| | | | | | | |
|---|---|---|---|---|---|---|
| **Title** | Involve in full DEE cycle – Job Design, Execution & Evaluation | | | | | |
| **Target Population** | Field Engineers | | | | | |
| This requirement is applicable to: | | JFE | | FST | | EOT |
| | | FE1 | | FS1 | | EO1 |
| | ✓ | FE2 | | FS2 | | EO2 |
| | | | ✓ | FS3 | | EO3 |

**Objective:**

The objective of this task is to evaluate and verify the employee's skills and knowledge in designing, executing and evaluating Coiled Tubing job, including safety outlines, complete procedure, equipment limits and interface with Clients

**Tasks:**

- Perform the job design tasks which include:
  - Data collection
  - Laboratory test
  - Cerberus simulation
  - Space/weight logistics
  - Job procedure
  - Equipment requirements

- Execute the jobs using following steps:

  **Pre-job**
  - Review the program for the job
  - Understand and explain the Job Objective(s) for the operation
  - Perform under supervision the Job Safety Analysis or JHARC-Hazard Analysis and Risk Control for the operation
  - Perform a Pre EMC and Post EMC I to equipment with the unit operator
  - Execute under supervision the rig-up and rig-down of equipment. as per CTS standard
  - Make some basic calculation as requested by FE/FS in charge of operation (some examples: MPSP, PT1 and PT2 values, CT string volume, volume to displace bottoms up wellbore, CT speed required to place fluids in wellbore, Nitrogen required to flush CT string at surface, N2 required to displace CT string when at a given depth)
  - Write a report to summarize completed Pre-Job tasks based on requirements and discussed your findings with your Mentor

  **Job Execution and Post Job Involvement**
  - Draw a layout of wellhead stack and well completion with the dimensions
  - Draw a schematic of downhole tool used for the operation, include dimensions and fishing diagram

- Assign tasks to the crew members and help the Supervisor leading the operation
- Keep a close relation with the Client during the operation
- Run the CT unit under supervision
- Participate in the Post Job report, including graphs interpretation and discussion of job results versus job objectives and prepare your own report for training purposes.

- Evaluation should include:
  - Participate in the post job report, including graphs interpretation and discussion on job results versus job objectives and prepare your own report for training purposes
  - Identify action plans and recommendations for next job.

**REQUIRED EVIDENCE:**

1 All relevant documents from conception to completion (Cost Estimation, Project on Paper, Job Program, Post Job Report etc) ☐

| OVERALL SCORE | STRONG | | | ADEQUATE | | | IMPROVEMENT NEEDED | | |
|---|---|---|---|---|---|---|---|---|---|
| | 10 | 9 | (8) | 7 | 6 | 5 | 4 | 3 | 2 |

MENTOR / ASSESSOR's Comments & Recommendation (Service Quality Engineer):

Hafiz had prepared various COP. With the experience handling in planning and communication with client, he had deliver good good in ensuring smooth planning and job delivery.

| Signature | | Assessment Date | 14/10/2024 |
|---|---|---|---|
| Name | MUHAMMAD NOORHAFIZAN BIN AB. MAJID | Position | SERVICE QUALITY ENG. |

FSM / OM Comments & Recommendation:

Manage to deliver task very well.

| Signature | | Assessment Date | 14/10/24 |
|---|---|---|---|
| Name | M. KHAIRUL RIDHWAN AZIZAN<br>CTS FIELD SERVICE MANAGER<br>Dimension Bid (M) Sdn Bhd. | Position | FSM |

# DIMENSION BID

## CTS PRESENTATION ASSESSMENT FORM

| | | | |
|---|---|---|---|
| **Presenter's Name** | Muhammad Hafiz Sahamuddin | **Date** | 13/10/2024. |
| **Position** | PE 2 | **SCORE** | |
| **Topic** | Dulang B75 SCO | | |
| **Objective** | Job design and execution for Dulang B75. | | |
| **Assessor (s)** | M. NOORHAFIZAN BIN AB. MAJID | | |

| | Assessment Criteria | Rating (*Please √ where appropriate*) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | STRONG | | | ADEQUATE | | | IMPROVEMENT NEEDED | | |
| | | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 |
| **A** | **Presentation Skill (20%)** | | | | | | | | | |
| | a. The presenter was well prepared and delivered the material in a clear and structured manner. | | | | ✓ | | | | | |
| | b. The presenter was knowledgeable about the topic and able to relate the importance of the subject matter to his job | | | | | ✓ | | | | |
| | c. The presentation contained practical examples and useful techniques that applied to current work. | | | | | ✓ | | | | |
| | | | | | | | | | | |
| **B** | **Creativity (20%)** | | | | | | | | | |
| | a. Did the presenter show creative thinking in the method of development and presentation? | | | | ✓ | | | | | |
| | b. Did presenter get audience involved in "learning" the material? | | | | ✓ | | | | | |
| | | | | | | | | | | |
| **C** | **Content (60%)** | | | | | | | | | |
| | a. Did the presenter cover all the key points of the subject matter | | | | ✓ | | | | | |
| | b. Did the presentation incorporate strong, effective supporting material throughout? | | | | | ✓ | | | | |
| | c. Did the presenter give clear and concert explanation and example? | | | | ✓ | | | | | |
| | d. Was the presenter able to answer questions on subject matter? Answers were correct and corresponded with the required understanding? | | | | | ✓ | | | | |
| | | | | | | | | | | |

