+	F 4,458
5	1	609,60	90000,0	16845,7	5,343	N/A	42,126	100+	F 5,385
6	1	699,97	89852,0	15952,7	5,632	N/A	38,875	100+	F 5,729
7	1	700,03	89851,9	15952,1	5,633	N/A	38,873	100+	F 5,730
8	1	914,40	89467,5	13855,2	6,457	N/A	32,817	100+	F 6,758
9	1	1219,20	88917,2	10953,5	8,118	N/A	26,814	100+	F 9,105
10	1	1249,95	88861,7	10668,3	8,329	N/A	26,325	100+	F 9,438
11	2	1250,02	74051,3	10667,8	6,942	N/A	21,936	100+	7,944
12	2	1524,00	73639,1	8235,0	8,942	N/A	18,854	100+	11,819
13	2	1828,80	73180,4	5956,3	12,286	N/A	16,278	100+	26,217
14	2	1999,98	72922,9	5099,8	14,299	N/A	15,108	100+	84,829
15	2	2000,04	72922,8	5396,7	13,513	N/A	15,107	100+	51,906
16	2	2133,60	72721,9	5009,4	14,517	N/A	14,300	100+	M 100+
17	2	2400,00	72321,0	5130,3	14,097	N/A	12,912	100+	M 26,885
18	2	2438,40	72265,5	5239,8	13,792	N/A	12,733	100+	M 23,666
19	2	2549,96	72097,6	5644,7	N 12,773	N/A	12,238	100+	M 17,683
20									
21	Burst and Axial Flags								

 20
 Burst and Axial Flags

 22
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 23
 Axial Flags

 24
 Axial Flags

 25
 Default = Tension, M = Compression

 26
 7

 27
 Triaxial Flags

 28
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 30
 Envelope Flags

 31
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	3	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	0,03	90000,0	22863,8	3,936	N/A	14,072	100+	F 3,59
	1	24,96	90000,0	22502,8	4,000	N/A	12,984	100+	F 3,63
	1	122,99	90000,0	21496,9	4,187	N/A	11,858	100+	F 3,80
	1	304,80	90000,0	19868,4	4,530	N/A	11,333	100+	F 4,16
	1	609,60	90000,0	17252,2	5,217	N/A	10,549	100+	F 4,96
:	1	699,97	89852,0	16512,3	5,442	N/A	10,320	100+	F 5,25
·	1	700,03	89851,9	16511,8	5,442	N/A	10,320	100+	F 5,25
	1	914,40	89467,5	14844,1	6,027	N/A	9,809	100+	F 6,10
1	1	1219,20	88917,2	12762,6	6,967	N/A	9,156	100+	F 7,95
0	1	1249,95	88861,7	12577,1	7,065	N/A	9,095	100+	F 8,20
1	2	1250,02	74051,3	12576,7	5,888	N/A	7,579	100+	6,90
2	2 2 2 2	1524,00	73639,1	11191,2	6,580	N/A	7,149	100+	9,65
3	2	1828,80	73180,4	10364,7	7,061	N/A	6,720	100+	17,46
4		1999,98	72922,9	10301,2	7,079	N/A	6,498	100+	32,29
5	2 2 2 2 2	2000,04	72922,8	10381,6	7,024	N/A	6,498	100+	26,01
6	2	2133,60	72721,9	10476,2	6,942	N/A	6,334	100+	50,79
7	2	2400,00	72321,0	11086,8	6,523	N/A	6,029	100+	M 55,99
8	2	2438,40	72265,5	11211,5	6,446	N/A	5,987	100+	M 43,66
9	2	2549,96	72097,6	11610,1	N 6,210	N/A	5,868	100+	M 26,91
0									
	Burst and Axial Flags								
2	Default = Pipe Body, I	. = Connection	i Leak, B = Connec	ction Burst, F = Con	nection Fracture,	J = Connection Ju	mp-out, Y = Con	nection Yield, C = 0	Connection
3									
	Axial Flags								
	Default = Tension, M :	Compression	n						
6									
	Triaxial Flags								
	Default = Inner Wall a	nd Positive Be	nding OR No Bend	ding, D = Outer wall	safety factor, N =	Negative Bending			
9									
	Envelope Flags								
1	EB = Envelope Burst,	EC = Envolony	Collongo N(A = r	a IOO Composition					

	String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors	ì	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	2540,02	86533,3	5112,5	D 16,926	N/A	100+	10,469	M 91,319
2	1	2549,96		5023,6	D 17,222	N/A	100+	10,427	M 81,610
3	1	2550,02		5023,8	D 17,222	N/A	100+	10,426	M 81,610
4	1	2743,20		3653,9	23,582	N/A	100+	8,970	M 26,642
5	1	2774,96	86110,9	3439,2	25,038	N/A	100+	8,768	M 23,972
5	2	2775,02	86110,8	3118,7	27,611	N/A	100+	9,812	M 22,228
7	2	3048,00		1614,1	53,043	N/A	100+	8,270	M 12,322
3	2	3150,99		1518,4	56,265	N/A	100+	7,805	M 10,537
		3172,97	85393,2	1552,7	54,998	N/A	100+	7,712	M 10.219
9	2	3172,97	00000,2	1002,7	04,000				
10	2	3172,97	00000,2	1002,7	01,000			.,	
10 11	2 Burst and Axial Flags		00000,2		01,000			.,	
10 11 12		•			,	J = Connection Ju	mp-out, Y = Con		,
10 11 12 13	Burst and Axial Flags Default = Pipe Body,	•			,	J = Connection Ju	mp-out, Y = Con		,
10 11 12 13 14	Burst and Axial Flags Default = Pipe Body, Axial Flags	L = Connection	n Leak, B = Connec		,	J = Connection Ju	mp-out, Y = Con		,
10 11 12 13 14	Burst and Axial Flags Default = Pipe Body,	L = Connection	n Leak, B = Connec		,	J = Connection Ju	mp-out, Y = Con		,
10 11 12 13 14 15 16	Burst and Axial Flags Default = Pipe Body, Axial Flags Default = Tension, M	L = Connection	n Leak, B = Connec			J = Connection Ju	mp-out, Y = Con		,
10 11 12 13 14 15 16 17	Burst and Axial Flags Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,		· /		,
10 11 12 13 14 15 16 17 18	Burst and Axial Flags Default = Pipe Body, Axial Flags Default = Tension, M	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,		· /		,
10 11 12 13 14 15 16 17 18 19	Burst and Axial Flags Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a	L = Connection	n Leak, B = Connec	tion Burst, F = Con	nection Fracture,		· /		,
10 11 12 13 14 15 16 17 18 19 20	Burst and Axial Flags Default = Pipe Body, Axial Flags Default = Tension, M Triaxial Flags	L = Connection = Compression nd Positive Be	n Leak, B = Connec n ending OR No Bend	tion Burst, F = Con ling, D = Outer wall	nection Fracture,		· /		

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Da	afety Factor Sumn								
	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	\$	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	2540,02	86533,3	36491,9	N 2,371	N/A	2,173	100+	10,9
	1	2549,96	86517,1	36416,0	N 2,376	N/A	2,177	100+	11,1
	1	2550,02	86517,0	47728,3	1,813	N/A	1,669	100+	7,9
	1	2743,20	86168,2	42551,8	2,025	N/A	1,869	100+	11,5
	1	2774,96	86110,9	40568,0	2,123	N/A	1,960	100+	13,1
	2	2775,02	86110,8	36728,9	2,344	N/A	B 2,032	100+	16,9
	2	3048,00	85617,9	31734,4	2,698	N/A	B 2,360	100+	100
	2	3172,97	85393,2	30504,1	N 2,799	N/A	B 2,466	100+	M 95,2
4	Burst and Axial Flags								
-	Axial Flags Default = Tension, M Triaxial Flags Default = Inner Wall a Envelone Flags			ling, D = Outer wall	safety factor, N =	Negative Bending			
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst	nd Positive Be , EC = Envelop	ending OR No Bend e Collapse, N/A = n	o ISO Connection		: Negative Bending			
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst afety Factor Summ	nd Positive Be , EC = Envelop nary - Greer	nding OR No Bend e Collapse, N/A = n nCement #1 - 7	ISO Connection					
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	nd Positive Be EC = Envelop nary - Greer MD	nding OR No Bend e Collapse, N/A = n nCement #1 - 7 Yield Strength	ISO Connection	<u>er</u>	Absol	ute Safety Factors		Avial
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst afety Factor Summ	nd Positive Be , EC = Envelop nary - Greer MD (m)	e Collapse, N/A = n Cement #1 - 7 Yield Strength (psi)	ISO Connection	<u>er</u> Triaxial	Absol	ute Safety Factors Burst	Collapse	Axial
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	nd Positive Be , EC = Envelop nary - Greer MD (m) 2540,02	e Collapse, N/A = n Cement #1 - 7 Yield Strength (psi) 86533,3	o ISO Connection "Production Lin VME Stress	er Triaxial 1,511	Absol Envelope N/A	ute Safety Factors Burst 1,379	Collapse 100+	3,9
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	nd Positive Be , EC = Envelop nary - Green MD (m) 2540,02 2549,96	e Collapse, N/A = n <u>Cement #1 - 7</u> Yield Strength (psi) 86533,3] 86517,1	ISO Connection	er Triaxial 1,511 1,511	Absol Envelope N/A N/A	ute Safety Factors Burst 1,379 1,379	Collapse 100+ 100+	3,9 3,9
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	nd Positive Be EC = Envelop nary - Greer MD (m) 2540,02 2549,96 2550,02	nding OR No Bend e Collapse, N/A = n <u>1Cement #1 - 7</u> Yield Strength (psi) 86537,1 86517,0	o ISO Connection " Production Lin VME Stress (psi) 57271,2 57269,4 57269,3	er Triaxial 1,511 1,511 1,511	Absol Envelope N/A N/A N/A	ute Safety Factors Burst 1,379 1,379 1,379	Collapse 100+ 100+ 100+	3,9 3,9 3,9
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	Ind Positive Be EC = Envelop MD (m) 2540,02 2549,96 2550,02 2743,20	e Collapse, N/A = n a Cement #1 - 7 Yield Strength (psi) 86533.3 86517.1 86517.0 86188.2	" Production Lin VME Stress (psi) 57271,2 57269,4 57269,3 56729,0	er Triaxial 1,511 1,511 1,511 1,519	Absol Envelope N/A N/A N/A N/A	ute Safety Factors Burst 1,379 1,379 1,379 1,386	Collapse 100+ 100+ 100+ 100+ 100+	3,9 3,9 3,9 4,4
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	and Positive Be EC = Envelop MD (m) 2540,02 2549,96 2650,02 2743,20 2774,96	e Collapse, N/A = n <u>Cement #1 - 7</u> Yield Strength (psi) 86533,3 86517,1 86517,0 86168,2 8110,9	o ISO Connection "Production Lin VME Stress (psi) 57271,2 57269,4 57269,3 56729,0 56643,5	er Triaxial 1,511 1,511 1,519 1,520	Absol Envelope N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,379 1,379 1,379 1,386 1,387	Collapse 100+ 100+ 100+ 100+ 100+ 100+	3,9 3,9 3,9 4,4 4,4
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	nd Positive Be arry - Green MD (m) 2540,02 2549,96 2560,02 2743,20 2774,96 2777,92	e Collapse, N/A = n aCcement #1 - 7 Yield Strength (psi) 86537,3 86517,0 86168,2 86110,9 8110,9	"Production Lin VME Stress (psi) 57271,2 57269,4 57269,3 56729,0 56643,5 51320,4	er Triaxial 1,511 1,511 1,519 1,520 1,678	Absol Envelope N/A N/A N/A N/A N/A N/A	ute Safety Factor: Burst 1,379 1,379 1,386 1,386 1,387 B 1,439	Collapse 100+ 100+ 100+ 100+ 100+ 100+	3,9 3,9 3,9 4,4 4,4 5,3
	Default = Tension, M Triaxial Flags Default = Inner Wall a Envelope Flags EB = Envelope Burst, afety Factor Sumn String	and Positive Be EC = Envelop MD (m) 2540,02 2549,96 2650,02 2743,20 2774,96	e Collapse, N/A = n <u>Cement #1 - 7</u> Yield Strength (psi) 86533,3 86517,1 86517,0 86168,2 8110,9	o ISO Connection "Production Lin VME Stress (psi) 57271,2 57269,4 57269,3 56729,0 56643,5	er Triaxial 1,511 1,511 1,519 1,520	Absol Envelope N/A N/A N/A N/A N/A N/A	ute Safety Factors Burst 1,379 1,379 1,379 1,386 1,387	Collapse 100+ 100+ 100+ 100+ 100+ 100+	3,9 3,9

 10
 Burst and Axial Flags

 11
 Default = Pipe Body, L = Connection Leak, B = Connection Burst, F = Connection Fracture, J = Connection Jump-out, Y = Connection Yield, C = Connection

 12
 Axial Flags

 14
 Default = Tension, M = Compression

 15
 Intravial Flags

 16
 Triaxial Flags

 17
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 19
 Envelope Flags

 20
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

	String	MD	Yield Strength	VME Stress		Absol	ute Safety Factors	i	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
	1	2540,02	86533,3	11900,5	D 7,271	N/A	100+	10,228	14,82
	1	2549,96	86517,1	11811,6	D 7,325	N/A	100+	10,192	15,11
	1	2550,02	86517,0	11811,7	D 7,325	N/A	100+	10,192	15,11
	1	2743,20	86168,2	10097,1	D 8,534	N/A	100+	9,534	24,27
	1	2774,96	86110,9	9814,9	D 8,774	N/A	100+	9,435	26,97
	2	2775,02	86110,8	8900,8	D 9,675	N/A	100+	10,498	37,79
	2	3048,00	85617,9	6476,0	D 13,221	N/A	100+	9,612	M 100
	2	3172,97	85393,2	5365,7	D 15,915	N/A	100+	9,216	M 38,74
Bur	st and Axial Flags								
1 Def	ault = Pipe Body,	L = Connection	n Leak, B = Connec	tion Burst, F = Cor	nection Fracture	, J = Connection Ju	Imp-out, Y = Coni	nection Yield, C = C	connection
2									
3 Axi	al Flags								
		= Compression							

 16
 Triaxial Flags

 17
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 18
 19

 19
 Envelope Flags

 20
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

File	: Slender Well De	sign, v0				Date/Time: Ma	rch 01, 2018	02:54:29 PM P	Page: 20 of 23
Sa	fety Factor Summ	ary - Runni	ngHole #1 - 7"	Production Line	r				
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factor	rs	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	2540,02	86533,3	14743,8	D 5,869	N/A	100+	10,100	9,972
2	1	2549,96	86517,1	14679,3	D 5,894	N/A	100+	10,063	10,072
3	1	2550,02	86517,0	14678,9	D 5,894	N/A	100+	10,063	10,073
4	1	2743,20	86168,2	13425,6	D 6,418	N/A	100+	9,401	12,532
5	1	2774,96	86110,9	13219,5	D 6,514	N/A	100+	9,300	13,058
6	2	2775,02	86110,8	12856,0	D 6,698	N/A	100+	10,305	13,820
7	2	3048,00	85617,9	11082,8	D 7,725	N/A	100+	9,450	22,484
8	2	3172,97	85393,2	10271,1	D 8,314	N/A	100+	9,107	31,643
9									
	Burst and Axial Flags								
	Default = Pipe Body, I	. = Connectior	n Leak, B = Connec	tion Burst, F = Con	nection Fracture	, J = Connection J	ump-out, Y = Cor	nnection Yield, C =	Connection
12									
13	Axial Flags								
	Default = Tension, M :	Compression	1						
15									

15 16 Triaxial Flags 17 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending 18 19 Envelope Flags 20 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

S	afety Factor Summ	ary - FullEv	vacuation #1 -	7" Production L	iner				
	String	MD	Yield Strength	VME Stress		Abso	lute Safety Factors	6	
	Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	1	2540,02	86533,3	10455,4	8,276	N/A	7,843	100+	59,981
2	1	2549,96	86517,1	10347,6	8,361	N/A	7,917	100+	65,044
3	1	2550,02	86517,0	10267,9	8,426	N/A	7,987	100+	66,809
4	1	2743,20	86168,2	8152,7	10,569	N/A	9,831	100+	M 81,681
5	1	2774,96	86110,9	7811,2	11,024	N/A	10,221	100+	M 59,729
6	2	2775,02	86110,8	7081,9	12,159	N/A	B 10,599	100+	M 43,941
7	2	3048,00	85617,9	4577,6	18,704	N/A	B 16,134	23,177	M 16,378
8	2	3172,97	85393,2	3689,2	N 23,147	N/A	B 21,259	16,971	M 12,699
9									
10	Burst and Axial Flags								
11	Default = Pipe Body, L	= Connection	n Leak, B = Conned	tion Burst, F = Co	nnection Fracture	, J = Connection Ju	ump-out, Y = Con	nection Yield, C = (	Connection
12									
13	Axial Flags								
14	Default = Tension, M =	Compression	n						

 14
 Default = Tension, m - Completence

 15
 15

 16
 Triaxial Flags

 17
 Default = Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 18
 Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 18
 Inner Wall and Positive Bending OR No Bending, D = Outer wall safety factor, N = Negative Bending

 19
 Envelope Flags

 20
 EB = Envelope Burst, EC = Envelope Collapse, N/A = no ISO Connection

String	MD	Yield Strength	VME Stress		Abso	ute Safety Factors	S	
Section	(m)	(psi)	(psi)	Triaxial	Envelope	Burst	Collapse	Axial
1	2540,02	86533,3	56958,8	1,519	N/A	100+	1,220	M 6,24
1	2549,96	86517,1	56834,5	1,522	N/A	100+	1,222	M 6,19
1	2550,02	86517,0	56927,6	1,520	N/A	100+	1,220	M 6,18
1	2743,20	86168,2	54743,6	1,574	N/A	100+	1,244	M 5,56
1	2774,96	86110,9	54387,9	1,583	N/A	100+	1,248	M 5,47
2	2775,02	86110,8	49211,5	1,750	N/A	100+	1,536	M 5,92
2	3048,00	85617,9	46442,2	1,844	N/A	100+	1,577	M 5,11
2	3172,97	85393,2	45209,3	1,889	N/A	100+	1,597	M 4,80
Axial Flags	ly, L = Connection		tion Burst, F = Con	nection Fracture	, J = Connection Ju	ımp-out, Y = Con	nection Yield, C =	Connection
Default = Pipe Boo Axial Flags Default = Tension Triaxial Flags Default = Inner Wa	y, L = Connection		tion Burst, F = Con ing, D = Outer wall			. ,	nection Yield, C =	Connection
Default = Pipe Boo Axial Flags Default = Tension Triaxial Flags Default = Inner Wa	y, L = Connection M = Compression II and Positive Be	nding OR No Bend	ling, D = Outer wall			. ,	nection Yield, C =	Connection
Default = Pipe Bod Axial Flags Default = Tension, Triaxial Flags Default = Inner Wa Envelope Flags EB = Envelope Bu Movement Summ	y, L = Connection M = Compression II and Positive Ber rst, EC = Envelope ary - Initial Co	nding OR No Bend e Collapse, N/A = n nditions - 13 3/	ling, D = Outer wall to ISO Connection /8" Conductor Ca	safety factor, N =	- = Negative Bending			
Default = Pipe Bod Axial Flags Default = Tension, Triaxial Flags Default = Inner Wa Envelope Flags EB = Envelope Bu Movement Summ	y, L = Connection M = Compression II and Positive Ber rst, EC = Envelope	nding OR No Bend e Collapse, N/A = n	ling, D = Outer wall	safety factor, N =	- = Negative Bending pon The	. ,	nection Yield, C =	Buckled Length (m)

Slender Well Design

		LostReturnsv	VithMudDrop #1 -	13 3/8" Conduc		<b>-</b> , ,	<b>-</b>	
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
	0,03	123,00	-0,003	0,000	0,002	0,001	0,000	0,
lovement (	Summary	OverPull #1 -	13 3/8" Conduct	or Casing				
novement	MD (m)	oven un#1-	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	)	Base	Law (m)	(m)	(m)	(m)	(m)	Lenath (m)
* Surface di	0,03	123,00 due to pickup (+)	0,008	0,000	0,000	0,000	0,008*	Ó
		,	.,					
Novement S	<u>Summarγ -</u> MD (m)	RunningHole	<u>#1 - 13 3/8" Con</u> Hooke's	ductor Casing Buckling	Balloon	Thermal	Total	Buckled
Тор	<b>b</b>	Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
			ľ	No results available f	or this load case			
Movement S		Initial Condition	ons - 11 3/4" Suri					
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon	Thermal (m)	Total (m)	Buckled Length (m)
1 OF	0,03	123,00	0,000	0,000	(m) 0,000	0,000	0,000	Cengui (m) O
/lovement \$	Summary -	PressureTest	:#1 - 11 3/4" Suri	face Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0.03	Base 123.00	Law (m) 0.041	(m) 0,000	(m) -0.041	(m) 0.000	(m) 0,000	Length (m) 123
	0,00	123,00	0,041	0,000	-0,041	0,000	0,000	125
/lovement \$	Summary -	LostReturnsV	VithMudDrop #1 -	11 3/4" Surface	Casing			
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0.03	Base 123.00	Law (m) -0.003	(m) 0,000	(m) 0.002	(m) 0.001	(m) 0.000	Length (m) 0
	0,03	123,00	-0,003	0,000	0,002	0,001	0,000	
Novement S	Summary -	GreenCemen	it #1 - 11 3/4" Su					
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)
	0,03	123,00	0,028	0,000	0,000	0,000	0,028	Cengur (m)
/lovement s	Summary -	OverPull #1 -	11 3/4" Surface	Casing				
	MD (m)		Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Тор	0,03	Base 123,00	Law (m) 0,075	(m) 0,000	(m) 0,000	(m) 0,000	(m) 0,075*	Length (m)
* Ourface d				0,000		0,000	0,073	
* Surface d	Isplacement of	due to pickup (+)	or slackoff (-)					
lovement S	Summary -	RunningHole	#1 - 11 3/4" Surf Hooke's		Balloon	Thermal	Total	Buckled
Тор	MD (m)	Base	Hooke's Law (m)	Buckling (m)	Balloon (m)	Ihermal (m)	l otal (m)	Buckled Length (m)
_				No results available t				
lovement s	Summarv -	Initial Condition	ons - 95/8" Prod	uction Casing				
Novement S	MD (m)	Initial Condition	ons - 95/8" Prod Hooke's Law (m)	uction Casing Buckling (m)	Balloon (m)	Thermal (m)	Total (m)	Buckled Length (m)

Appendix

-										CSL #	PressureTe	illiaiv -	
Buckled		Total		Thermal	1	Balloon		Bucklin	looke's			MD (m)	
Length (m)		(m)		(m)		(m)		(m)	aw (m)		Base		Тор
626	0,000		0,000		-0,977		-0,003		0,980	00	2000,00	0,03	
Buckled		Total		Thermal		on Casing Balloon		9 5/8" F Bucklin	/ludDrop #1 - looke's	nsWith	LostReturn	mmary - MD (m)	nent Su
Length (m)		(m)		(m)		(m)	•	(m)	aw (m)		Base		Тор
C	0,000		0,001		-0,007		0,000		0,005	00	2000,00	0,03	
Buckled		Total		Thermal	I	Balloon		Bucklin	- 95/8" Pro- looke's	nent#		mmary - MD (m)	nent Su
Length (m)	0.600	(m)	0.000	(m)	0.000	(m)	0.000	(m)	aw (m)		Base	0.02	Тор
C	0,628		0,000		0,000		0,000		0,628	JU	2000,00	0,03	
							<b>N</b>	n Cocinc	/8'' Productic	нο	OverPull #1	mon	oont Su
Buckled		Total		Thermal	I	Balloon		Bucklin	looke's			MD (m)	
Length (m)	0.070+	(m)	0.000	(m)	0.000	(m)	0.000	(m)	aw (m)	20	Base	0.02	Тор
(	0,273*		0,000		0,000		0,000		0,273		2000,00	0,03	face dic-
									5KUII (-)	( <del>*</del> ) or s	ие то ріскир (	acement d	race disp
Buckled		Total		Thermal		Balloon		uction Ca Bucklin	9 5/8" Prod looke's	ole #1	RunningHo	mmarγ - MD (m)	nent Su
Length (m)		1 otai (m)		(m)		Balloon (m)	9	Bucklin (m)	aw (m)		Base		Тор
					case	or this load	available f	No results :					
					case	or this load (	available fi	No results					
Buckled		Total		Thermal			ing	tion Cas	9 5/8" Produc	ak#1 -	TubingLeal		nent Su
Buckled Length (m)		Total (m)		Thermal (m)		Balloon (m)	ing	tion Cas		a <u>k#1 -</u>	TubingLeak Base	mmary - MD (m)	
Buckled Length (m)	0,000		0,000			Balloon	ing	tion Cas	9 5/8'' Produc				nent Su Top
Length (m)	0,000					Balloon	ing Ig 0,000	<u>ction Cas</u> Bucklin (m)	9 5/8" Produc looke's aw (m) 0,053	00	Base 2000,00	MD (m) 0,03	Тор
Length (m) (	0,000	(m)	0,000	(m)	-0,053	Balloon (m)	ing g 0,000 Casing	tion Cas Bucklin (m)	9 5/8" Produc looke's aw (m) 0,053 - 9 5/8" Pro	00	Base 2000,00	MD (m) 0,03 mmary -	Тор
Length (m) ( Buckled Length (m)			0,000		-0,053	Balloon	ing g 0,000 Casing g	<u>ction Cas</u> Bucklin (m)	1 <u>5/8" Produc</u> looke's aw (m) 0,053 0,053 - <u>9 5/8" Prc</u> looke's aw (m)	ation #	Base 2000,00 FullEvacua Base	MD (m) 0,03 mmary - MD (m)	Тор
Length (m) ( Buckled Length (m)	0,000	(m) Total	0,000	(m) Thermal	-0,053	Balloon (m) Balloon	ing g 0,000 Casing	tion Cas Bucklin (m) oduction ( Bucklin	) 5/8" Produc looke's aw (m) 0,053 - 95/8" Prc looke's	ation #	Base 2000,00 FullEvacua	MD (m) 0,03 mmary -	Top nent Su
Length (m) ( Buckled Length (m)		(m) Total	0,000	(m) Thermal	-0,053	Balloon (m) Balloon	ing g 0,000 Casing g	<u>stion Cas</u> Bucklin (m) w <u>duction (</u> Bucklin (m)	9 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Prc</u> looke's aw (m) 0,147	ation #	Base 2000,00 FullEvacua Base 2000,00	MD (m) 0,03 mmarγ - MD (m) 0,03	Top nent Su Top
Length (m) ( Buckled Length (m) (		(m) Total	0,000	(m) Thermal	-0,053	Balloon (m) Balloon	ing g 0,000 <u>Casing</u> 9 0,000	<u>stion Cas</u> Bucklin (m) w <u>duction (</u> Bucklin (m)	1 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Pro</u> looke's aw (m) 0,147 - <u>7" Producti</u> looke's	ation #	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond	MD (m) 0,03 mmarγ - MD (m) 0,03	Top nent Su Top
Length (m) ( Buckled Length (m) ( Buckled Length (m)	0,000	(m) Total (m)	0,000	(m) Thermal (m)	-0,053	Balloon (m) Balloon (m)	ing g 0,000 Casing g 0,000	tion Cas Bucklin (m) <u>oduction (</u> Bucklin (m) on Liner	9 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Prc</u> looke's aw (m) 0,147 <u>7" Producti</u> looke's aw (m)	ation #	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base	MD (m) 0,03 mmary - MD (m) 0,03 mmary - MD (m)	Top nent Su Top nent Su Top
Length (m) ( Buckled Length (m) ( Buckled Length (m)		(m) Total (m) Total	0,000	(m) Thermal (m) Thermal	-0,053	Balloon (m) Balloon (m) Balloon	ing g 0,000 <u>Casing</u> 9 0,000	tion Cas Bucklin (m) bduction ( Bucklin (m) <u>on Liner</u> Bucklin	1 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Pro</u> looke's aw (m) 0,147 - <u>7" Producti</u> looke's	ation #	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond	MD (m) 0,03 mmary - MD (m) 0,03 mmary -	Top nent Su Top nent Su Top
Length (m) ( Buckled Length (m) ( Buckled Length (m)	0,000	(m) Total (m) Total	0,000	(m) Thermal (m) Thermal	-0,053	Balloon (m) Balloon (m) Balloon	ing g 0,000 Casing g 0,000	tion Cas Bucklin (m) bduction ( Bucklin (m) on Liner Bucklin (m)	) <u>5/8" Produc</u> looke's aw (m) 0,053 looke's looke's aw (m) 0,147 7" Producti looke's aw (m) 0,000	ation #	Base 2000,00 FullEvacua Base 2000,00 Initial Cond Base 2550,00	MD (m) 0,03 mmary - MD (m) 0,03 mmary - MD (m) 40,02	Top nent Su Top nent Su Top 2t
Length (m) Buckled Length (m) Buckled Length (m) Buckled	0,000	(m) Total (m) Total (m) Total	0,000	(m) Thermal (m) Thermal (m)	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon	ing 9 0,000 Casing 9 0,000 9 9 0,000	tion Cas Bucklin (m) oduction ( Bucklin (m) on Liner Bucklin (m)	2 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Pro</u> looke's aw (m) 0,147 - <u>7" Producti</u> looke's aw (m) 0,000 - <u>7" Producti</u> looke's	ation #	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base 2550, 00 PressureTe	MD (m) 0,03 mmary - MD (m) 0,03 mmary - MD (m) 40,02	Top nent Su Top nent Su Top 2t
Length (m)	0,000	(m) Total (m) Total (m)	0,000	(m) Thermal (m) Thermal	-0,053	Balloon (m) Balloon (m) Balloon (m)	ing g 0,000 (2asing g 0,000 g 0,000	tion Cas Bucklin (m) Bucklin (m) <u>on Liner</u> Bucklin (m) <u>on Liner</u>	9 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Prc</u> looke's aw (m) 0,147 	ation #	Base 2000,00 FullEvacua Base 2000,00 Initial Cond Base 2550,00 PressureTe Base	MD (m) 0,03 mmary - MD (m) 0,03 mmary - MD (m) 40,02 mmary - MD (m)	Top nent Su Top Top 24 nent Su Top
Length (m)	0,000	(m) Total (m) Total (m) Total	0,000	(m) Thermal (m) Thermal (m)	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon	ing 9 0,000 Casing 9 0,000 9 9 0,000	tion Cas Bucklin (m) oduction ( Bucklin (m) on Liner Bucklin (m)	2 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Pro</u> looke's aw (m) 0,147 - <u>7" Producti</u> looke's aw (m) 0,000 - <u>7" Producti</u> looke's	ation #	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base 2550, 00 PressureTe	MD (m) 0,03 mmary - MD (m) 0,03 mmary - 40,02 mmary -	Top nent Su Top Top 24 nent Su Top
Length (m)	0,000	(m) Total (m) Total (m) Total	0,000	(m) Thermal (m) Thermal (m)	-0,053	Balloon (m) Balloon (m) Balloon (m) Balloon	ing 9 0,000 0,000 0,000 9 0,000	tion Cas Bucklin (m) bduction ( Bucklin (m) <u>on Liner</u> Bucklin (m) <u>on Liner</u>	9 <u>5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Prc</u> looke's aw (m) 0,147 	00 ation <u>#</u> 00 00 00 00 00 00 00	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base 2550, 00 PressureTe Base 2550, 00	MD (m) 0,03 MIT ary - MD (m) 0,03 MD (m) 40,02 MD (m) 40,02	Top nent Su Top Top 24 nent Su Top 24
Length (m)	0,000	(m) Total (m) Total (m) Total (m)	0,000	(m) Thermal (m) Thermal (m) Thermal	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon	ing g 0,000 2 <u>asing</u> 9 0,000 19 0,000 19 0,000	tion Cas Bucklin (m) duction ( Bucklin (m) on Liner Bucklin (m) on Liner Bucklin (m)	2 5/8" Production looke's aw (m) 0,053 looke's aw (m) 0,147 7" Producti looke's aw (m) 0,000 7" Producti looke's aw (m) 0,003 - 7" Producti looke's	00 ation <u>#</u> 00 00 00 00 00 00 00	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base 2550, 00 PressureTe Base 2550, 00 GreenCem	MD (m) 0,03 MIT ary - MD (m) 0,03 MD (m) 40,02 MD (m) 40,02	Top nent Su Top nent Su nent Su Top 2t nent Su
Length (m)	0,000	(m) Total (m) Total (m)	0,000	(m) Thermal (m) Thermal (m)	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon (m)	ing g 0,000 2 <u>asing</u> 9 0,000 19 0,000 19 0,000	tion Cas Bucklin (m) bduction ( Bucklin (m) on Liner Bucklin (m) on Liner Bucklin (m)	<u>     5/8" Produc</u> looke's aw (m) 0,053 - <u>95/8" Pro</u> looke's aw (m) 0,147 7" Producti looke's aw (m) 0,000 <u>7" Producti</u> looke's aw (m) 0,000 <u>7" Producti</u> looke's aw (m) 0,000 <u>7" Producti</u> looke's aw (m) 0,000 <u>7" Producti</u> looke's aw (m) 0,000 <u>7" Producti</u> looke's aw (m) 0,000 <u>7" Producti</u> looke's aw (m) 0,000 <u>7" Producti</u>	200 ation <u>#</u> 00 ditions 00 00 00 00 00 00 00 00 00 0	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base 2550, 00 PressureTe Base 2550, 00	MD (m) 0,03 mmary - MD (m) 0,03 mmary - MD (m) 40,02 mmary -	Top nent Su Top Top 24 nent Su Top 24 nent Su Top
Length (m) Buckled Length (m) Buckled Length (m) Buckled Length (m) 10 Buckled Length (m)	0,000	(m) Total (m) Total (m) Total (m)	0,000	(m) Thermal (m) Thermal (m) Thermal	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon	ing g 0,000 2asing 9 0,000 19 0,000 19 0,000	tion Cas Bucklin (m) duction ( Bucklin (m) on Liner Bucklin (m) on Liner Bucklin (m)	<u>a 5/8" Produc</u> looke's aw (m) 0,053 - <u>9 5/8" Pro</u> looke's aw (m) 0,147 - <u>7" Producti</u> looke's aw (m) 0,000 - <u>7" Producti</u> looke's aw (m)	200 ation <u>#</u> 00 ditions 00 00 00 00 00 00 00 00 00 0	Base 2000,00 FullEvacua Base 2000,00 Initial Cond Base 2550,00 PressureTe Base 2550,00 GreenCem Base	MD (m) 0,03 mmary - MD (m) 0,03 mmary - MD (m) 40,02 mmary - MD (m)	Top nent Su Top Top 24 nent Su Top 24 nent Su Top
Length (m) Buckled Length (m) Buckled Length (m) 10 Buckled Length (m)	0,000	(m) Total (m) Total (m) Total (m)	0,000	(m) Thermal (m) Thermal (m) Thermal (m)	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon (m)	ing g 0,000 9 0,000 19 0,000 19 0,000 19 0,000 19 0,000 19 0,000	tion Cas Bucklin (m) bduction ( Bucklin (m) on Liner Bucklin (m) tion Liner Bucklin (m)	9 5/8" Productioke's           iooke's           aw (m)           0,053           - 9 5/8" Production           iooke's           aw (m)           0,147           7" Producti           iooke's           aw (m)           0,000           7" Producti           iooke's           aw (m)           0,000           7" Producti           iooke's           aw (m)           0,003           - 7" Production           ooke's           aw (m)           0,003	ation # ation # ati	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base 2550, 00 GreenCem Base 2550, 00	MD (m)           0,03           mmary -           MD (m)           0,03           mmary -           MD (m)           40,02           mmary -           MD (m)           40,02	Top nent Su Top Top 24 nent Su Top 25 nent Su
Length (m)	0,000	(m) Total (m) Total (m) Total (m) Total (m)	0,000	(m) Thermal (m) Thermal (m) Thermal (m)	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon (m) Balloon	ing g 0,000 9 0,000 19 0,000 19 0,000 19 0,000 19 0,000 19 0,000	tion Cas Bucklin (m) bduction ( Bucklin (m) on Liner Bucklin (m) tion Liner Bucklin (m) tion Liner Bucklin (m)	9.5/8"         Productiooke's           aw (m)         0,053           -         9.5/8"         Productiooke's           looke's         0,147           -         7"         Productiooke's           looke's         0,000           7"         Productiooke's           aw (m)         0,000           7"         Productiooke's           aw (m)         0,003           -         7"           Iooke's         aw (m)           0,003         -           -         7"           Production Lilooke's         -	ation # ation # ati	Base 2000,00 FullEvacua Base 2000,00 Initial Cond Base 2550,00 PressureTe Base 2550,00 GreenCem Base 2550,00	MD (m) 0,03 mmary - MD (m) 0,03 mmary - MD (m) 40,02 mmary - MD (m) 40,02	Top nent Su Top Top 28 nent Su Top 28 nent Su Top 28 nent Su
Length (m) Buckled Length (m) Buckled Length (m) 10 Buckled Length (m)	0,000	(m) Total (m) Total (m) Total (m)	0,000	(m) Thermal (m) Thermal (m) Thermal (m)	-0,053 -0,147 0,000	Balloon (m) Balloon (m) Balloon (m) Balloon (m)	ing g 0,000 9 0,000 19 0,000 19 0,000 19 0,000 19 0,000 19 0,000	tion Cas Bucklin (m) bduction ( Bucklin (m) on Liner Bucklin (m) tion Liner Bucklin (m)	9 5/8" Productioke's           iooke's           aw (m)           0,053           - 9 5/8" Production           iooke's           aw (m)           0,147           7" Producti           iooke's           aw (m)           0,000           7" Producti           iooke's           aw (m)           0,000           7" Producti           iooke's           aw (m)           0,003           - 7" Production           ooke's           aw (m)           0,003	ation # ation # ation # ations ati	Base 2000, 00 FullEvacua Base 2000, 00 Initial Cond Base 2550, 00 GreenCem Base 2550, 00	MD (m)           0,03           mmary -           MD (m)           0,03           mmary -           MD (m)           40,02           mmary -           MD (m)           40,02	Top nent Su Top nent Su Top 2t nent Su Top 2t nent Su Top 2t nent Su

Slender Well Design

WELLCAT 5000.1.13.1

File: Slender Well Design, v0			Date/Time	: March 01, 2018	02:54:29 PM	Page: 23 of 23
Movement Summary - RunningHole #	#1 - 7" Production	n Liner				
MD_(m)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
3	N	o results available fo	r this load case			
4						
5						
Movement Summary - FullEvacuation	n #1 - 7" Producti	on Liner				
MD (m)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1 2540,02 2550,00	0,001	0,000	-0,001	0,000	0,000	0,00
Movement Summary - TubingLeak #*	1 - 7" Production	liner				
MD (m)	Hooke's	Buckling	Balloon	Thermal	Total	Buckled
Top Base	Law (m)	(m)	(m)	(m)	(m)	Length (m)
1 2540,02 2550,00	-0,004	0,000	0,004	0,000	0,000	0,00

Slender Well Design

WELLCAT 5000.1.13.1

- 5.3 Drill Cost Estimates
- 5.3.1 Barents Sea
- 5.3.1.1 Conventional Well Design

DRILLING COST ESTIMATE																
Well Name: BarentsSee																
D-Minge Rig : 0 Rig X			L												-	
Rermit: 7120				Phase	pre-sbrid	_	Surface Hole	ns S	Surface Casing	Nipple Up BOPS	6 BOP's	Intermediate Hole 1		Intermediate Casing 1	g1	LOT al
			_	Number of days Depth	2.1 days II m		1.3 days 645 m		1.9 days 645 m	3.3 days 645 m	£ Е	4.0 days 1355 m		3.5 days 1355 m		135
Reation 0	Contractor	Unit Cost	Pre-Drill		Unit cost S	SubTotal Un	Unit Cost Sub Total	otal Unit Cost	t Sub Total	Unit ast	Sub Total	Unit cost	SubTotal	Unit cost Sub	Sub Total Un	Unit cost
Startf Salaries Operating Company Personnel		510,000			510,000	520,833 51	\$10,000 \$12,500	00 210,000	518, 750	510,000	233,333	510,000	15 59583	510,000 535	535,000 \$1	510,000
Overhead Allocation General Overhead Recovery (53 2MMspread over well)		565,473								565,473	5238,244					565, 473
RigCosts Mab / Demab - Initial Mabilisation			\$1,150,000		5	ľ	50	20		50	I	5	ľ	20		5
Web / Demob - Final Demokilisation Rig Operator Rein Anzeitener Actss		\$260,000 \$145,000 \$10,000	Π	ľ	5145,000 5146,000	55	15,000 \$181,250 0.000		5271,875	\$145,000 5145,000	5483,333					45,000 0.000
Fuel and Luch can be and a survey examples a sign (s remained and ). Rue and Luch can an		550,000 550,000	Π		550,000 550,000	5104,167 55 51 208 333 55	550,000 562,500 558,000 562,500	000 255,000	593,750 51.087.500	550,000	5166,667 51 433 333	550,000 550,000	5197,917 55 52 945.833 55	550,000 \$17 550,000 \$17	\$175,000 55 \$2 nan nnn sw	550,000
LK Endel für eftigtere						-		H	- 1		maturates	- 8			-	
rscand Auditurg Site Survey and Inspections			\$1,300,000			Η		-					Η		Η	
bwatubnor Mudingging an dData Han ding Wr≊nine Innerine-∩n an Hale		55,000 55,000	520,000		55,000	510,417 51	55,000 56,250	50 55,000	59,375	22 <sup>,</sup> 000	516,667	\$5,000	519,792 55 5250.000	55,000 51	517,500 51	55,000
Wreine Logging - Cared Hole - CBL Subset Works		200,072	Π												H	
DynamicPatitioning Communications			558,000													
Communications - Phone Charges Reporting Costs (USS:360k spread over well)		55.00 55,32.0	Π		5500 55,320	51,042 5 511,083 5	5500 5625 55,320 56,650	5 5500 50 55,320	5938 59,974	55.00 55,320	\$1,667 \$17,732	5500 55,320	51,9 <b>79</b> 5 521,057 55	5500 51 55,320 516	51,750 5 518,619 59	5500 55,320
Transport Transport / Freight - Materials Transport and General Freight 		520,000	\$100,000	Γ	520,000	541,667 52	520,000 525,000	00 \$20,000	232,500	520,000	566,667	520,000	579,167 52	520,000 S7	570,000 52	520,000
WaterSource & Supply Haulage Chaine and Anersonies		25,000				+				22,000	516,667	25,000	ł			5,000
Surface Centry, 2011;131(A: N-BOTTSHER, Ricarge III) Intermediate Canig: -132-3(8' -721)(A: A-210V-AAZ) (Aurge III) Intermediate Canig: -132-3(8' -721)(A: A-210V-AAZ) (Tange III) Producion Canie - 779-3(A): A-130 (MARCH) (Canie - III)		5400/m 5300/m 5200/m 5150/m	Π		П	Ħ	П	5400/m	528,000		П	П	8	5300/m \$40	\$406,500	II.
Production can ing linkt system Cas ing running cantra dor - Premium Cas ing Services		515,000 58,000	510,000	1		t		28,000	\$15,000		Ľ	Ľ		58,000 5.%	528,000	Ľ
Casing equipment Sealant and brushas Morenners		\$10,000	\$3,500	ľ	l	H	l	H	\$10,000		Π	I	H	230	000'1	I
wern each Weilhead Equipment - Weilhead Installaton and Testing Weilhead Equipment - X° section		5 20,000 5200,000	Π			H		Η			\$200,000	I	H		H	Π
Welhead Equipment - "5" ection Welhead Equipment - "C" Section		5300,000 5300,000	T	Î	l	t	l	ł	ļ		I	İ	t	8	2300,000	T
contains Chemicals (juuftao, intermediate, production and P2A) Service (juuftao, Intermediae, production and P2A)			Π			H		H	\$45,000 \$80,000		Π	Π	H	560	560,000 590,000	П
Mud Otterricht Mud erginner of release Lingreiseas (Assuming 2x Mud Men @ USS24/4) Contringes (Deamder / Dealter		53,000 52,000	510,000		53,000 52,000	56,250 5 54,167 5	53,000 53,500 52,000 53,750 52,000 52,500	00 23,000 50 53,000	55,625 53,750	000'85 000'85	\$10,000 \$6,667	53,000 52,000	565,000 51 511,875 51 57,917 52	53,000 510 52,000 57	510,500 ST 57,000 ST	53,000 52,000
Misselle neo.s et uprime M Tanks - Additional Water Storage Tanks Office Additional Water Storage Tanks		5500 5150	T	Î	5500 5160	51,042 5	5500 5625 5100 5625	5 5500	5938	55.00 51.50	51,667 51,667	5500 515.0	51,979 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	5500 51 5150 51	51,750 52,750	5500 5160
once appea Wate Treatment And Disposal - Deliver bin to welk its, cost of empty the bins Drilling Toolst & Equipment		22,000	T	Ì	Ŀ	÷	Ŀ	÷	÷	22,000	516,667	÷	÷	Ŀ.	÷	2,000
Delidie Rottwared Deling Tools ferant Scowy Took (ug. Ros/rt), Marian MWO) Deling Tools ferant Scowy Took (ug. Deling Tools ferant Scows Analysis for rental & pread Dear well) Deling Tools ferant Scows Stools and		5400 52,000 3800	54,000		50 5400 52,000 5800	54,167 5: 54,167 5:	5900,000 5400 55500 52,000 53,000 53,000	000 \$0 0 \$400 00 \$2,000 00 \$3,000	5.750 53,750 51,500	50 5400 52,000 5800	299'02' 29'99'333 21'333	50 5400 52,000 5800	560,000 55 57,917 52 53,167 52	50 5400 51 52,000 57 5800 52	51,400 57,000 52,800 52,800	50 5400 53,000 5300
Drilling Tools Rental - Directional Onling Services Class Changess						İ					I	Ī	İ		t	
Class charges written over five years Field Professional Services			\$154,000													
n eos morecenses es como esta para (Assuming 2x Gers @ USS28/d) Sefery Adviser (Assuming 2x GArg @ USS28/d)		54,000 53,000			54,000 53,000	58,333 55 56,250 5	54,000 55,000 53,000 53,750	00 54,000 50 53,000	57,500 55,625	\$4,000 \$3,000	\$13,333 \$10,000	54,000 50	515,833 54	54,000 \$34 \$0	514,000 54	54,000 53,000
Mediae Cont per well Campany Man (1 x day, 1 x nght ans uning each at US2, 54/d)		\$5,000	5.25,000							22 <sup>,</sup> 000	\$16,667		\$19,792 \$5		\$17,500 \$9	55,000
TOTALS			\$2,834,500		5922,143 \$:	\$1,58,214 59	5922,143 \$1,305179	179 \$930,543	\$2,118,268	5922,143	\$3,240,476	5919,143 5	54,013,274 592	5927,443 54,1	54,111,500 590	\$922,143
Prase Totals		Pre-Well Charges	\$2,834,500		Pre-spud \$1	\$1,528,214 Surfa	Surface Hole \$1,305,179	179 Surface Casing	ing \$2,118,268	Nipple Up BOP's	\$3,240,476	Intermediate \$ Hole1 \$	\$4,013,274 Interr	Intermediate \$4,1. Casing 1	\$4,111,500 IDTa	LDT and Test

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Barents Sea

Mol

Drilling No.																		
Rex									-		-				_		-	
Rermit: 7120			rd Test	Intermediate Hole 2	te Hole 2	Intermediate Casing 2	asing 2	LDT and Test	~	Production Hole	0	Evaluation	g	Production Liner	ž	Rig Release		
			glæje	6.9 days	ays	3.7 days		2.5 days		7.1 days		5.4 days		4.3 days		0.3 days		
		-	E 2	1995	E	1995 m		1995 m		2500 m	+	25.00 m		25 00 m		2500m		
Rekision 0	Contractor	Unit Cost	SubTotal	Urrit cost	Sub Total	Unit cost	Sub Total Ur	Unit cost Su	Sub Total Ur	Unit cost Sub	Sub Total Unit cost	cost Sub Total	ta I Unit cost	st Sub Total	al Unit cost	Sub Total	Sub-total	Total
Staff Salaries Operative Company Personnel		\$10,000	527,500	510,000	568.750	510.000	536,667 57	510.000	525.000 53	510.000 57(	570.833 S10.000	000 554,167	67 S10.000	0 542.500	0 510.000	53.333	\$488.750	\$488,750
Overtread Allocation General Overtread Recovery (53 2010/sorread over well)		565.473	5180.051	565.473	5450.128			-			894		-			521.824	\$3.200,000	\$3,200,000
Rig Costs							-	-										\$39,218,542
Mab / Demab - Initia IMabilisation Mab / Demab - Final Demab iisation		5260.000		88		5		20		20	5		8		8	5260.000	\$1,150,000 \$260,000	
Rig Operating Casts		5145,000	5398,750	5145,000	5996,875		-	H	-	-	51,027,083 5145,	000 5785,417		00 5616,250	Н	Н	\$6,784,792	
Hig U perating Costs - Crew Change Hight (Heliopiters) Fuel and Lubricants		200'005 220'000	5137,500	530,000	5343,750 5343,750	250,000	5.36,567 5: 5183,333 5:	510,000 51 550,000 51	5125,000 51 5125,000 55	520'000 232	5354,167 \$50,000	000 5270,833	33 550,000	0 5212,500	250,000	\$16,667	\$2,443,750 \$2,443,750	
Marine Costs - General Spread Rate		2580,000	\$1,595,000	5580,000	53,987,500												\$28,347,500	
HSEand Auditing																		\$1,300,000
site survey and inspections Bealuation																	mnimerte	\$1,154,375
Mud teging and Dat a Han direg Wireline Loverine - Open Hole		\$5,000 5250.000	513,750	55,000	534,375 5250.000	52 <sup>,</sup> 000	538,333 5	55,000 57	512,500 51	22'000 23i	\$35,41 <b>7</b> \$5,000	00 \$27,083 5250.000	33 \$5,000 00	521,250	0 25,000	51,667	\$750,375 \$750,000	
Wireline Logging - Cased Hole - CBL Sultrea Montes		570,000						57	570,000							570,000	\$140,000	¢ the num
Dynamic? in itining				l				ŀ			-		L				\$58,000	00/020
Communications Communications - Phone Changes Reporting Costs (USS560K:ponead ownwall)		55.00 55.320	51,375 514,629	\$500 \$5.320	53,438 536,573	5500 55,320	\$1,833 \$19,506 \$	5500 5 55.320 5:	51,250 5 513,299 51	55.00 53 55.320 53	53,542 5500 53,7691 55,320	10 52,708 120 528,815	B 5500 15 55,320	52,125 52,609	5 5500 55320	5167 51.773	\$24,438 \$260,000	\$284,438
							-											61 001 07E
ransport Tarropart Freight - Materials Tarropart and General Freight Water Source 8.5 up phy Haudage		5 20,000	555,000 513,750	520,000 55,000	\$137,500 \$34,375	\$20,000 \$5,000	573,333 538,333 538,333	520,000 55 55,000 55	550,000 52 512,500 51	520,000 514 55,000 535	5141,667 520,000 535,417 55,000	000 5108,333 000 527,083	33 520,000 33 55,000	0 \$85,000 3 \$21,250	0 \$20,000 0 \$5,000	56,667 51,667	\$1,077,500 \$244,375	= /0'T7C'T0
Casing and Accessories Surface (arrive 2014 113 NAP ALSOTTALER (Barree III)		2400/m		and the se			H										0080	\$1,316,750
Intermediate Casing: 13-3/8" 7216/ft P-110VAM21 (Range III)		m/0085															\$406,500	
Intermediate Casing: 9-5/8' 535 Ib/ft P-110 VAM21 (Bange III) Production Casing : 7'' 291b/ft L-80 VAMTOPHC (Bange III)		5200/m 5150/m		l		\$200/m	2399,000	f		ŀ	-		s 150/m				\$75790	
Production casing liner system		\$15,000				l									ł		\$15,000	
Casing cuming contractor - Fremum Casing Services Casing equipment		510,000				nnn/96	510,000			ł			nn %	1 510,000		22,667	000/0#\$	
Sealant and brushes Meilhead				l						ł					ł	ļ	96,63	\$1,110,000
Wellhead Equipment - Welhead Installation and Testing Molibood Equipment - With sociation		520,000													510,000	\$10,000	\$10,000	
Wellhead Equipment - "B" section		2300,000						H	H	Η	H						\$300,000	
Weinhead Equipment - "U" Section Cernenting		nnnfnnst		l	ľ		nnnínnst	t	-		-		-	nnninnst		L	nnimet	\$310,000
Chemicate (surface, intermediate, production and P&A) Services (jurface, intermediate, production and P&A)					T		5120,000 595,000				╢			53 20,000	80		\$545000 \$365000	
Prw.				l			H	╞	H									\$603,375
unemaan Mud engineer rig release to rig release (Assuming ≥ Mud Men @ USS2/4) Contrifige / Desander / Desiter		53,000 52,000	38,250 55,500	53,000 52,000	520,625 513,750	53,000 52,000	511,000 5 57,333 5	53,000 5 52,000 5	57,500 S 55,000 S	53,000 521 52,000 521	\$21,250 \$3,000 \$14,167 \$2,000	00 516,250 00 510,833	50 53,000 33 52,000	512,750 58,500	0 53,000 0 52,000	51,000 5667	\$146,625 \$146,625	
Missiella reous tiq uipment Tants - Additional WaterStorage Tants		\$500	51,375	\$500	53,438		÷	÷	+		-		ł		ł	5167	\$24,438	SZ76,144
Office Supplies Waste Treatment And Disposal - Deliver bin towelkite, cost of empty the bins		\$150 \$5,000	5413 513,750	\$150 55,000	51,031 534,375	\$150 \$5,000	5 28,333 5	5150 St 22	5375 5375 5 512,500 51	5150 51 55,000 535	51,063 5150 535,417 55,000	50 <u>527,083</u> 100 527,083	3 55,000	5628	5150 0 55,000	550 51,667	57,381 \$244,375	
Dritierg Tools & Equipment Dritierg Poorli Bits Purchased				l	550.000					54S	S45.000					ļ	\$235000	\$395,400
Drilling Tools Rental - Survey Took (e.g. Flochff, Manless MWD) Anter-Tools Proved - Anter-Tools Proved		2000	64.400	50 200	0 H 63	50	H	Η	Η				H		Н	5663	8	
onning roots rental - Pointe Jaan starting Drilling Tools Rental - Redress/Run chages for rentak (spread over well)		52,000	25,500	52,000	513,750	52,000	57,333 57,333	52,000 5	55,000 S.	Н	514,167 52,000	100 \$10,833	33 52,000	28,500	52,000	2667	06//6\$	
Drilling: Tools Rental - Stabilisers Drilling: Tools Rental - Directional Drilling:Services		888	52,200	2800	55,500	5800	ŀ	ŀ	ł	20 22			ŀ		ŀ	5267	8183	
Class Charges Class charges written over five vears																	\$154,000	\$154,000
Field Professional Services							-	⊢	-									\$557,500
Wellsite Geologist (Assuming 2x Geo's @ US5 24/d) Safety Adviser (Assuming 2x SA's @ US5 124/d		54,000 53,000	511,000 \$8,250	54,000 50	\$27,500	54,000 50	514,667 5	54,000 57 53,000 5	510,000 5 57,500 5	54,000 526 53,000 521	528,333 54,000 521,250 53,000	100 521,667 100 516,250	67 54,000 53,000	0 517,000 512,750	0 54,000 0 53,000	51,333 51,000	\$195,500 \$32,625	
rweowaccuast per wei Camp any Man (1 x day, 1 x night assuming each at USS2.5V/d)		55,000	213,750	55,000	534,375	55,000	538,333 5	55,000 SC	512,500 51	52'000 23;	535,417 55,000	100 527,083	33 \$5,000	3 521,250	0 22'000	51,667	\$244,375	
TOTALS			52,535,893	5919,143	56,739,107	5927,343 5	54,323,524 59	5922,143 52.	\$2,375,357 \$9:	5922,143 56,5I	56,561,012 5922,143	143 55, 190, 774	774 5930,293	33 \$4,761,357	57 \$940,143	\$646,714	5 2,355,148	\$52,355,148
				Intermediate		Irte mediate		-		Production			Bench ettion			-		
Phase Totals		Pre-Well Changes	\$2,535,838	Hole 2	S6,739,107		\$4,323,524 IDT	IDT and Test \$23	\$2,375,357		S6,561,012 Evaluation	rtion \$5,130,774	-		S7 Rig Release	e \$646,714	Total Cost	\$52,355,148

# Appendix

### 5.3.1.2 Slender Well Design

DRILLING CO	DRILLING COST ESTIMATE														
Well Name: Barents Sea	Barents Sca 0														
Permit : 7120	x Bu				Phase	Pre-spud	p	Surface Hole	Hole	Surface Casing	Casing	LOT and Test	Test	Intermediate Hole	te Hole
					Number of days Depth	2.1 days 0 m	sh	4.6 days 950 m	ski u	3.5 days 950 m	ste e	2.8 days 950 m	ws w	7.9 days 2100 m	50 11
Revision 0		Contractor	Unit Cost	Pre-Drill		Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total
Staff Salaries	Operating Company Personnel		\$10,000			\$10,000	\$20,833	\$10,000	\$45,833	\$10,000	\$35,000	\$10,000	\$27,500	\$10,000	\$79,167
Overhead Allocatio	<b>C</b>		\$72,590			\$72,590	\$151,229	\$72,590	\$332,703	\$72,590	\$254,064	\$72,590	\$199,622	\$72,590	\$574,669
Rig Costs	Mob / Demob - Initial Mobilisation			\$1,150,000		ş		8		8		Ş		8	
	Mah / Demok - Final Demoklisation Re, Operating cons Re, Demetring Cons Crew Charge Flight (Helicopters) Fiel and Lubriciants		\$260,000 \$145,000 \$10,000 \$50,000			\$145,000 \$10,000 \$50,000	\$104,167	\$145,000 \$10,000 \$50,000	\$664,583 \$45,833 \$229,167	\$145,000 \$10,000 \$50,000	\$507,500 \$35,000 \$175,000	\$145,000 \$10,000 \$50,000	\$398,750 \$27,500 \$137,500	888	\$1,147,917 \$79,167 \$395,833
MCP and Audition	Mainthe Costs - United a Spread Matte		nnninzė			000/076	/00/160	000/075	/00/160	000/076	nnninze	000/074	non/ccc	- 1	ccc/gctc
First and Auditing	Site Survey and Inspections			\$1,300,000		Π	Π	Π	Π	Π	Π	Ι	Π	Π	
Evaluation	Mudlogging and Data Handling Workeine Logistics - Cosen Hole Workeine Logistics - Cosen Hole - CR		\$5,000 \$250,000 \$70,000	\$20,000		\$5,000	\$10,417	\$5,000	\$22,917 \$250,000	\$5,000	\$17,500	\$5,000	\$13,750	\$5,000	\$39,583 \$250,000
Subsea Works	Dynamic Positioning			\$58,000					I					I	
Communications	Communications - Phone Charges Reporting Costs (USS260K spread over well)		\$500 \$5,898			\$500 \$5,898	\$1,042 \$12,287	\$5,898	\$2,292 \$27,032	\$500 \$5,898	\$1,750 \$20,643	\$500 \$5,898	\$1,375 \$16,219	\$5,898	\$3,958 \$46,692
Transport	Transport / Freight - Materials Transport and General Freight		\$20,000	\$100,000	ľ	\$20,000	\$41,667	\$20,000	\$91,667	\$20,000	\$70,000	\$20,000	\$55,000	\$20,000	\$158,333
M Casing and Accessories	Water Source & Supply Haulage offes		\$5,000			\$5,000	\$10,417	\$5,000	\$22,917	\$5,000	\$17,500	\$5,000	\$13,750	\$5,000	\$39,583
	Surface Caving: 13-3/8° 54.5 kb/th-155 BTC (Pange III) Intermediate Caving: 9-5/8° 4.5 kb/th M-55 BTC (or premium if desired) (Bange III) 9-5/8° 47 kb/th C-75 BTC (or premium if desired) (Bange III)	\$201/m \$144/m	\$201/m \$144/m							\$201/m	\$190,950				
	Production Casing : 7" 29 lb/ft, C-75 BTC (or premium thread if desired) (Range III) Production casing liner system	\$150/m	\$150/m \$15,000	410 AND	Î	I	I	I	I	40.000	dan ana	I	I	I	I
	Lising unimg contractor - Premium Lasing services Casing equipment Sealant and burbles		\$10,000	000/01<\$	Î	I	I	I	T	28,000	\$10,000	I	I	ľ	I
Wellhead	Worthead Gaugment - Worthmad Installation and Testing Withmad Gaugment - M. section Withmad Gaugment - T. Scitcon Withmad Gaugment - C. Scitcon	\$200,000 \$300,000 \$300,000 \$300,000	\$20,000 \$133,750 \$215,887,85 \$300,000			Ш					\$215,888		Ш	Ш	
Cementing	Chemicals (surface, intermediate, production and P&A) Services (surface, intermediate, production and P&A)										\$63,559 \$90,000		Π		
Mud Mud Cent	Chemickis Mud regineer: rig: release to rig: release (Assuming 2x Mud Men @ US23V(d) Constringe / Desander / Desiter		\$3,000 \$2,000	\$10,000		\$3,000 \$2,000	\$6,250 \$4,167	\$3,000 \$2,000	\$67,600 \$13,750 \$9,167	\$3,000 \$2,000	\$10,500 \$7,000	\$3,000 \$2,000	\$8,250 \$5,500	\$3,000 \$2,000	\$95,239 \$23,750 \$15,833
MISCEllaneous Equ	apment Tanks - Additional Water Storage Tanks Water Treatment And Disposal - Deliver bin to welishte, cost of empty the bins		\$500 \$150 \$5,000			\$500 \$150 \$5,000	\$1,042 \$313 \$10,417	\$500 \$150 \$5,000	\$2,292 \$688 \$22,917	\$500 \$150 \$5,000	\$1,750 \$525 \$17,500	\$500 \$150 \$5,000	\$1,375 \$413 \$13,750	\$500 \$150 \$5,000	\$3,958 \$1,188 \$39,583
Drilling Tools & Equipment Drill Drilling Drilling Drilling	ujement Dimili Ber Muntakeed Dimili Stock Remark Sciency Took (e.g. Floor/ft, Maniers MWD) Dimilig Took Remark Sciency Science And Remark Dimilig Took Remark Science Science Annu Changels for renative (spread over well)		\$400 \$2,000	\$4,000		\$0 \$400 \$2,000	\$833 \$4,167	\$0 \$400 \$2,000	\$40,385 \$1,833 \$9,167	\$0 \$400 \$2,000	\$1,400 \$7,000	\$0 \$400 \$2,000	\$1,100 \$5,500	\$0 \$400 \$2,000	\$35,000 \$3,167 \$15,833
Class Charges	brilling Tools Rental - Directional Drilling Services		nnac			000	/00/10	nnac	/00/c¢	mad	000/76	me	007'20	noc	666,0¢
Field Professional S	Class charges written over five years nal Services			\$154,000				I						I	
	Welishe Geologist (Assuming 2x Geo's @ U\$52k/d) safety Adviser (Assuming 2x SA's @ U\$51.5V/d		\$4,000 \$3,000			\$4,000 \$3,000	\$8,333 \$6,250	\$4,000 \$0	\$18,333	\$4,000 \$0	\$14,000	\$4,000 \$3,000	\$11,000 \$8,250	\$4,000 \$0	\$31,667
	Medivac Cots per well Company Man (1 x day, 1 x night assuming each at US52.5k/d)		\$5,000	\$25,000	Î	\$5,000	\$10,417	\$5,000	\$22,917	\$5,000	\$17,500	\$5,000	\$13,750	\$5,000	\$39,583
	TOTALS			\$2,834,500		\$369,838	\$447,579	\$366,838	\$2,039,324	\$375,039	\$1,882,329	\$369,838	\$1,017,054	\$366,838	\$3,284,371
	Phase Totals		Pre-Well Charges	\$2,834,500		Pre-spud	\$447,579	Surface Hole	\$2,039,324 5	Surface Casing	\$1,882,329	LOT and Test	\$1,017,054	Intermediate Hole	\$3,284,371

And the control of t		64 FC4144475																Γ
Image: sector of the	DKILLING CC	ISI ESIIMATE																
Image: constrained integration integrate integrate integrate integrate integrate integrate integrate in	Well Name: B Drilling Rig :	arents Sea o																
International         Internat		Rig X																
Image: section of the sectio	Permit: /120				3.7	ate casing days	2.5 c	a rest Says	7.1 d	n noie lys	5.4 da	u0 %	4.3 day	1 mer	0.3 day	a ~		
Image         Image <th< td=""><td></td><td></td><td></td><td></td><td>210</td><td>шO</td><td>210</td><td>m</td><td>2500</td><td>Е</td><td>2500</td><td>E</td><td>2500 r</td><td>E</td><td>2500 1</td><td></td><td></td><td></td></th<>					210	шO	210	m	2500	Е	2500	E	2500 r	E	2500 1			
1         1	Revision 0		Contractor	Unit Cost		Sub Total		Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total		Sub Total	Sub-total	Total
1         1	Staff Salaries	Operating Company Personnel		\$10,000	\$10,000	\$36,667	\$10,000	\$25,000	\$10,000	\$70,833	\$10,000	\$54,167	\$10,000	\$42,500	\$10,000	\$3,333		\$440,833
1         1	Overhead Allocatio	d General Overhead Recovery (53.2MM spread over well)		\$72,590	\$72,590	\$266,163	\$72,590	\$181,474	\$72,590	\$514,178	\$72,590	\$393,195	\$72,590	\$308,507	\$72,590	\$24,197		\$3,200,000
No.         No. <td>Rig Costs</td> <td>Moh / Damoh - Initial Mohilication</td> <td></td> <td></td> <td>5</td> <td></td> <td>Ş</td> <td></td> <td>5</td> <td></td> <td>5</td> <td>ľ</td> <td>5</td> <td>I</td> <td>5</td> <td>I</td> <td>¢1 150 000</td> <td>\$10,835,000</td>	Rig Costs	Moh / Damoh - Initial Mohilication			5		Ş		5		5	ľ	5	I	5	I	¢1 150 000	\$10,835,000
Image: state in the s		No Dy Perindo - Tintai modinisation Mos Dy Perindo - Final Demobilisation Rig Operating Costs		\$260,000 \$145,000	\$145,000	\$531,667	\$145,000	\$362,500	30 \$145,000	\$1,027,083	5145,000	\$785,417	\$145,000	\$616,250	5145,000	\$260,000 \$48,333	\$260,000 \$260,000 \$6,090,000	
No.         State         S		Rig Operating Costs - Crew Change Flight (Helicopters) Fuel and Lubricans: - General Spread Rate Marine Gost - General Spread Rate		\$10,000 \$50,000 \$20,000	\$10,000 \$50,000 \$20,000	\$36,667 \$183,333 \$73,333	\$50,000 \$50,000 \$20,000	\$125,000 \$125,000 \$50,000	\$10,000 \$50,000 \$20,000	\$354,167 \$141,667	\$10,000 \$50,000 \$20,000	\$270,833 \$108,333	\$10,000 \$50,000 \$20,000	\$212,500 \$85,000	\$50,000 \$50,000 \$20,000	\$16,667 \$6,667	\$2,204,167 \$2,204,167 \$881,667	Π
Image: state         Image: state<	HSE and Auditing																	\$1,300,000
1         1	Evaluation	Site Survey and Inspections															\$1,300,000	\$1,130,417
Image: state         Image: state<		Mudlogging and Data Handling Wireline Logging - Open Hole		\$5,000 \$250,000	\$5,000	\$18,333	\$5,000	\$12,500	\$5,000	\$35,417	\$5,000	\$27,083	\$5,000	\$21,250	\$5,000	\$1,667	\$240,417 \$750,000	
4         5	Subsea Works	Wireline Logging - Cased Hole - CBL		\$70,000				\$70,000			I	I	I	I	I	\$70,000	\$140,000	\$58,000
1         1	Communications	Dynamic Positioning									I	I	I	I	I	I	\$58,000	\$282.042
Image: state		Communications - Phone Charges Reporting Costs (USS260k spread over well)		\$500 \$5,898	\$500 \$5,898	\$1,833 \$21,626	\$500 \$5,898	\$1,250 \$14,745	\$500 \$5,898	\$3,542 \$41,777	\$500 \$5,898	\$2,708 \$31,947	\$500 \$5,898	\$2,125 \$25,066	\$500 \$5,898	\$167 \$1,966	\$22,042 \$260,000	
4         5	Transport									I	I	I	I	I	I	I	I	\$1.202.083
Other and state         State		Transport / Freight - Materials Transport and General Freight Water Source & Suppiy Haulage		\$20,000 \$5,000	\$20,000 \$5,000	\$73,333 \$18,333	\$20,000 \$5,000	\$50,000 \$12,500	\$20,000 \$5,000	\$141,667 \$35,417	\$20,000 \$5,000	\$108,333 \$27,083	\$20,000 \$5,000	\$85,000 \$21,250	\$20,000 \$5,000	\$6,667 \$1,667	\$981,667 \$220,417	
Control         State         <	Casing and Accessor	tes							I	I	I	I	I	I	I	1	ş	\$705,850
Control         Contro         Control         Control <th< td=""><td></td><td>Surface Casing : 13-3/8" 54.5 lb/ht 1-55 BTC (Range III) Inter-mediate Casina : 9-5/8° 40 lb/ht M-56 BTC (or or oremium if decired) (Range III)</td><td>\$201/m</td><td>\$201/m</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>I</td><td>I</td><td></td><td></td><td>I</td><td>\$190,950</td><td></td></th<>		Surface Casing : 13-3/8" 54.5 lb/ht 1-55 BTC (Range III) Inter-mediate Casina : 9-5/8° 40 lb/ht M-56 BTC (or or oremium if decired) (Range III)	\$201/m	\$201/m								I	I			I	\$190,950	
model         model <th< td=""><td></td><td>9-5/8" 47 lb/tt C-75 BTC (or premium if desired) (Range III)</td><td>5144/m ¢1E0/</td><td>5144/m</td><td>\$144/m</td><td>\$302,400</td><td></td><td></td><td></td><td></td><td></td><td></td><td>cito/</td><td>¢en non</td><td></td><td></td><td>\$302,400</td><td></td></th<>		9-5/8" 47 lb/tt C-75 BTC (or premium if desired) (Range III)	5144/m ¢1E0/	5144/m	\$144/m	\$302,400							cito/	¢en non			\$302,400	
Constraint         Constra		Production casing in 23 with C+75 Bits (or premium unread in occared) (mange in) Production casing liner system	III INCTO	\$15,000	40.000	440 000			I	I	I	Ī	III/ncte	\$15,000	40.000	44.000	\$15,000	
International control of control		Lasing running contractor - Premium Lasing Services Casing equipment		\$10,000	000/95	\$10,000	I	I	I	I	I	I	000/95	\$10,000	28,000	/99/7¢	\$30,000	I
$ = 1 \  contrast $	Wellhead	Searant and prushes									Ī	Ī	ľ				000'5¢	\$825,888
Other of the control from the contro from the cont tron from the control from the control from the con		Wellhead Equipment - Wellhead Installaiton and Testing Wellhead Equipment - "A" section	\$200,000	\$20,000 \$133,750			I	I	I	I	I	I	I	I	\$10,000	\$10,000	\$10,000 \$0	I
		Wellhead Equipment - "B" section  Wellhead Equipment - "C" Section	\$300,000	\$215,887.85 \$300.000		\$300.000								\$300.000		I	\$215,888 \$600.000	
$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	Π			8 8 8 8		204 442				Π		l				Π		\$686,156
and the formation the formation the formationand the formation the formationand the formation the formationand the formation the formationand the formati		unemicals (surface, intermediate, production and P&A) Services (surface, intermediate, production and P&A)				000'56\$		Π	Π	Π	Ι	Π	Π	\$100,000	Ι	Π	\$285,000	Π
International control control         International control         Internatinternational control         Internatinternatio		Chemicals Mud et al. (1996): A constraint of the constraint of the second of the secon		\$3,000	\$3,000	\$11,000	\$3,000 53,000	\$7,500 66 0000	\$3,000	\$43,564 \$21,250 \$14 167	\$3,000	\$16,250	\$3,000	\$23,762 \$12,750 ¢a con	\$3,000	\$1,000	\$230,167 \$132,250 ¢08 167	\$460,583
- ratio and the formation of the form	Miscellaneous Equip	Jerrit uge / seconder / seconder /					000/88	maint	000/84	101544	0000146	ereation of	000186	anciat	000/94		and and	\$249,071
$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$		Tanks - Additional Water Storage Tanks Office Supplies		\$150	\$150	\$1,833	\$150	\$3,250 \$375	\$150	\$1,063	\$150	\$2,708 \$813	\$150	\$2,125 \$638	\$150	\$167 \$50	\$6,613	
	Drilling Tools & Equi	Waste Treatment And Disposal - Deliver bin to wellsite, cost of empty the bins ipment		\$5,000	\$5,000	\$18,333	\$5,000	\$12,500	\$5,000	\$35,417	\$5,000	\$27,083	\$5,000	\$21,250	\$5,000	\$1,667	\$220,417	\$265,451
Interfactor         300         313 <th< td=""><td></td><td>Drill Bits Purchased Drilling Tools Rental – Survey Tools (e.g. Flodrift, Manless MWD)</td><td></td><td></td><td>8</td><td></td><td>s</td><td></td><td>8</td><td>\$45,000</td><td>8</td><td>t</td><td>\$</td><td>ľ</td><td>8</td><td>ľ</td><td>\$120,385 \$0</td><td></td></th<>		Drill Bits Purchased Drilling Tools Rental – Survey Tools (e.g. Flodrift, Manless MWD)			8		s		8	\$45,000	8	t	\$	ľ	8	ľ	\$120,385 \$0	
$ \frac{1}{10000} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $		Drilling Tools Rental - Drilling Jars Rental		\$400	\$400	\$1,467	\$400	\$1,000	\$400	\$2,833	\$400	\$2,167	\$400	\$1,700	\$400	\$133	\$21,633	I
Dirat         Other         Other <th< td=""><td></td><td>urilling tools kental - keoressykun charges tor rentais (spiread over well) Drilling Tools Rental - Stabilisers</td><td></td><td>2800</td><td>\$800</td><td>\$2,933</td><td>5800 5800</td><td>\$2,000</td><td>\$800 \$800</td><td>\$5,667</td><td>\$800</td><td>\$4,333 \$4,333</td><td>\$800 S</td><td>\$3,400</td><td>\$800</td><td>\$267</td><td>\$35,267</td><td>I</td></th<>		urilling tools kental - keoressykun charges tor rentais (spiread over well) Drilling Tools Rental - Stabilisers		2800	\$800	\$2,933	5800 5800	\$2,000	\$800 \$800	\$5,667	\$800	\$4,333 \$4,333	\$800 S	\$3,400	\$800	\$267	\$35,267	I
Including         Including <t< td=""><td>Class Charges</td><td>Drilling Tools Rental - Directional Drilling Services</td><td></td><td></td><td></td><td></td><td></td><td></td><td>8</td><td></td><td>I</td><td>I</td><td>I</td><td>I</td><td>I</td><td>I</td><td>s</td><td>\$154.000</td></t<>	Class Charges	Drilling Tools Rental - Directional Drilling Services							8		I	I	I	I	I	I	s	\$154.000
$\frac{1}{1000} = \frac{1}{1000} = 1$	2 Part	Class charges written over five years															\$154,000	
N3234(1)         Matrix         Matri		Weliste Geologist (Assuming 2x Geo's @ U\$\$2k/d) Icefers Makinee Ateconomy 2x GA's @ U\$\$3 [\$4/d]		\$4,000	\$4,000	\$14,667	\$4,000	\$10,000	\$4,000	\$28,333	\$4,000	\$21,667 \$16,750	\$4,000	\$17,000	\$4,000	\$1,333	\$176,333	vov.e.46
Interface         Total		Autory research presenting and and a construction Mediverse Cost per well Mediverse for the date of a value according and a streft cut/al		οου (10) (12)	ée non	CCC 01-2	te nou		çe vou	Catat	¢E 000		çe vou	001/12/	ćE DUU	64 657	\$25,000	
Free Model Canadia         S2174.302         S2107.304         S206.304         S206.314         S2106.312         S2174.207         S407.403         S407.404         S2109.111         S217.403         S407.403         S407.404         S407.4		Го Мс 7500 те цара Знанаков нада и туби и т. 400 т. т. 1 нем Карала		000/66	non/ce	ccc'ore	nnice	MC'7T¢	non/ce	/T#/cc¢	000/66	con'/70	000/66	062/176	000/66	100/1¢	\$0	
Pre-Weld Charges 52,173,248 [OT and Test 5984,558 [Production 25,153,415] [Production 22,195,121] [Pro		TOTALS			\$374,982	\$2,173,248	\$369,838	\$994,594	\$369,838	\$2,637,415	\$369,838	_	\$377,988	\$2,318,227	\$387,838		22,290,374	\$22,290,374
		Phase Totals		Pre-Well Charges	Intermediate Casing	\$2,173,248	LOT and Test	\$994,594	Production Hole	\$2,637,415	Evaluation		Production	\$2,318,227	Rig Release	\$462,613	Total Cost	\$22,290,374

# 5.3.2 Norwegian Sea

5.3.2.1 Conventional Well Design

DRILLING COST ESTIMATE																
Well Name: Norwegian Sca <sup>Dolling Rie</sup> : o																
Ng X Permit: 5506				Phase	Pre-spud	2	Surface Hole	tole	Surface Casing	sing	Nipple Up BOP's	s,do	Intermediate Hole 1	Hole 1	Intermediate Casing 1	Lasing 1
				Number of days	2.1 days		1.5 days	2	1.7 days		2.3 days		4.0 days	,	2.6 days	
				Depth	ωO		915 m		915 m		915 m		2220 m	_	2220 m	
Revision 0	Contractor	Unit Cost	Pre-Drill		Unit cost	Sub Total	Unit Cost	Sub Total	Unit Cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total
Staff Salaries Onerative Comnawy Perconnel		\$10,000			\$10,000	\$20.833	\$10,000	\$14.583	\$10,000	\$16.667	\$10,000	\$23.333	\$10,000	\$39.583	\$10,000	\$25,833
Overhead Allocation																
General Overhead Recovery (53.2MM spread over well) Rig Costs		\$75,073			\$75,073	\$156,403	\$75,073	\$109,482	\$75,073	\$125,122	\$75,073	\$175,171	\$75,073	\$297,165	\$75,073	\$193,939
Π		PAGE 2000	\$1,150,000		şo	Π	\$0	Π	\$0	Π	\$0	Π	\$0	Π	\$0	Π
MOD / Demoio - Final DemoDilisation Rig Operating Costs		5260,000 \$145,000			\$145,000	Π	\$145,000	\$211,458	\$145,000	\$241,667	\$145,000	\$338,333	\$145,000		H	\$374,583
Rig Operating Costs - Crew Change Flight (Helicopters) Fuel and Lubricants		\$10,000 \$50,000			\$10,000 \$50,000	\$104.167	\$10,000 \$50.000	572.917	\$10,000 \$50.000	\$83.333	\$10,000 \$50.000	÷	\$10,000 \$50.000	\$39,583	\$10,000 \$50.000	\$25,833 \$129.167
Marine Costs - General Spread Rate		\$20,000			\$20,000	\$41,667	\$20,000	\$29,167	\$20,000	\$33,333	\$20,000	\$46,667	\$20,000	÷	÷	\$51,667
HSE and Auditing																
Site Survey and Inspections Evaluation			\$1,300,000		I					I	I	1		1		
Mudlogging and Data Handling		\$5,000	\$20,000		\$5,000	\$10,417	\$5,000	\$7,292	\$5,000	\$8,333	\$5,000	\$11,667	\$5,000	\$19,792	\$5,000	\$12,917
		\$70,000			ľ	ľ	I	ľ	ľ	ľ	ľ	ľ	ľ	\$250,000	ľ	
Subsea Works Domamic Positioning			\$58.000		ľ		I	ľ		ľ	ľ		ľ	ľ		
Communications														Ī		
Communications - Phone Charges Repeting Costs (USS260: spread over well)		\$500 \$6,100			\$500 \$6,100	\$1,042 \$12,708	\$500 \$6,100	\$729 \$8,895	\$500 \$6,100	\$10,166	\$500 \$6,100	\$1,167 \$14,233	\$500 \$6,100	\$1,979 \$24,145	\$500 \$6,100	\$1,292 \$15,758
Transport					I		I	I	I	I		I	I	I	l	
Transport / Freight - Materials Transport and General Freight Water Source & Supply Haulage		\$20,000 \$5,000	\$100,000		\$20,000 \$5,000	\$41,667 \$10,417	\$20,000 \$5,000	\$7,292	\$20,000 \$5,000	\$33,333 \$8,333	\$20,000 \$5,000	\$46,667 \$11,667	\$20,000 \$5,000	\$79,167 \$19,792	\$20,000 \$5,000	\$51,667 \$12,917
Casing and Accessories		-1001-			1	1	1	1	Panol	000.000	1	1	1	1	1	
Surface Cosing: 20" 113 byff V 20 DYSHER (Range III) Intermediate Casing: 13-3/1" V 20 DYff P-110 VM21 (Range III) Intermediate Casing - 6.5 (35 CAK) P.6.1 DVMA3 (Barana III)		\$300/m \$300/m \$300/m			Ι	Π	Π	Π	S400/m	\$366,000	Π	Π	Π	Π	\$300/m	\$666,000
Production Cusing : 7" 29 lb/ft L-80 VAMTOPIC (Range III)		\$150/m			Ι	Π	Π	Π	Π	Π	I	H	Π	Π	H	Π
Froeuction casing mer system Casing running contractor - Premium Casing Services		58,000	\$10,000		Ι	Π	Π	Π	\$8,000	\$13,333	I	I	Π	I	\$8,000	\$20,667
Casing equipment Sealant and brushes		\$10,000	\$3,500		ľ	ľ	I	ľ	ľ	\$10,000	ľ	ľ	1	ľ	ľ	\$10,000
Wellhead		000 000														
Weittreeu couprirent - weittreeu msiananun ann i esung Weithead Equipment - "A" section		\$200,000			I	I	I	I	I	I	Ī	\$200,000	I	Ī	Ī	I
		\$300,000			I	I	I	I	I	I	I	I	I	I	I	\$300,000
Cementing										4 4 4 4 4 4 4						100.000
Untermicalis (surriace, intermediate, production and P&A) Services (surface, intermediate, production and P&A)					Ι	Π	Π	Π	Π	\$80,000	I	I	Π	Π	Π	000'06\$
Mud				Γ	Ι	Π				Π	I	Π	Π			
Chemicals Mud engineer: rig release to rig release (Assuming 2x Mud Men @ US\$2k/d)		\$3,000			\$3,000	\$6,250	\$3,000	\$4,375	\$3,000	\$5,000	\$3,000	\$7,000	\$3,000	\$11,875	\$3,000	\$7,750
Centrifuge / Desander / Desilter Missellaneous Equipment		\$2,000	\$10,000		\$2,000	\$4,167	\$2,000	\$2,917	\$2,000	\$3,333	\$2,000	\$4,667	\$2,000	\$7,917	\$2,000	\$5,167
Tanks - Adóitional Water Storage Tanks		\$500		Ī	\$500	\$1,042	\$500	\$729	\$500	\$833	\$500	\$1,167	\$500	\$1,979	\$500	\$1,292
Office Supplies Waste Treatment And Disposal - Deliver bin to wellate, cost of empty the bins		\$150 \$5,000		1	\$150	\$10,417	\$150 \$5,000	\$7,292	\$150 \$5,000	\$250 \$8,333	\$150 \$5,000	\$11,667	\$150	\$19,792	\$150 \$5,000	\$12,917
Uniting Tools & Equipment Drill Bits Purchased					I	I	I	\$80,000	I	I	I	İ	I	\$60,000	I	I
Drilling Tools Rental - Survey Tools (e.g. Flodrift, Mankes MWD) Drilling Tools Boots-L Drilling Los Boots-L		6400	C4 000		\$0	6033	\$0	6693	\$0	6667	\$0 6400	6833	\$0	61 E03	\$0 6400	61 033
Drilling Tools Rental - Redress/Run charges for rentals (spread over well)		\$2,000	0000544		\$2,000	\$4,167	\$2,000	\$2,917	\$2,000	\$3,333	\$2,000	\$4,667	\$2,000	\$7,917	\$2,000	\$5,167
Drilling Tools Rental - Stabilisers Drilling Tools Rental - Directional Drilling Services		\$800			\$800	\$1,667	\$800	\$1,167	\$800	\$1,333	\$800	\$1,867	\$800	\$3,167	\$800	\$2,067
dass charges			000 9110													
Luiss charges Written over rive years Field Professional Services			000/9514		I	I	I	I	I	I	I	I	I	I	Ī	
Wellste Geologist (Assuming 2x Geo's @ U552k/d)		\$4,000			\$4,000	\$8,333	\$4,000	\$5,833	\$4,000	\$6,667	\$4,000	\$9,333	\$4,000	\$15,833	\$4,000	\$10,333
Janery Autore: (Assaming 24.34.5 @ US\$1.34/9 Medirac Cost per well		nnnict	\$25,000		nnn/cc	067'00	non/se	D/0(#0	nonice	nonice	nonice	non'/c	ne	ľ	Ŀ	
Company Man (1 x day, 1 x night assuming each at USS2.5k/d)		\$5,000			\$5,000	\$10,417	\$5,000	\$7,292	\$5,000	\$8,333	\$5,000	\$11,667	\$5,000	\$19,792	\$5,000	\$12,917
TOTALS			\$2,834,500		\$372,523	\$453,173	\$372,523	\$693,679	\$380,923	\$1,118,538	\$372,523	\$1,045,887	\$369,523	\$1,837,695	\$377,823	\$2,101,268
Dhua Tatala		Bra-Wall Charact	005 828 C\$	Γ	Dra-enud	CAS2 172	Curfara Mala	¢602.670 6	Surface Casine	¢1 118 528	Nipple Up	41 DAS 887 In	ntermediate	¢1 827 605 Ir		\$2 101 268
			ancientar		node at a	-		-	9	-		inoleante	Hole 1		Casing 1	

DRILLING CO	DRILLING COST ESTIMATE																
Well Name: N	Well Name: Norwegian Sea nilline #is: 0																
Permit : 6506	Rue X			LOT ar	LOT and Test	Intermediate Hole 2	te Hole 2	Intermediate Casing 2	• Casing 2	LOT and Test	fest	Production Hole	Hole	Evaluation	lo	Production Liner	Liner
				1.7	1.7 days	6.9 days	ske	2.9 days	sAe	2.5 days	8	4.6 days		5.4 days	sA	4.3 days	~
	l			222	2220 m	2906 m	E	2906 m	E	2906 m	c	3300 m		3300 m	E	3300 m	
Revision 0	0	Contractor	Unit Cost	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total
Staff Salaries	Operating Company Personnel		\$10,000	\$10,000	\$16,667	\$10,000	\$68,750	\$10,000	\$29,167	\$10,000	\$25,000	\$10,000	\$45,833	\$10,000	\$54,167	\$10,000	\$42,500
Overhead Allocatio	C		\$75,073	\$75,073	\$125,122	\$75,073	\$516,129	\$75,073	\$218,964	\$75,073	\$187,683	\$75,073	\$344,086	\$75,073	\$406,647	\$75,073	\$319,062
Rig Costs	Mob / Demob - Initial Mobilisation			8		8		\$0		Ş	ľ	8	ľ	\$0	ľ	55	
	Mob / Demob - Final Demobilisation Rig Operating Costs		\$145,000	\$145,000	\$241,667	\$145,000	\$996,875	\$145,000	\$422,917	\$145,000	\$362,500	\$145,000	\$664,583	\$145,000	\$785,417	\$145,000	\$616,250
	Rig Operating Costs - Crew Change Flight (Helicopters) Fuel and Lubricants		\$10,000 \$50,000	\$10,000 \$50,000	\$16,667 \$83,333	\$10,000 \$50,000	\$68,750 \$343,750	\$10,000 \$50,000	\$29,167 \$145,833	\$10,000 \$50,000	\$25,000 \$125,000	\$10,000 \$50,000	\$229,167	\$10,000 \$50,000	\$270,833	\$10,000 \$50,000	\$212,500
	Marine Costs - General Spread Rate		\$20,000	\$20,000	\$33,333	\$20,000	\$137,500	\$20,000	\$58,333	\$20,000	\$50,000		\$91,667	\$20,000	\$108,333	\$20,000	\$85,000
HSE and Auditing	- Site Survey and inspections												Π				
Evaluation	Mudlogging and Data Handling		\$5,000	\$5,000	\$8,333	\$5,000	\$34,375	\$5,000	\$14,583	\$5,000	\$12,500	\$5,000	\$22,917	\$5,000	\$27,083	\$5,000	\$21,250
	Wrreline Logging - Open Hole Wrreline Logging - Cased Hole - CBL		\$70,000				\$250,000			I	\$70,000	l	I	I	\$250,000	I	
Subsea Works	Dynamic Positioning												I	I			
Communications	Communications - Phone Charges		\$500	\$500	\$833	\$500	\$3,438	\$500	\$1,458	\$500	\$1,250	\$500	\$2,292	\$500	\$2,708	\$500	\$2,125
	Reporting Costs (US\$260k spread over well)		\$6,100	\$6,100	\$10,166	\$6,100	\$41,935	\$6,100	\$17,791	\$6,100	\$15,249	\$6,100	\$27,957	\$6,100	\$33,040	\$6,100	\$25,924
Transport	Transport / Freight - Miterials Transport and General Freight		\$20,000	\$20,000	\$33,333	\$20,000	\$137,500	\$20,000	\$58,333	\$20,000	\$50,000	\$20,000	\$91,667	\$20,000	\$108,333	\$20,000	\$85,000
Casing and Accessories	Water Source & Suppry Haurage ories		000/55	000/55	\$6,333	000/55	c/5,95¢	000/55	\$14,583	000/55	005,214	000,44	/16/775	non/s¢	\$80'/7¢	000/55	N62,12¢
	Surface Casing: 20° 113 lb/ft: N-80 T5H-ER (Range III) Intermediate Casing: 31-387 "27 UP + 110 VMA31 (Range III) Intermediate Casing - 54 cMF PF + 10 VMA31 (Range III)		\$400/m \$300/m \$200/m					\$200/m	\$581.200	Π	Ħ	II	П	Π	Π	Π	Π
	Production Casing : 7' 29 lb/ft L-80 VAMTOPHC (Range III)		\$150/m								I		I			\$150/m	\$59,100
	Producton cosing mer system Casing running contractor - Premium Casing Services		\$8,000				Π	\$8,000	\$23,333	Π	I	I	Ι	Π	Π	\$8,000	\$34,000
	cosmit equipments Sealant and brushes		000/010						000/010			l	I	Ι		I	noninte
Wellhead	Weilhead Equipment - Weilhead installaton and Testing		\$20,000				I		Π	I	I	I	I	Π	Π	I	
	Weinead Equipment - "A" section Weilhead Equipment - "B" section		000'00ES				Π			Ι	I	I	I	Ι	I	I	
Cementing	Wellhead Equipment - "C" Section		\$300,000						\$300,000								\$300,000
	Chemicals (surface, intermediate, production and P&A) Services (surface, intermediate, production and P&A)							Π	\$120,000 \$95,000	Π	II	H	П	Π	Π	Π	\$320,000 \$100,000
PnW	Chemicais Chemicais And regiment: of release to rig release (Assuming 21 Mud Men @ US52Vd) Countribus/Desander / Destar		\$3,000 \$2,000	\$3,000 \$2,000	\$5,000 \$3,333	\$3,000 \$2,000	\$120,000 \$20,625 \$13,750	\$3,000 \$2,000	\$8,750 \$5,833	\$3,000	\$7,500 \$5,000	\$3,000 \$2,000	\$55,000 \$13,750 \$9,167	\$3,000	\$16,250 \$10,833	\$3,000	\$30,000 \$12,750 \$8.500
Miscellaneous Equipment	lipment  Taske_Additional Wiston Character		¢E00	çevu	6033	çevu	60 430	cen	61 AEO	¢enn	¢1 360	¢em	c0 207	GEN	¢3 7/0	cenn	¢7 176
	I ans Augurunal water storage I ants Office Supplies		\$150	\$150	\$250	\$150	\$1,031	\$150	\$438	\$150	\$375	\$150	5688 5688	\$150	\$813	\$150	\$638
Drilling Tools & Equipmen	Waste Treatment And Disposal - Deliver bin to wellsite, cost of empty the bins upment		\$5,000	\$5,000	\$8,333	\$5,000	\$34,375	\$5,000	\$14,583	\$5,000	\$12,500	\$5,000	\$22,917	\$5,000	\$27,083	\$5,000	\$21,250
	Drill Bits Purchased Drilling Tools Rental – Survey Tools (e.g. Flodrift, Manless MWD)			8		s	\$50,000	şo		\$	ľ	şo	\$45,000	ŝo	I	\$	
	Drilling Tools Rental - Drilling Jars Rental Drilling Tools Rental - Redress/Run charges for rentals (spread over well)		\$400 \$2,000	\$400 \$2,000	\$667 \$3,333	\$400 \$2,000	\$2,750 \$13,750	\$400 \$2,000	\$1,167 \$5,833	\$400 \$2,000	\$1,000 \$5,000	\$400 \$2,000	\$1,833 \$9,167	\$400 \$2,000	\$2,167 \$10,833	\$2,000	\$1,700 \$8,500
	Drilling Tools Rental - Stabilišers Drilling Tools Rental - Directional Drilling Services		\$800	\$800	\$1,333	\$800	\$5,500	\$800	\$2,333	\$800	\$2,000	\$800	\$3,667	\$800	\$4,333	\$800	\$3,400
Class Charges	Class charges written over five vears												ľ	ľ	ľ	ľ	
Field Professional Services Wellsi	Services Weelste Geologist (Assuming 2x Geo's @ US52k/d)		\$4,000	\$4,000	\$6,667	\$4,000	\$27,500	\$4,000	\$11,667	\$4,000	\$10,000		\$18,333	\$4,000	\$21,667	\$4,000	\$17,000
	Safety Adviser (Assuming 2x SA's @ US\$1.5k/d Mediane Costs nov well		000'E\$	\$3,000	\$5,000	\$0		\$0		\$3,000	\$7,500	\$3,000	\$13,750	\$3,000	\$16,250	\$3,000	\$12,750
	Company Man (1 x day, 1 x night assuming each at US\$2.5V/d)		\$5,000	\$5,000	\$8,333	\$5,000	\$34,375	\$5,000	\$14,583	\$5,000	\$12,500	\$5,000	\$22,917	\$5,000	\$27,083	\$5,000	\$21,250
	TOTALS			\$372,523	\$620,872	\$369,523	\$2,960,471	\$377,723	\$2,207,309	\$372,523	\$1,001,308	\$372,523	\$1,761,564	\$372,523	\$2,213,666	\$380,673	\$2,408,823
	Phase Totals		Pre-Well Charges	LOT and Test	\$620,872	Intermediate	\$2,960,471	Intermediate	\$2,207,309	LOT and Test	\$1,001,308	Production	\$1,761,564	Evaluation	\$2,213,666	Production	\$2,408,823
						Hole 2		Casing 2	۰.		-	L	۰.		-	Liner	

DRILLING CO	ST ESTIMATE						
Well Name: No	orwegian Sea						
Drilling Rig :	0						
	Rig X					1	
Permit: 6506				Rig Ri	elease		
				0.3	days	1	
				330	0 m	1	
Revision 0		Contractor	Unit Cost	Unit cost	Sub Total	Sub-total	Total
Staff Salaries		contractor	Unit Cost	Unit cost	Sub Total	Sub-total	\$426,250
	Operating Company Personnel		\$10,000	\$10,000	\$3,333	\$426,250	
Overhead Allocation	General Overhead Recovery (\$3.2MM spread over well)		\$75,073	\$75,073	\$25,024	\$3,200,000	\$3,200,000
tig Costs	action over the ast in the over it (bought in the over the it)		\$15,515	\$15,515	VEDJORT	43,200,000	\$10,477,29
	Mob / Demob - Initial Mobilisation			\$0		\$1,150,000	
	Mob / Demob - Final Demobilisation		\$260,000		\$260,000	\$260,000	
	Rig Operating Costs Rig Operating Costs - Crew Change Flight (Helicopters)		\$145,000 \$10,000	\$145,000 \$10,000	\$48,333	\$5,878,542 \$205,000	_
	Fuel and Lubricants		\$50,000	\$50,000	\$16,667	\$2,131,250	
	Marine Costs - General Spread Rate		\$20,000	\$20,000	\$6,667	\$852,500	
ISE and Auditing	Cite Communed Incompliant					\$1,300.000	\$1,300,000
valuation	Site Survey and Inspections					\$1,300,000	\$1,123,125
	Mudlogging and Data Handling		\$5,000	\$5,000	\$1,667	\$233,125	· · · · · · · · · · · · · · · · · · ·
	Wireline Logging - Open Hole		\$250,000			\$750,000	
	Wireline Logging - Cased Hole - CBL		\$70,000		\$70,000	\$140,000	
ubsea Works						444 ****	\$58,000
ommunications	Dynamic Positioning					\$58,000	\$281,313
	Communications - Phone Charges		\$500	\$500	\$167	\$21.313	\$281,313
	Reporting Costs (US\$260k spread over well)		\$6,100	\$6,100	\$2,033	\$260,000	
ransport							\$1,165,625
	Transport / Freight - Materials Transport and General Freight		\$20,000	\$20,000	\$6,667	\$952,500	
asing and Accessori	Water Source & Supply Haulage		\$5,000	\$5,000	\$1,667	\$213,125	\$1,834,800
	Surface Casing: 20" 113 lb/ft N-80 TSH-ER (Range III)		\$400/m			\$366,000	\$1,834,800
	Intermediate Casing : 13-3/8" 72 lb/ft P-110 VAM21 (Range III)		\$300/m			\$666.000	
	Intermediate Casing : 9-5/8" 53.5 lb/ft P-110 VAM21 (Range III)		\$200/m			\$581,200	
	Production Casing : 7" 29 lb/ft L-80 VAMTOPHC (Range III)		\$150/m			\$59,100	
	Production casing liner system		\$15,000			\$15,000	
	Casing running contractor - Premium Casing Services		\$8,000 \$10,000	\$8,000	\$2,667	\$104,000 \$40,000	
	Casing equipment Sealant and brushes		\$10,000			\$40,000 \$3,500	
Vellhead	Jealant and ordines					\$3,300	\$1,110,000
	Wellhead Equipment - Wellhead Installaiton and Testing		\$20,000	\$10,000	\$10,000	\$10,000	
	Wellhead Equipment - "A" section		\$200,000			\$200,000	
	Wellhead Equipment - "B" section		\$300,000			\$300,000	
Cementing	Wellhead Equipment - "C" Section		\$300,000			\$600,000	\$910,000
	Chemicals (surface, intermediate, production and P&A)					\$545,000	\$910,000
	Services (surface, intermediate, production and P&A)					\$365,000	
Aud							\$578,125
	Chemicals Mud engineer: rig release to rig release (Assuming 2x Mud Men @ US\$2k/d)		\$3,000	\$3,000	\$1,000	\$355,000 \$127,875	
	Mud engineer: rig release to rig release (Assuming 2x Mud Men @ US\$2k/d) Centrifuge / Desander / Desilter		\$3,000	\$3,000	\$1,000	\$127,875	
Aiscellaneous Equip	ment		24,000	02,000	0.007	000,000	\$240,831
	Tanks - Additional Water Storage Tanks		\$500	\$500	\$167	\$21,313	
	Office Supplies		\$150	\$150	\$50	\$6,394	
Frilling Tools & Equi	Waste Treatment And Disposal - Deliver bin to wellsite, cost of empty the bins		\$5,000	\$5,000	\$1,667	\$213,125	\$375,400
	Drill Bits Purchased					\$235,000	\$375,400
	Drilling Tools Rental - Survey Tools (e.g. Flodrift, Manless MWD)			\$0		\$0	
	Drilling Tools Rental - Drilling Jars Rental		\$400	\$400	\$133	\$21,050	
	Drilling Tools Rental - Redress/Run charges for rentals (spread over well)		\$2,000	\$2,000	\$667	\$85,250	
	Drilling Tools Rental - Stabilisers		\$800	\$800	\$267	\$34,100	
lass Charges	Drilling Tools Rental - Directional Drilling Services					\$0	\$154,000
	Class charges written over five years					\$154,000	4134,300
ield Professional Se	rvices						\$487,500
	Wellsite Geologist (Assuming 2x Geo's @ US\$2k/d)		\$4,000	\$4,000	\$1,333	\$170,500	
	Safety Adviser (Assuming 2x SA's @ US\$1.5k/d		\$3,000	\$3,000	\$1,000	\$78,875	
	Medivac Cost per well Company Man (1 x day, 1 x night assuming each at US\$2.5k/d)		\$5.000	\$5,000	\$1,667	\$25,000 \$213,125	
	company wait (1 x day, 1 x night assuming each at US\$2.5K/0)		\$5,000	\$5,000	\$1,667	\$213,125 \$0	
	TOTALS			\$390,523	\$463,508	\$ 23,722,260	\$23,722,26

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5.3.2.2 Slende		5.4 days		Sub Total	\$54,167	\$542,373		\$785,417	00 \$270,833 00 \$108,333		527,083	5250,000		0 \$2,708 36 \$44,068	00 \$108,333	Ŀ					Π	00 \$16,250 00 \$16,250	- 1	÷	0 \$2,167 X0 \$10,833	H		0 \$21,667 0 \$16.250		516 ¢2 360.420
	Hole			Sub Total Unit cost	\$95,833 \$10,000	\$959,583 \$100,130	\$9	\$1,389,583 \$145,000 \$10,000	\$479,167 \$50,0 \$191,667 \$20,0		\$47,917 \$5,000			\$4,792 \$500 \$77,966 \$8,136	\$191,667 \$20,000	H	Η		H	ł	H	\$28,750 \$19,167 \$2,000		÷	\$3,833 \$400 \$19,167 \$2,000			\$38,333 \$4,000 \$28,750 \$3,000	-	and many over the
	Production Hole	9.6 days		Onit cost	\$10,000	\$100,130	8	\$145,000 \$			\$5,000			\$500 \$8,136	\$20,000	Ŀ	I		Π	I	Π	\$3,000 \$2,000	\$500 \$150 \$5,000		5400 52.000	\$800		\$4,000		eres ere
	LOT and Test	2.9 days 1350 m	Ŀ	Sub Total	\$29,167	\$292,047		\$422,917 \$29,167	÷		\$14,583			\$1,458 \$23,729	\$58,333							\$8,750 \$5,833	\$1,458 \$438 \$14,583		\$1,167 \$5,833	\$2,333		\$11,667 \$8.750	\$14,583	64 165 547
				al Unit cost	3 \$10,000	0 \$100,130	8	3 \$145,000 3 \$10,000	÷		25,000	ļ		5500 7 \$8,136	7 \$20,000		5					\$3,000		÷	52.000			3 \$4,000		44 \$300.616
	Surface Casing	2.6 days 1350 m		cost Sub lotal	00 \$25,833	130 \$258,670		000 \$374,583 00 \$25,833	÷		00 \$12,917		_	0 \$1,292 36 \$21,017	200 \$51,667	÷	/m \$259,875 m	00 \$20,667 \$10,000	\$96,250		\$22,361 \$90,000	00 \$57,750 00 \$57,750	-	÷	0 \$1,033	H		00 \$10,333	00 \$12,917	2/18 C1 573 744
			+	Sub lotal Unit cost	\$47,917 \$10,000	\$479,791 \$100,130	\$0	\$694,792 \$145,000 \$47,917 \$10,000	-		\$5,000	000'09	+	52,396 5500 538,983 58,136	\$95,833 \$20,000		\$193/m \$0/m	\$8,000	H	ł	H	\$27,216 \$14,375 \$9,583 \$2,000		÷	\$1,917 \$400 \$9.583 \$2.000			\$19,167 \$4,000	\$23,958 \$5,000	COLUCION CONTRACTOR
	Surface Hole	4.8 days	$\vdash$	Unit cost Sut	\$10,000 \$4	\$100,130 \$4	\$	\$145,000 \$6/ \$10,000 \$4	÷		\$5,000 \$2	25		\$500 \$136 \$3	\$20,000 \$9		H		H	t	H	52 53,000 51,000 51,000 51,000 51,000 51,000 51,000 51,000 51,000 51,000 51,000 52,000 50,0000 50,0000 50,000 50,000 50,000 50,000 50,000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000 50,0000000 50,00000000		÷	\$400 S	H		\$4,000 \$1		\$306.616 \$3.3
	pn	sh		Sub Total	\$20,833	\$208,605	I	-	\$104,167 \$41,667		\$10,417	I		\$16,949	\$41,667		I	Ш	T	I	Π	\$6,250 \$4,167	\$1,042 \$313 \$10,417	I	\$833 \$4.167	\$1,667		\$8,333 56,250	\$10,417	¢500.617
	Pre-spud	2.1 days		Unit cost	\$10,000	\$100,130	8	\$145,000 \$10,000	\$50,000		\$5,000			\$500 \$8,136	\$20,000	\$5,000	I				Π	\$3,000 \$2,000	\$1500 \$150 \$5,000	4	\$400 \$2,000	\$800		\$4,000 \$3,000	\$5,000	\$300.616
	Phase	Number of days	nepu																											
				Pre-Dril			\$1,150,000		l	\$1,300,000	\$20,000		\$58,000		\$100,000		l	\$10,000	\$3,500		Ι	\$10,000	II		\$4,000		\$154,000	l	\$25,000	47 824 500
				Unit Cost	\$10,000	\$100,130	000 001.0	\$145,000 \$10,000	\$20,000		\$5,000 41100,000	\$70,000		\$500 \$8,136	\$20,000	\$5,000	\$192.50	\$150/m \$15,000 \$8,000 \$10,000	\$20,000 \$96,250	\$300,000		53,000 52,000	\$500 \$150 \$5,000		\$400 \$2.000	\$800		\$4,000	\$5,000	
				Contractor													\$400/m	\$150/m	\$200,000	\$300,000										
DRILLING COST ESTIMATE Weil Name: Norwegian Sea	New X			2	Operating Company Personnel	ation General Dverhead Recovery (53.2MM spread over well)	Mob / Demob - Initial Mobilisation MAAA / Demock Eard Demockilization	Rischer seinen sonnen sonnen sonnen in Rischer Steinen Ste Steinen Steinen ref and Lubriciants Marrine Costs - General Spread Rate	K Site Survey and Inspections	Mudbaging and Data Handling	Wireine Logging - Open Hote Wireine Logging - Cased Hole - CBL	Dynamic Positioning	Communications - Phone Charges Reporting Costs (USS280K spread over well)	Transport / Freight - Materials Transport and General Freight	Water Source & Supply Haulage	Surface Casing: 9.5/8" 47 lb/ft P-110 BTC (Range III) Intermediate Casing: \	Production care; 27: 32 b)th P-110 BTC (or premium if desired) (Range III) Production careful line: system Constructions careful line: system Carefore grantmetter - Premium Caling Services	Sealant and brushes Wellhead Equipment - Wellhead Instalation and Testing Wellhead Equipment - "A" section	Weilhead Equipment - "8" section Weilhead Equipment - "C" Section	Chemicals (surface, intermediate, production and P&A) Services (unface, intermediate, production and P&A)	Cheminais Mud engineer ng nekare to ng nekara (Assuming 2x Mud Men @ USSU/d) (Contribue) Desander (Desiter	Equipment Tanis - Additional Water Storage Tanks Water Treatment And Disposal - Deliver bin to wellsite, cost of empty the bins	Equipment Drin Bits Purchased	Uriming Tools Kental – Survey Tools (e.g. Hodrift, Mantess MWU) Drilling Tools Rental – Dring Lars Rentals (Large Large Store Hotals) Drilling Tools Rental – Rentoss/Plun Charges for rentals (soread over well)	Drilling Tools Rental - Stabilisers Drilling Tools Rental - Directional Drilling Services	lass Charges  Class charges written over five years	aa services Wellsite Geologist (Assuming 2x Geo's @ U552k/d) Safret Adviorer fAssumine 7x 5A's @ U551.5k/d	Medivac Cost per well Company Man (1 x day, 1 x night assuming each at US\$2.5k/d)	TOTALS	
DRILLING C Well Name:	Permit: 6506			Kevision 0	Staff Salaries	Overhead Allocatic	cron Bru			HSE and Auditing	Evaluation		Subsea Works	20111121122	Transport	Casing and Accessories			Wellhead		Cementing	pnw	Miscellaneous Equipment Tan Offi	Drilling Tools & Equipme			Class Charges	Held Professiona		

420 \$2,36

\$3,778,820

Production Hole

Casing \$1,523,744 LOT and Test \$1,165,547

Surfac \$2,205,937

Surface Hole

\$509,617

Pre-spud

\$2,834,500

Phase Totals

DRILLING CO	OST ESTIMATE								
Well Name: N	Norwegian Sea								
Drilling Rig :	0								
	Rig X							1	
Permit : 6506					ion Casing		elease days		
								-	
				33	00 m	33	00 m		
Revision 0		Contractor	Unit Cost	Unit cost	Sub Total	Unit cost	Sub Total	Sub-total	Total
Staff Salaries			_		_				\$319,583
	Operating Company Personnel		\$10,000	\$10,000	\$42,500	\$10,000	\$3,333	\$319,583	
Overhead Allocatio	General Overhead Recovery (\$3.2MM spread over well)		\$100,130	\$100,130	\$425,554	\$100,130	\$33,377	\$3,200,000	\$3,200,000
Rig Costs	General Overhead Recovery (55.2mini spread over wein)		\$100,150	\$100,130	2423,334	\$100,150	\$33,377	\$3,200,000	\$8,081,875
	Mob / Demob - Initial Mobilisation		4252.000	\$0		\$0	1200.000	\$1,150,000	
	Mob / Demob - Final Demobilisation Rig Operating Costs		\$260,000	\$145,000	\$616,250	\$145,000	\$260,000 \$48,333	\$260,000 \$4,331,875	
	Rig Operating Costs - Crew Change Flight (Helicopters)		\$10,000	\$10,000		\$10,000		\$102,917	
	Fuel and Lubricants Marine Costs - General Spread Rate		\$50,000 \$20,000	\$50,000 \$20,000	\$212,500 \$85,000	\$50,000 \$20,000	\$16,667 \$6,667	\$1,597,917 \$639,167	
	Marine Costs - General apreau Rate		\$20,000	\$20,000	\$83,000	\$20,000	\$0,007	\$035,107	
HSE and Auditing	File Superval Incontinue							£1.200.000	\$1,300,000
Evaluation	Site Survey and Inspections							\$1,300,000	\$749,792
	Mudlogging and Data Handling		\$5,000	\$5,000	\$21,250	\$5,000	\$1,667	\$179,792	
	Wireline Logging - Open Hole Wireline Logging - Cased Hole - CBL		\$250,000 \$70,000				\$70,000	\$500,000 \$70,000	
Subsea Works	witeline cogging - cased note - coc		\$70,000				\$70,000	\$70,000	\$58,000
Communications	Dynamic Positioning							\$58,000	4222.022
Communications	Communications - Phone Charges		\$500	\$500	\$2,125	\$500	\$167	\$15,979	\$275,979
	Reporting Costs (US\$260k spread over well)		\$8,136	\$8,136	\$34,576	\$8,136	\$2,712	\$260,000	
Transport			_		_				\$898,958
Tansport	Transport / Freight - Materials Transport and General Freight		\$20,000	\$20,000	\$85,000	\$20,000	\$6,667	\$739,167	\$636,936
	Water Source & Supply Haulage		\$5,000	\$5,000	\$21,250	\$5,000	\$1,667	\$159,792	
Casing and Accesso	Surface Casing: 9-5/8" 47 lb/ft P-110 BTC (Range III)	\$400/m	\$192.50					\$259.875	\$658,208
	Intermediate Casing : \	3400/m	\$152.50					\$0	
	Intermediate Casing : \							\$0	
	Production Casing : 7" 32 lb/ft P-110 BTC (or premium if desired) (Range III) Production casing liner system	\$150/m	\$150/m \$15,000	\$150/m	\$292,500 \$15,000			\$292,500 \$15,000	
	Casing running contractor - Premium Casing Services		\$8,000	\$8,000	\$34,000	\$8,000	\$2,667	\$67,333	
	Casing equipment Sealant and brushes		\$10,000		\$10,000			\$20,000 \$3,500	
Wellhead	sealant and brusnes							\$3,500	\$406,250
	Wellhead Equipment - Wellhead Installaiton and Testing		\$20,000			\$10,000	\$10,000	\$10,000	
	Wellhead Equipment - "A" section Wellhead Equipment - "B" section	\$200,000 \$300,000	\$96,250 \$300,000				\$300,000	\$96,250 \$300,000	
	Wellhead Equipment - "C" Section	4300,000	\$300,000		\$0		\$300,000	\$0	
Cementing	Observable functions interest adjusts and until a and D0.41				\$320,000			\$342,361	\$532,361
	Chemicals (surface, intermediate, production and P&A) Services (surface, intermediate, production and P&A)			_	\$320,000			\$342,361 \$190,000	
Mud	Chemicals				\$120,000		\$30,000	\$177,216	\$347,008
	Mud engineer: rig release to rig release (Assuming 2x Mud Men @ US\$2k/d)		\$3,000	\$3,000	\$12,750	\$3,000	\$1,000	\$95,875	
Miscellaneous Equi	Centrifuge / Desander / Desilter		\$2,000	\$2,000	\$8,500	\$2,000	\$667	\$73,917	\$180,565
wiscellaneous Equi	Ipment Tanks - Additional Water Storage Tanks		\$500	\$500	\$2,125	\$500	\$167	\$15,979	\$180,565
	Office Supplies		\$150	\$150	\$638	\$150	\$50	\$4,794	
Drilling Tools & Equ	Waste Treatment And Disposal - Deliver bin to wellsite, cost of empty the bins		\$5,000	\$5,000	\$21,250	\$5,000	\$1,667	\$159,792	\$179,536
	Drill Bits Purchased							\$73,269	\$275,530
	Drilling Tools Rental - Survey Tools (e.g. Flodrift, Manless MWD)			\$0	és 200	\$0	é	\$0	
	Drilling Tools Rental - Drilling Jars Rental Drilling Tools Rental - Redress/Run charges for rentals (spread over well)		\$400 \$2,000	\$400 \$2,000	\$1,700 \$8,500	\$400 \$2,000	\$133 \$667	\$16,783 \$63,917	
	Drilling Tools Rental - Stabilisers		\$800	\$800	\$3,400	\$800	\$267	\$25,567	
Class Charges	Drilling Tools Rental - Directional Drilling Services							\$0	\$154.000
	Class charges written over five years							\$154,000	+
Field Professional S	Services		\$4,000		447	\$4,000	44		\$386,375
	Wellsite Geologist (Assuming 2x Geo's @ US\$2k/d) Safety Adviser (Assuming 2x SA's @ US\$1.5k/d		\$4,000 \$3,000	\$4,000 \$3,000	\$17,000 \$12,750	\$4,000 \$3,000	\$1,333 \$1,000	\$127,833 \$73,750	
	Medivac Cost per well							\$25,000	
	Company Man (1 x day, 1 x night assuming each at US\$2.5k/d)		\$5,000	\$5,000	\$21,250	\$5,000	\$1,667	\$159,792 \$0	
	TOTALS			\$407,766	\$2,547,368	\$417,616	\$802,539	\$ 17,728,490	\$17,728,490

### 5.3.3 North Sea

# 5.3.3.1 Conventional Well Design

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Well Name: North Sea	orth Sea a																
· See Summer	Page X			-			ł		ŀ		ŀ				ľ		
Permit: 2					Phase Mumber of Asses	Pre-spud 2.1 days		Surface Hole 0.8 davs	ele .	Surface Casing 1.0 days	sing	Nipple Up BOP's 1.3 davs	BOP's	Intermediate Hole 1 2.4 davs	Hole 1	Intermediate Casing 1 1.8 days	Casing 1
					Depth	οw		573 m		573 m		573 m		1528 m		1528 m	r.
Revision 0		Contractor	Unit Cost	Pre-Drill		Unit cost	Sub Total	Unit Cost	Sub Total	Unit Cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total
Staff Salaries	Operating Company Personnel		\$10,000			\$10,000	\$20,833	\$10,000	\$8,333	\$10,000	\$10,417	\$10,000	\$12,500	\$10,000	\$24,167	\$10,000	\$18,333
Overhead Allocation	n   General Overhead Recovery (53.2MM spread over well)		\$97.586			\$97,586	\$203.304	\$97,586	\$81.321	\$97,586	\$101.652	\$97,586	\$121.982	\$97.586	\$235,832	\$97.586	\$178.907
Rig Costs				61 150 000	ĺ	4		4		00		0		0			
	MOD / Demob - Initial Mobilisation MOD / Demob - Final Demobilisation		\$260,000	\$1,150,000	Ī	8	İ	8	I	8	Ī	8	÷	8	I	8	I
	Rig Operating Costs Bit Operating Costs - Crew Change Flight (Helicooters)		\$145,000 \$10,000			\$145,000		\$145,000	\$120,833	\$145,000	\$151,042	\$145,000	H	\$145,000	\$350,417	\$145,000	\$265,833 \$18.333
	regionaria and access - succer change regin prenoupering fuel and University Median Price Connected Extransity Data		550,000 000 nes		ľ	550,000	\$104,167 Cat 667	\$50,000	\$41,667	\$50,000	552,083 630 833	\$50,000 \$50,000	\$62,500	000/055	\$120,833	\$50,000	\$91,667 \$91,667
			0000/03#			0001030	Н	0001034	1000/0110	000/034	000/030	000/034	Н	440/000	000000	0001000	100/000
HSE and Auditing	Site Survey and Inspections			\$1,300,000		ľ	ľ	ľ	ľ	ľ	I	I	ľ	ľ	ľ	I	
Evaluation			44 000	446 446		1		44 444		44 444	100		1			-	40.000
	Muthogging and Data Handling Writeline Logging - Open Hole Writeline Logging - Open Hole - Ch	I	5250,000 5250,000 570,000	000'02%	Î	000'65	\$10,417	000/55	24,167	25,000	807'64	000/55	36,250	000'65	\$250,000	000/55	29,167
Subsea Works	ATTENDED AND A		0000/01 t #			ľ	İ	ľ	Ī	ľ	Ī	ľ	ľ	İ	ľ	ľ	
Communications	Dynamic Positioning			000'855		I	I	I	I	Ī	I	I	I	I	I	I	
	Communications - Phone Charges Reporting Costs (US5260K spread over well)		\$500 \$7,929			\$500	\$16,518	\$7,929	\$417 \$6,607	\$5:00	\$521 \$8,259	\$500	\$625 \$9,911	\$500	\$1,208 \$19,161	\$500 \$7,929	\$917 \$14,536
Transport					ĺ	İ	İ	I	I	I	I	I	I	I	I	I	
and because	Transport / Freight - Materials Transport and General Freight Water Source & Supply Huntuge		\$20,000	\$100,000		\$20,000 \$5,000	\$41,667 \$10,417	\$20,000	\$16,667 \$4,167	\$5,000	\$20,833 \$5,208	\$5,000	\$25,000 \$6,250	\$5,000	\$48,333 \$12,083	\$20,000	\$36,667 \$9,167
needed and weeks	ser Surface Casing: 20" 113 lb/ft N-80 T5H-ER (Range III)		\$400/m		I	I	İ	I	Ī	\$400/m	\$229,200	I	I	I	I	I	
	intermediate Casing : 13-3/8" 72 lb/ft P-110 VAM21 (Range III) Intermediate Casine -0-62/8" 53 5 lb/ft P-110 VAM21 (Base III)		\$300/m			I	1	1	1	I	1	1	1	1	1	\$300/m	\$458,400
	Production Casing : 7* 29 lb/ft L-80 VAMTOPHC (Range III)		\$150/m				I		Ι		Ι						
	Production casing liner system Casing running contractor - Premium Casing Services		\$8,000	\$10,000		I	I	I	I	\$8,000	\$8,333	I	I	I	I	\$8,000	\$14,667
	Casing equipment Sealant and brushes		\$10,000	\$3,500		ľ	ľ	ľ	ľ	ľ	\$10,000	ľ	ľ	ľ	ľ	ľ	\$10,000
Wellhead	MARIHamood Emulationand Provide Lands of Emulation		000 01.9				ľ		ľ					ľ	ľ	ľ	
	Weithead Equipment - Weithead installation and Lesting		\$200,000		I	I	I	I	I	I	I	I	\$200,000	I	I	I	
	Wellhead Equipment - "0" section Wellhead Equipment - "0" Section		\$300,000			I	I	I	I	I	I	I	1	I	1	I	\$300,000
Cementing									l								
	Chrenklask (surface, intermediate, production and P&A) Services (surface, intermediate, production and P&A)		l			I	I	I	Π	Π	\$45,000 \$80,000	Π	I	I	Π	Π	\$60,000 \$90,000
Mud	descents to					l	H		4 01 000	l	I	l	I	l	448 000	Ι	
	unerneues Mud engineer: rig release to rig release (Assuming 2x Mud Men @ US\$2k/d) Gravitiues / Desconter / Descharter		\$3,000	\$10.000	ľ	\$3,000	\$6,250	\$3,000	\$2,500 \$1.667	\$3,000	\$3,125 \$2.083	\$3,000	\$3,750	\$3,000	\$7,250 54 831	\$3,000 52,000	\$5,500
Miscellaneous Equipment	prient		encount du suit	or reactions de		-	-	-	-	-		-	-		-		
	Tanks - Additional Water Storage Tanks Office Supplies		\$150			\$150	\$313	\$150	\$125	\$150	\$156	\$150	5025 \$188	\$150	\$363	\$150	\$275
Drittine Tools & Equipment	Waste Treatment And Disposal - Deliver bin to wellshe, cost of empty the bins ionnert		\$5,000			\$5,000	\$10,417	\$5,000	\$4,167	\$5,000	\$5,208	\$5,000	\$6,250	\$5,000	\$12,083	\$5,000	\$9,167
	Drill Bits Purchased				Î	4	t	44	\$80,000	40	İ		İ	40	\$60,000	4	I
	Drilling Tools Rental - Drilling Jars Rental		\$400	\$4,000	I	\$400	\$833	5400 S400	\$333	5400	\$417	\$400	\$500	\$400	\$967	\$400	\$733
	Drilling Tools Rental - Redress/Run charges for rentals (spread over well) Drilling Tools Rental - Stabilivers		\$2,000 \$800			\$2,000 \$800	\$4,167 \$1.667	\$2,000 \$800	\$1,667 \$667	\$2,000	\$2,083 \$833	\$2,000 \$800	\$2,500	\$2,000 \$800	\$4,833 \$1.933	\$2,000 \$800	\$3,667 \$1.467
	Drilling Tools Rental - Directional Drilling Services		-				a analysis						anates		a natura		1. mar 10. A
class charges	Lass charges [Class charges written over five years			\$154,000		I	l	I	I	I	I	I	I	I	I	I	
Field Professional 5	ervices   Wellste Geologist (Assuming 2x Geo's @ U552k/d)		\$4,000			\$4,000	\$8,333	\$4,000	\$3,333	\$4,000	\$4,167	\$4,000	\$5,000	\$4,000	\$9,667	\$4,000	\$7,333
	Safety Adviser (Assuming 2x SA's @ USS1.5k/d		\$3,000	445 445	1	\$3,000	\$6,250	\$3,000	\$2,500	\$3,000	\$3,125	\$3,000	\$3,750	80		\$0	
	meonae.cost per wee Company Man (1 x day, 1 x night assuming each at US\$2.5K/d)		\$5,000	000'078	ĺ	\$5,000	\$10,417	\$5,000	\$4,167	\$5,000	\$5,208	\$5,000	\$6,250	\$5,000	\$12,083	\$5,000	\$9,167
	TOTALS			\$2.834.500		\$396.865	\$503.885	\$396.865	\$487.387	\$405.265	\$775.517	\$396.865	\$683.581	\$393.865	\$1.326.839	\$402.165	\$1.655.152
					I		+					Minute Lin		- ا	+	Internadiate	
	Phase Totals		Pre-Well Charges	\$2,834,500		Pre-spud	\$503,885 Si	Surface Hole	\$487,387 5	Surface Casing	\$775,517	BOP's	\$683,581		\$1,326,839	casing 1	\$1,655,152

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e Rig X	
Drilling Rig :	Permit : 2

International state of the state o		×se																
Image: state	Permit: 2 Revision 0																	
International state and	Revision 0				LOT an	d Test	Intermedia	te Hole 2	Intermediat	e Casing 2	LOT at	d Test	Productic	an Hole	Evalut	tion	Productio	n Liner
Image: static	Revision 0				1528	lays 3 m	4.2 d. 2691	avs m	2.1 d 2691	ays m	269	l m	3.1 d. 3173	ays m	3173	ays m 1	3173	ske Li
International         Internad         International         International			Contractor	Unit Cost	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total		Sub Total	Unit cost	Sub Total
other         other <th< td=""><td></td><td>berating Company Personnel</td><td></td><td>\$10,000</td><td>\$10.000</td><td>\$20,833</td><td>\$10,000</td><td>\$41.667</td><td>\$10.000</td><td>\$20,833</td><td>\$10.000</td><td>\$18.750</td><td>\$10,000</td><td>\$31,250</td><td>\$10,000</td><td>\$54,167</td><td>\$10.000</td><td>\$42.500</td></th<>		berating Company Personnel		\$10,000	\$10.000	\$20,833	\$10,000	\$41.667	\$10.000	\$20,833	\$10.000	\$18.750	\$10,000	\$31,250	\$10,000	\$54,167	\$10.000	\$42.500
International contro control control control control control control co	5			201 600	407 500		001 600	A 404 601	604 Fac	100 100	001 500	100.001	007 500	104 DEC	001 640	6810 800	001 500	
International consistence         In		Seneral Overhead Recovery (53.2MM spread over well)		\$97,586	\$97,586		\$97,586	\$406,607	\$97,586	\$203,304	\$97,586	\$182,973	\$97,586	\$304,956	\$97,586	\$528,590	\$97,586	\$414,740
Tarrand for the secon	Π	Aob / Demob - Initial Mobilisation		000 0369	8		Ş		Ş		\$		Ş		ş		ŝô	
The construction contact the c	e e	Wob / Demob - Final Demobilisation		\$145,000	\$145,000	\$302,083	\$145,000	\$604,167	\$145,000	\$302,083	\$145,000	\$271,875	\$145,000	\$453,125	\$145,000	\$785,417	\$145,000	\$616,250
International state (international state)         International state (international state)         International state (international state)         International state		Ug Operating Costs - Crew Change Flight (Helicopters)		\$10,000	\$10,000	\$20,833	\$10,000	\$41,667	\$10,000	\$20,833	\$10,000	\$18,750	\$10,000	036,2260	\$10,000	000 VLL4	\$10,000	0111 6000
Interfactor         Interfactor	2	ver and coursemes Marine Costs - General Spread Rate		\$20,000	\$20,000	\$41,667	\$20,000	\$83,333	220,000	\$41,667	\$20,000	\$37,500	\$20,000	\$62,500	000'02\$	\$108,333	000'02\$	\$85,000
International control of the																I		l
Transmertionary and the first sector of the fi	Evaluation	ite Survey and Inspections																
Outon         Decision <thdecision< th=""> <thdecision< th=""> <thd< td=""><td>23</td><td>Mudlogging and Data Handling Wreline Logaring - Oben Hole</td><td></td><td>\$5,000 \$250.000</td><td>\$5,000</td><td>\$10,417</td><td>\$5,000</td><td>\$20,833</td><td>\$5,000</td><td>\$10,417</td><td>\$5,000</td><td>\$9,375</td><td>\$5,000</td><td>\$15,625</td><td>\$5,000</td><td>\$27,083 \$250,000</td><td>\$5,000</td><td>\$21,250</td></thd<></thdecision<></thdecision<>	23	Mudlogging and Data Handling Wreline Logaring - Oben Hole		\$5,000 \$250.000	\$5,000	\$10,417	\$5,000	\$20,833	\$5,000	\$10,417	\$5,000	\$9,375	\$5,000	\$15,625	\$5,000	\$27,083 \$250,000	\$5,000	\$21,250
International         Internadd/dindddddddddddddddddddddddddddddddd	П	L A H		\$70,000								\$70,000						
International condi		ynamic Positioning														Ι	Π	l
International state in the state i	Communications	0.mmunications - Phone Charges immeting Costs (11555560); soment own well)		\$500	\$500	\$1,042	\$500 \$7 929	\$2,083	\$500	\$1,042	\$500	\$938 \$14.867	\$500 \$7 929	\$1,563 \$24.778	\$500 \$7 979	\$2,708 542 948	\$500 \$7.424	\$2,125 \$33.698
Interfactor         Interfactor		ferent state provide second by a contract of the second by		0.000		avalava				avalava		1000						a contract
The chant fragment fr	Π	ransport / Freight - Materials Transport and General Freight		\$20,000	\$20,000	\$41,667	\$20,000	\$83,333	\$20,000	\$41,667	\$20,000	\$37,500	\$20,000	\$62,500	\$20,000	\$108,333	\$20,000	\$85,000
Constraint         Sector         Sec	Casing and Accessories	Water Source & Supply Haulage		\$5,000	\$5,000	\$10,417	\$5,000	\$20,833	\$5,000	\$10,417	\$5,000	\$9,375	\$5,000	\$15,625	\$5,000	\$27,083	\$5,000	\$21,250
control         contro         control         control <th< td=""><td><u>wi</u> 2</td><td>(urface Casing: 20" 113 lb/ft N-80 TSH-ER (Range III) viewworkishe Casine - 13-2/8" 72 lh/fe D-110 VAM21 (Range III)</td><td></td><td>\$400/m \$300/m</td><td></td><td></td><td>ĺ</td><td>Ī</td><td>I</td><td></td><td></td><td></td><td>ĺ</td><td></td><td>I</td><td>I</td><td>I</td><td>L</td></th<>	<u>wi</u> 2	(urface Casing: 20" 113 lb/ft N-80 TSH-ER (Range III) viewworkishe Casine - 13-2/8" 72 lh/fe D-110 VAM21 (Range III)		\$400/m \$300/m			ĺ	Ī	I				ĺ		I	I	I	L
The concert of the function of		atermediate Casing : 9-5/8" 53.5 lb/ft P-110 VAM21 (Range III)		\$200/m		I	Í	Ī	\$200/m	\$538,200			Í	I	I	I		
Conductor thread (not)         Conductor thread (not)<	a 16	Production Casing : 7" 29 Ib/ft: L-80 VAMTOPHC (Range III) Voduction casing liner system		\$150/m \$15,000			I	I	I				I		I	I	\$150/m	\$72,300 \$15,000
Induction       Induction	0.0	asing running contractor - Premium Casing Services		\$8,000					\$8,000	\$16,667							\$8,000	\$34,000
Operation         Signed         Sign		eating experiments		nond ne h						000/020						Ι		0000000
Stationary and and approximative stationary and stationary		Velihead Equipment - Welihead Installaiton and Testing		\$20,000			I	Π					Π	Π		Π		L
Indicational contribution         Stati	**	Weilhead Equipment - "A" section		\$200,000														
Initial contact interfactor (initial contact)         Initial contact         Initial		Velhead Equipment - *C" Section		\$300,000						\$300,000								\$300,000
$ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	L	hemicals (surface, intermediate, production and P&A) provices (surface, intermediate, production and P&A)					t	T	I	\$120,000			T	I	Ι	Ι	Ι	\$320,000
Interfactor         Interfactor																		
Indemt strate function         5.000		hemicals						\$120,000						\$55,000				\$30,000
• Additional Ware Store Functional from the function from the functional from the functional from the fu	2 10	Mud engineer: rig release to rig release (Assuming 2x Mud Men @ US52k/d) 'entrifuge / Desander / Desliter		\$3,000 \$2,000	\$3,000 \$2,000	\$6,250 \$4,167	\$3,000	\$12,500 \$8,333	\$2,000	\$6,250 \$4,167	\$3,000 \$2,000	\$5,625 \$3,750	\$3,000	\$9,375	\$3,000 \$2,000	\$16,250 \$10,833	\$3,000 \$2,000	\$12,750 \$8,500
Unitation         <	Miscellaneous Equipm	tent Inniss - Additional Water Storage Tanks		4500	\$500	\$1.042	6500	\$2.083	\$500	\$1.042	\$500	\$938	\$500	\$1.563	6500	\$2.708	\$500	321.52
$T_{1000000000000000000000000000000000000$	.0	After Supplies		\$150	\$150	\$313	\$150	\$625	\$150	\$313	\$150	\$281	\$150	\$469	\$150	\$813	\$150	\$638
$ \  \  \  \  \  \  \  \  \  \  \  \  \ $	Drilling Tools & Equipn	waxe ireatment and bisposal - Denver bin to website, cost or empty the bins		000/cé	non/cé	/1#/010	nnn/ce	CC0'076	nonice	/T#'010	MM/ce	C/5/6¢	non/ce	670'CTC	nnnice	con'/7¢	nnn'ce	007/170
Interfact instant informative reading and state in the interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant informative reading and state interfact instant interfact interfact interfact instant interfact interfact instant interfact in		brill Bits Purchased Irilling Tooks Rental - Survey Tools (e.g. Flodrift, Manless MWD)			8		8	\$50,000	\$		\$		8	\$45,000	8	I	\$0	
$ \frac{1}{1000} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$		Prilling Tools Rental - Drilling Jars Rental		\$400	\$400	\$833	\$400	\$1,667	\$400	\$833	\$400	\$750	\$400	\$1,250	\$400	\$2,167	\$400	\$1,700
Owner for freetant: Dreated hind precision         Owner for freetant: Dreated hind precision         Owner for free free free free free free fre		Driming: Doos Rentair - Rearesy Kun charges for rentais (spread over weil) Milling Tools Rental - Stabilisers		\$800	\$800	51,667	\$800	\$3,333	\$800	51,667	\$800	\$1,500	\$800	\$2,500	\$800	\$4,333	\$800	\$3,400
Clara All from A		Drilling Tools Rental - Directional Drilling Services											8					
Recondent (Annumler 2 Gev. (B US2)(4)         Endongent (A US2)(4)         Endongent (A US2)(4)         Endongent (A US2)(4)         Endongent (A US2)(4)         E		Jass charges written over five years														Ι		
Size         Size <th< td=""><td></td><td>veisite Geologist (Assuming 2x Geo's @ U\$\$2k/d)</td><td></td><td>\$4,000</td><td>\$4,000</td><td>\$8,333</td><td>\$4,000</td><td>\$16,667</td><td>\$4,000</td><td>\$8,333</td><td>\$4,000</td><td>\$7,500</td><td>\$4,000</td><td>\$12,500</td><td>\$4,000</td><td>\$21,667</td><td>\$4,000</td><td>\$17,000</td></th<>		veisite Geologist (Assuming 2x Geo's @ U\$\$2k/d)		\$4,000	\$4,000	\$8,333	\$4,000	\$16,667	\$4,000	\$8,333	\$4,000	\$7,500	\$4,000	\$12,500	\$4,000	\$21,667	\$4,000	\$17,000
Ydnol 1x day, 1x day         S5,000	<u>vi</u> 2	afety Adviser (Assuming 2x SA's @ US\$3.5k/d fedivar Cost per well		\$3,000	\$3,000	\$6,250	\$0		\$0		\$3,000	\$5,625	\$3,000	\$9,375	\$3,000	\$16,250	\$3,000	\$12,750
State         State <th< td=""><td></td><td>formpany Man (1 x day, 1 x night assuming each at US\$2.5k/d)</td><td></td><td>\$5,000</td><td>\$5,000</td><td>\$10,417</td><td>\$5,000</td><td>\$20,833</td><td>\$5,000</td><td>\$10,417</td><td>\$5,000</td><td>\$9,375</td><td>\$5,000</td><td>\$15,625</td><td>\$5,000</td><td>\$27,083</td><td>\$5,000</td><td>\$21,250</td></th<>		formpany Man (1 x day, 1 x night assuming each at US\$2.5k/d)		\$5,000	\$5,000	\$10,417	\$5,000	\$20,833	\$5,000	\$10,417	\$5,000	\$9,375	\$5,000	\$15,625	\$5,000	\$27,083	\$5,000	\$21,250
Intermediate Interme		OTALS			\$396,865	\$826,801	\$393,865	\$2,061,103	\$402,065	\$1,900,418	\$396,865	\$814,121	\$396,865	\$1,308,952	\$396,865	\$2,345,517	\$405,015	\$2,525,475
							Intermediate		Intermediate				Production				Production	

Permit : 2 Revision 0 Staff Salaries Overhead Allocation Rig Costs	9 Big X Operating Company Personnel General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Tinial Demobilisation Mob / Demob - Tinial Demobilisation Nab / Demos - T	Contractor	Unit Cost \$10,000	Rig Ri 0.3 317 Unit cost	days	Sub-total	
tevision 0 taff Salaries Verhead Allocation tig Costs	Operating Company Personnel General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Tinial Demobilisation Rig Operating Costs	Contractor		0.3 317 Unit cost	days 13 m	Sub-total	
ermit : 2 evision 0 taff Salaries terhead Allocation ig Costs	Operating Company Personnel General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Tinial Demobilisation Rig Operating Costs	Contractor		0.3 317 Unit cost	days 13 m	Sub-total	
tevision 0 taff Salaries Dverhead Allocation tig Costs	General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Final Demobilisation Rig Operating Costs	Contractor		0.3 317 Unit cost	days 13 m	Sub-total	
taff Salaries Overhead Allocation lig Costs	General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Final Demobilisation Rig Operating Costs	Contractor		317 Unit cost	/3 m	Sub-total	
Staff Salaries	General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Final Demobilisation Rig Operating Costs	Contractor			Sub Total	Sub-total	
taff Salaries Overhead Allocation lig Costs	General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Final Demobilisation Rig Operating Costs	Contractor			Sub Total	Sub-total	1
Overhead Allocation Rig Costs	General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Final Demobilisation Rig Operating Costs		\$10,000				Total
verhead Allocation	General Overhead Recovery (53.2MM spread over well) Mob / Demob - Initial Mobilisation Mob / Demob - Final Demobilisation Rig Operating Costs			\$10,000	\$3,333	\$327,917	\$327,917
ig Costs	Mob / Demob - Initial Mobilisation Mob / Demob - Final Demobilisation Rig Operating Costs						\$3,200,00
	Mob / Demob - Final Demobilisation Rig Operating Costs		\$97,586	\$97,586	\$32,529	\$3,200,000	\$8,302,70
	Rig Operating Costs			\$0		\$1,150,000	90,502,71
			\$260,000		\$260,000	\$260,000	
			\$145,000 \$10,000	\$145,000 \$10.000	\$48,333	\$4,452,708 \$144,583	
	Rig Operating Costs - Crew Change Flight (Helicopters) Fuel and Lubricants		\$50,000	\$10,000	\$16,667	\$1,639,583	
	Marine Costs - General Spread Rate		\$20,000	\$20,000	\$6,667	\$655,833	
CF and Au Price							
SE and Auditing	Site Survey and Inspections					\$1,300,000	\$1,300,00
valuation	ane aurvey and inspections					\$1,300,000	\$1,073,95
	Mudlogging and Data Handling		\$5,000	\$5,000	\$1,667	\$183,958	
	Wireline Logging - Open Hole		\$250,000			\$750,000	
	Wireline Logging - Cased Hole - CBL		\$70,000		\$70,000	\$140,000	tra con
ubsea Works	Dynamic Positioning					\$58,000	\$58,000
ommunications						\$30,000	\$276,39
	Communications - Phone Charges		\$500	\$500	\$167	\$16,396	
	Reporting Costs (US\$260k spread over well)		\$7,929	\$7,929	\$2,643	\$260,000	
ransport							\$919,79
ransport	Transport / Freight - Materials Transport and General Freight		\$20.000	\$20,000	\$6.667	\$755,833	\$919,79
	Water Source & Supply Haulage		\$5,000	\$5,000	\$1,667	\$163,958	
asing and Accessorie	5						\$1,442,93
	Surface Casing: 20" 113 lb/ft N-80 TSH-ER (Range III)		\$400/m			\$229,200	
	Intermediate Casing : 13-3/8" 72 lb/ft P-110 VAM21 (Range III) Intermediate Casing : 9-5/8" 53.5 lb/ft P-110 VAM21 (Range III)		\$300/m \$200/m			\$458,400 \$538,200	
	Production Casing : 7" 29 lb/ft L-80 VAMTOPHC (Range III)		\$150/m			\$72,300	
	Production casing liner system		\$15,000			\$15,000	
	Casing running contractor - Premium Casing Services		\$8,000	\$8,000	\$2,667	\$86,333	
	Casing equipment Sealant and brushes		\$10,000			\$40,000 \$3,500	
Vellhead	sealanc and brushes					\$3,300	\$1,110,00
	Wellhead Equipment - Wellhead Installaiton and Testing		\$20,000	\$10,000	\$10,000	\$10,000	
	Wellhead Equipment - "A" section		\$200,000			\$200,000	
	Wellhead Equipment - "B" section		\$300,000 \$300,000		(	\$300,000 \$600,000	
ementing	Wellhead Equipment - "C" Section		\$300,000			\$600,000	\$910,00
	Chemicals (surface, intermediate, production and P&A)					\$545,000	1111,00
	Services (surface, intermediate, production and P&A)					\$365,000	
Nud							4530
	Chemicals					\$355,000	\$528,95
	Mud engineer: rig release to rig release (Assuming 2x Mud Men @ US\$2k/d)		\$3,000	\$3,000	\$1,000	\$98,375	
	Centrifuge / Desander / Desilter		\$2,000	\$2,000	\$667	\$75,583	
1iscellaneous Equipn	nent						\$185,27
	Tanks - Additional Water Storage Tanks Office Supplies		\$500 \$150	\$500 \$150	\$167 \$50	\$16,396 \$4,919	
	Waste Treatment And Disposal - Deliver bin to wellsite, cost of empty the bins		\$150	\$150	\$1,667	\$163,958	
rilling Tools & Equip	ment						\$343,93
	Drill Bits Purchased					\$235,000	
	Drilling Tools Rental - Survey Tools (e.g. Flodrift, Manless MWD) Drilling Tools Rental - Drilling Jars Rental		\$400	\$0 \$400	\$133	\$0 \$17,117	
	Drilling Tools Rental - Drilling Jars Rental Drilling Tools Rental - Redress/Run charges for rentals (spread over well)		\$2,000	\$400	\$133 \$667	\$17,117 \$65,583	
	Drilling Tools Rental - Stabilisers		\$800	\$800	\$267	\$26,233	
	Drilling Tools Rental - Directional Drilling Services					\$0	
ass Charges	Class charges written over five years					\$154,000	\$154,00
eld Professional Ser	vices					\$134,000	\$387,00
1	Wellsite Geologist (Assuming 2x Geo's @ US\$2k/d)		\$4,000	\$4,000	\$1,333	\$131,167	
1	Safety Adviser (Assuming 2x SA's @ US\$1.5k/d		\$3,000	\$3,000	\$1,000	\$66,875	
	Medivac Cost per well		\$5.000	65.000	61.007	\$25,000	
	Company Man (1 x day, 1 x night assuming each at US\$2.5k/d)		\$5,000	\$5,000	\$1,667	\$163,958 \$0	
	TOTALS			\$414,865	\$471,622	\$ 20,520,869	\$20,520,1
	Phase Totals		Pre-Well Charges	Riz Release	\$471.622	Total Cost	\$20,520,1

# Appendix

#### 5.3.3.2 Slender Well Design

DRILLING CO	DRILLING COST ESTIMATE																
Well Name: North Sea Drilling Rig : 0	North Sea																
Permit : 2	× The				Phase	Pre-spud	-	Surface Hole	e e	Surface Casing	sing	Nipple Up BOP's	80P's	Intermediate Hole 1	Hole 1	Intermediate Casing 1	Casing 1
					Number of days Depth	2.1 days 0 m		1.7 days 700 m		1.0 days 700 m	γ	1.3 days 700 m	\$ .	6.3 days 2550 m	5 E	1.8 days 2550 m	SÅ E
Revision 0		Contractor	Unit Cost	Pre-Drill		Unit cost	Sub Total	Unit Cost	Sub Total	Unit Cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total
Staff Salaries	Operating Company Personnel		\$10,000			\$10,000	\$20,833	\$10,000	\$16,667	\$10,000	\$10,417	\$10,000	\$12,500	\$10,000	\$62,500	\$10,000	\$18,333
<b>Overhead Allocatio</b>	S		160,001			\$109,091	\$227,273	\$109,091	\$181,818	\$109,091	\$113,636	\$109,091	\$136,364	\$109,091	\$681,818	\$109,091	\$200,000
Rig Costs	Mob / Demon- Initial Mobilication			\$1.150.000		9		9		9		ş		ş		9	
	Mob / Termon - Final Demobilisation Ris Constrained Constrained		\$260,000 \$145,000		Î	\$145,000	t	\$145,000	\$241.667	\$145,000	\$151.042	\$145,000	\$181.250	\$145,000	5906.250	\$145,000	\$265,823
	Rig Operating Costs - Crew Change Flight (Helicopters)		\$10,000			\$10,000	÷	\$10,000	100,000	\$10,000	and and	\$10,000		\$10,000	\$62,500	\$10,000	\$18,333
	Fuel and uppricants Marine Costs - General Spread Rate		\$50,000 \$20,000		ĺ	\$20,000	\$41,667	\$20,000	\$83,333 \$33,333	\$50,000 \$20,000	\$52,083	\$50,000 \$20,000	\$25,000	\$20,000	\$312,500 \$125,000	\$20,000	\$31,667 \$36,667
HSE and Auditing	Site Surviv and Inconctions			\$1.300.000								Ī		ľ			
Evaluation	Administration of the second se		¢6.000	000 002		de non	C10.417	66 AM	¢6 333	de non	or 30	de ono	CE JED	CE DOD	¢31.360	ce ono	¢0.167
	revoluzing and over renorme Writeline Logging – Open Hole Writeline Logging – Cater Hole – CBL		\$250,000 \$70,000	000/020	Ì	000'60	A Factor 6	000100	60°333	000/06	DANKER	000/60	newine .	000/68	\$250,000	000/60	101100
Subsea Works	Dynamic Positioning			\$58,000													
Communications	Communications - Phone Charges Reporting: Costs (1355760k spread over well)		\$500 \$8,864			\$500 \$8,864	\$1,042 \$18,466	\$500 \$8,864	\$833 \$14,773	\$500 \$8,864	\$521 \$9,233	\$500 \$8,864	\$625 \$11,080	\$500 \$8,864	\$3,125 \$55,398	\$500 \$8,864	\$917 \$16,250
Transport	a second desired a descent of the second descent descent descent of the second descent of the second descent of the second descent of the second descent des		dian and	A 100 0000	ľ	000	100.000	000		000 014		000.004	410 000	440.000	011F 000	440.000	440.000
~	I ransport / Freight Materials Fransport and General Freight Water Source & Supply Haulage		\$5,000	\$100,000		\$5,000	\$10,417	\$5,000	\$8,333	\$5,000	\$5,208	\$5,000	56,250 56,250	\$5,000	\$31,250	\$5,000	530,067 \$9,167
cashig and eccess	orns. Surtace Casing: 11-3/4" 5 lb/ft-155 BTC (Range III) Intermediate Casing: 9-5/8" 53:5 lb/ft C-90 BTC (or premium if desired) (Range III)	\$400/m \$300/m	\$235/m \$215.89			I	I	П	I	\$235/m	\$164,500	П	I	П	П	\$216/m	\$550,514
	Production Casing : 7" 32 lb/ft P-110 BTC (or premium if desired) (Range III)	\$150/m	\$150/m			ľ	ľ	I	ľ	I	ľ	I	ľ	I	I	I	
	Productions casing liner system Caving turning contractor - Premium Cusing Services Caving environment		\$15,000 \$8,000 \$10,000	\$10,000		Π	Π	Π	Π	\$8,000	\$8,333 \$10,000	Π	Π	Π	Π	\$8,000	\$14,667 \$10,000
Wellhead	Sealant and brushes			\$3,500		I	I	I	I	Ī		I	I	I	I	I	
	Weithread Equipment - Weithread Installation and Testing Weithread Equipment - "A" section Weithread Equipment - "B' section		\$20,000 \$117,500 \$215,888 \$300,000			П	П	П	П	П	П	П	\$117,500	П	П	П	\$215,888
Cementing	Chemicals (surface, intermediate, production and P&A) Serveces (surface, intermediate, production and P&A)					Π	T	П	Π	Π	\$9,238 \$80,000	П	Π	Π	Π	Π	\$65,257 \$90,000
Mud	Chemicals				Γ	Π	I	Π	\$29.946	Π	Π	Π	Π	Π	Π	Π	Π
Mud	Mud engineer: rig release to rig release (Assuming 2x Mud Men @ USS2k/d) Constituge / Desander / Desiter		\$3,000 \$2,000	\$10,000		\$3,000 \$2,000	\$6,250 \$4,167	\$3,000 \$2,000	\$3,333	\$3,000 \$2,000	\$3,125 \$2,083	\$3,000 \$2,000	\$3,750 \$2,500	\$3,000 \$2,000	\$18,750 \$12,500	\$3,000 \$2,000	\$5,500 \$3,667
Miscellaneous Edu	aparten. 1 Tanks - Additional Water Storage Tanks Office Autonologi		\$500 \$150		ĺ	\$500	\$1,042 5313	\$500	\$833 \$250	\$500 \$150	5521 5156	\$500	\$625 \$188	\$500	\$3,125 \$938	\$500	\$917 \$275
Wast Drilline Tools & Equipment	Waste Treatment And Disposal - Deliver bin to wellsite, cost of empty the bins unement		\$5,000			\$5,000	\$10,417	\$5,000	\$8,333	\$5,000	\$5,208	\$5,000	\$6,250	\$5,000	\$31,250	\$5,000	\$9,167
	Drill Bits Purchased Drilling Tools Rental - Survey Tools (e.g. Flodrift, Manless MWD)					8	I	8	\$41,538	Ş	I	8	Π	8	\$42,000	8	
	Drilling Tools Rental - Drilling Jars Rental Drilling Tools Rental - Redress/Run charges for rentals (spread over well)		\$400 \$2,000	\$4,000		\$400 \$2,000	\$833 \$4,167	\$2,000	\$667 \$3,333	\$2,000	\$417 \$2,083	\$400 \$2,000	\$500 \$2,500	\$400 \$2,000	\$12,500	\$400 \$2,000	\$733 \$3,667
	Drilling Tools Rental - RSS Drilling Tools Rental - Directional Drilling Services		\$2,000 \$4,000	\$20,000		\$2,000 \$4,000	\$4,167 \$8,333	\$2,000 \$4,000	\$3,333 \$6,667	\$4,000	\$2,083 \$4,167	\$4,000	\$5,000	\$2,000 \$4,000	\$12,500 \$25,000	\$2,000 \$4,000	\$3,667 \$7,333
Class Charges	lass changes Class charges written over five years			\$154,000		I	I	I	I	I	I	Ι	I	I	Π	Ι	
	ae verses Velisite Geologist (Assuming 2x Geo's @ USS2k/d) Sefera Advisor (Assuming 2x Ge's @ 11651 E4/d)		\$4,000 63.000			\$4,000	\$8,333 \$6.350	\$4,000	\$6,667 65,000	\$4,000	\$4,167 c3 136	\$4,000	\$5,000	\$4,000 60	\$25,000	\$4,000 60	\$7,333
	Medivac Cost per well Company Man (1 x digr. 1 x night assuming each at US\$2.54/d)		\$5,000	\$25,000		\$5,000	\$10,417	\$5,000	\$8,333	\$5,000	\$5,208	\$5,000	\$6,250	\$5,000	\$31,250	\$5,000	\$9,167
	TOTALS			\$2,854,500		\$414,505	\$540,634	\$414,505	\$745,659	\$422,740	\$693,430	\$414,505	\$623,131	\$411,505	\$2,863,903	\$419,720	\$1,700,750
	Phase Totals		Pre-Well Charges	\$2,854,500		Pre-spud	\$540,634 Si	Surface Hole	\$745,659 St	Surface Casing	\$693,430	Nipple Up BOP's	\$623,131 1	itermediate Hole 1	\$2,863,903	ntermediate Casing 1	\$1,700,750

DRILLING C	DRILLING COST ESTIMATE														
Well Name: North Sea	Vorth Sea														
Drilling Rig :	0 Rig X														
Permit : 2				LOT and Test	Test	Production Hole	n Hole	Evaluation	tion	Production Liner	n Liner	Rig Release	lease		
				2.1 days 2550 m	ays m	3.1 days 3173 m	ske u	5.4 days 3173 m	uys m	4.3 days 3173 m	ske	0.3 days 3173 m	ays I m		
Revision 0	<u> </u>	Contractor	Unit Cost	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Unit cost	Sub Total	Sub-total	Total
Staff Salaries	Operating Company Personnel		\$10,000	\$10,000	\$20,833	\$10,000	\$31,250	\$10,000	\$54,167	\$10,000	\$42,500	\$10,000	\$3,333	\$293,333	\$293,333
Overhead Allocation			\$109,091	\$109,091	\$227,273	\$109,091	\$340,909	\$109,091	\$590,909	\$109,091	\$463,636	\$109,091	\$36,364	\$3,200,000	\$3,200,000
Kig Costs	Mob / Demob - Initial Mobilisation			\$0		\$0		\$		\$0		\$0		\$1,150,000	\$7,516,250
	Mob / Demob - Final Demobilisation Rig Operating Costs		\$260,000 \$145,000	\$145,000	\$302,083	\$145,000	\$453,125	\$145,000	\$785,417	\$145,000	\$616,250	\$145,000	\$260,000 \$48,333	\$260,000 \$3,951,250	
	Rig operating Costs - Crew Change Flight (Helicopters) Fuel and Lubricants Opread Rate Marine Octs. General Spread Rate		\$10,000 \$50,000 \$20,000	\$10,000 \$50,000 \$20,000	\$20,833 \$104,167 \$41.667	\$10,000 \$50,000 \$20,000	\$156,250 \$62,500	\$10,000 \$50,000 \$20,000	\$270,833 \$108.333	\$10,000 \$50,000 \$20,000	\$212,500 \$85,000	\$10,000 \$50,000 \$20,000	\$16,667 \$6,667	\$101,667 \$1,466,667 \$586,667	
HSE and Auditing															\$1.300.000
Evaluation	Site Survey and Inspections													\$1,300,000	\$736,667
	Mudlogging and Data Handling Wirreline Logging - Open Hole		\$5,000 \$250,000	\$5,000	\$10,417	\$5,000	\$15,625	\$5,000	\$27,083 \$250,000	\$5,000	\$21,250	\$5,000	\$1,667	\$166,667 \$500,000	
Subsea Works	Wireline Logging - Cased Hole - CBL		\$70,000										\$70,000	\$70,000	\$58,000
Communications	Dynamic Positioning													\$58,000	¢374 CC7
	Communications - Phone Charges Reporting Costs (US\$260k spread over well)		\$500 \$8,864	\$500 \$8,864	\$1,042 \$18,466	\$500 \$8,864	\$1,563 \$27,699	\$500 \$8,864	\$2,708 \$48,011	\$500 \$8,864	\$2,125 \$37,670	\$500 \$8,864	\$167 \$2,955	\$14,667 \$260,000	2001-234
Transport															\$833.333
	Transport / Freight - Materials Transport and General Freight Water Source & Supply Haulage		\$20,000 \$5,000	\$5,000	\$41,667 \$10,417	\$20,000 \$5,000	\$62,500 \$15,625	\$5,000	\$108,333 \$27,083	\$5,000	\$85,000 \$21,250	\$20,000 \$5,000	\$6,667 \$1,667	\$686,667 \$146,667	
Casing and Accessories 5(	mes Surface casing: 11-3/4" 5 lb/ft-J55 BTC (Range III) Intermediate Gading: 9-5/8" 53.5 lb/ft C-60 BTC (or premium if desired) (Range III)	\$400/m \$300/m	\$235/m \$215.89		T	I	T	I	I	I		I		\$164,500 \$550,514	\$926,631
	Production Casing : 7" 32 lb/ft P-110 BTC (or premium if desired) (Range III)	\$150/m	\$150/m							\$150/m	\$93,450			\$0 \$93,450	
	Production casing liner system Casing running contractor - Premium Casing Services		\$15,000 \$8,000		Ī	Ī			Ī	\$8.000	\$15,000 \$34,000	\$8,000	\$2,667	\$15,000 \$69,667	
	Casing equipment Sealant and brushes		\$10,000								\$10,000			\$30,000 \$3,500	
Wellhead	Wellhead Equipment - Weilhead installation and Testing		\$20,000									\$10,000	\$10,000	\$10,000	\$643,388
	Werlmead Equipment - N section Wellhead Equipment - "B's section Wellhead Faujment - "B's section		\$215,888 \$200.000		I				I		6300.000	Π		\$215,888 \$200.000	
Cementing			analaast		Π	Ħ	Π		Π						\$374,495
	Chemicals (surface, intermediate, production and P&A) Services (surface, intermediate, production and P&A)										\$100,000			\$104,495 \$270,000	
Mud Mud	Chemicals Mud regimer: rig: release to rig: release (Assuming 2A Mud Men @ US\$2V/d) Centrifuge / Desander / Dealter		\$3,000 \$2,000	\$3,000 \$2,000	\$6,250 \$4,167	\$3,000 \$2,000	\$43,041 \$9,375 \$6,250	\$3,000 \$2,000	\$16,250 \$10,833	\$3,000 \$2,000	\$30,000 \$12,750 \$8,500	\$3,000 \$2,000	\$1,000 \$667	\$102,986 \$88,000 \$68,667	\$259,653
Miscellareous Equ	prement Tanks - Additional Water Storage Tanks Office Supplies		\$500 \$150	\$500 \$150	\$1,042 \$313	\$500 \$150 ¢r con	\$1,563 \$469	\$500 \$150	\$2,708 \$813	\$500 \$150 ¢r 0000	\$2,125 \$638	\$500 \$150	\$167 \$50	\$14,667 \$4,400	\$165,733
Drilling Tools & Equipment	upment		000/66	Mn/cc	/T4/07¢	000/66	C70'CTC	non/ce	con'/7¢	000/66	0621126	nnn/cc	/00/10	100'0470	\$398,938
	Drill Bits Purchased Drilling Tools Rental - Survey Tools (e.g. Flodrift, Manless MWD)		6400	\$0		80	\$45,000	\$0		\$0	2011	\$0		\$128,538 \$0 \$17 710	
	Drilling Tools tental - brilling Jars tentral Drilling Tools fental - Redress/Run charges for rentals (spread over well) Drilling Tools meaned to the second provided the second provided to the second		\$2,000 \$2,000	\$2,000 52,000	\$4,167 \$4,167 ¢4 ±67	\$2,000 \$2,000	\$6,250 \$6,250	\$2,000 \$2,000	\$10,833 \$10,833 \$10,833	\$2,000 52,000	58,500 58,500	\$2,000 52,000	\$667 \$667	\$58,667 \$58,667	
Place Phonese	Drilling Tools Rental - Nas Drilling Tools Rental - Directional Drilling Services		54,000	\$4,000	\$8,333	\$4,000	\$12,500	\$4,000	\$21,667	\$4,000	\$17,000	\$4,000	\$1,333	\$137,333	6111 000
Class Elote Brofoscional Contras	Class charges written over five years													\$154,000	DUD/PCTS
	weikiste Geologist (Assuming 2x Geo's @ U552k/d) Saffery Adviser (Assuming 2x SA's @ U551.5k/d		\$4,000 \$3,000	\$4,000 \$3,000	\$8,333 \$6,250	\$4,000 \$3,000	\$12,500 \$9,375	\$4,000 \$3,000	\$21,667 \$16,250	\$4,000 \$3,000	\$17,000 \$12,750	\$4,000 \$3,000	\$1,333 \$1,000	\$117,333 \$63,750	nc/*ccċ
	Medhac Cost per well Company Man (1 x day, 1 x night assuming each at US\$2.5K/d)		\$5,000	\$5,000	\$10,417	\$5,000	\$15,625	\$5,000	\$27,083	\$5,000	\$21,250	\$5,000	\$1,667	\$25,000 \$146,667 \$0	
	TOTALS			\$414,505	\$863,551	\$414,505	\$1,352,117	\$414,505	\$2,441,066	\$422,655	\$2,331,594	\$432,505	\$477,502	\$ 17,487,838	\$17,487,838
	Phase Totals		Pre-Well Charges	LOT and Test	\$863,551	Production Hole	\$1,352,117	Evaluation	\$2,441,066	Production Liner	\$2,331,594	Rig Release	\$477,502	Total Cost	\$17,487,838