**Additional Comments:**

| Assessed By: | Verified By: |
|---|---|
| Name: M. NOORHAFIZAN AB. MAJID | Name: M. KHAIRUL RIDHWAN AZIZAN |
| Position: SERVICE QUALITY ENG. | Position: CTS FIELD SERVICE MANAGER |
| Date: 14/10/2024 | Date: 14/10/2024 |
| | Dimension Bid (M) Sdn Bhd. |

DIMENSION BID
WELL INTERVENTION | PERFORATION SERVICES
Suite 5-1 & 5-2, Menara UOA II, 21 Jln Pinang,
50450 Kuala Lumpur, Malaysia
Tel: +603 - 2166 8877 Fax: +603 - 2166 8787

# QUOTATION

**DBCTS/DULANG/0724/Q-76**

**Quote To:**
**PETRONAS Carigali Sdn Bhd,**
Peninsular Malaysia Operation
Kompleks Operasi Petronas
24300 Kerteh, Terengganu, Malaysia

**Attn:** Pravin Nair

**Date:** 8-Aug-24

**Subject: Quotation to CTU Services for Dulang B-75**

| No | Item | UOM | Unit Price (RM) | Quantity/Day | Total (RM) |
|---|---|---|---|---|---|
| **Equipment, Personnel and Services list as per Contract requirement & Price Book: Contract Ref: CHO/2015/DR/1006(A)** | | | | | |
| **A** | **CTU Package Rental & Personnel Charges:** | | | | |
| 1 | Mob/Demobilize for Pumping (Call Out) | EA | 33,075.00 | 1 | 33,075.00 |
| 2 | CTU#1 24 Hour Package as per below item:<br>* 1ea of CTU Complete package with PCE<br>* 1ea complete pumping Package<br>* 2 ea Fluid Storage Tank capacity of 105 - 125 bbls each<br>* 2" Treating iron for rig up<br>* Piping/Valves/Hoses for surface rig up<br>* Necessary Crossover<br>* 6 ea of Transfer Pump (Wilden)<br>* 1ea Tool Container<br>* 1ea Iron Transport Basket<br>* 1ea Zone II Air Compressor 175 scfm<br>* 1ea Genset | PKG | 1,129,519.33 | 1 | 1,129,519.33 |
| 3 | 21 pax of Personnel for 24 hour Operation | | 552,263.80 | 1 | 552,263.80 |
| 4 | 1 set Downhole tool for SCO | PKG | 197,039.30 | 1 | 197,039.30 |
| 5 | RIH Charges | | 21,359.31 | 2 | 21,359.31 |
| **B** | **Chemical Charges (Estimation charge per usage):** | | | | |
| 1 | | | | | |
| | Nitrogen | gal | 6.00 | 8,000 | 48,000.00 |
| | H2S/CO2 corrosion inhibitor | gal | 73.50 | 220 | 16,170.00 |
| | Microbiocide | gal | 71.40 | 220 | 15,708.00 |
| | Oxygen Scavenger | gal | 121.00 | 220 | 26,620.00 |
| | Contingency Wax Dissolver | | | | |
| | Wax/Paraffin Removal (WaxCLEN300) | gal | 165.90 | 550 | 91,245.00 |
| | Contingency Lost Circulation Material | | | | |
| | Calcium Carbonate | Lbs | 1.58 | 1,760 | 2,780.80 |
| | | | | **Grand Total:** | **2,133,780.53** |

**Additional Notes :**

1. Terms and condition as per contract PMA CHO/2015/DR/1006(A)
2. Quotation is based on proposal which includes the risk mitigation.
3. Charges applied based on rental, operating and services provided not objectivity basis.
4. All other charges apply as per contract if there any deviation from the proposal.

| Incoterms | Origin | Delivery Period | Validity | Payment Term |
|---|---|---|---|---|
| Ex Work | KSB | 14 DAYS | 60 DAYS | 30 DAYS |

| Prepared by: | Muhammad Hafiz | Approved By: | Alif Adonan |
|---|---|---|---|

**Please indicate your acceptance below:**

I hereby agree with the quoted price(s), terms & conditions in DBCTS/DULANG/0724/Q-76:

| Agreed by (Name & Position): | Signature: |
|---|---|
| | |

**Terms and Conditions:**

**1. Definitions:**

a. "COMPANY" means Dimension Bid M Sdn Bhd.

b. "MOBILIZATION /DEMOBILIZATION POINT" means COMPANY warehouse in Kemaman Supply Base (KSB) and/or Asian Supply Base (ASB) or otherwise stated based on THIRD PARTY conditions.

**2. Customs Taxes & Duties**

a. The above rates do not include customs taxes & duties (import & export charges). The said charges shall be borne by Customer. Any such charges paid in advance by Dimension Bid will be

b. The above rates are exclusive of Witholding Tax (WHT) and any other taxes.

**3. Provisions by Clients**

a. Client shall advice Company regarding their Company Requirements for Personnel to go onboard their Worksite (with regards to Safety Passport, Medical Examination, etc.)

b. Transportation (other than covered under Mob/Demob Charges), and storage of equipment

c. Customer shall extend their assistance for any issues related to customs clearance and also immigration procedures.

d. Client needs to provide transportation for equipment and personnel from mobilization site and back to demobilization site, lodging including meals and any relevant matters.

**4. Lost, Damages and Repair**

a. Any repairs for damages, or loss of equipment that occur during the performance of Works, during transportation from mobilization/demobilization site to the Worksite, or other conditions in which the Equipment is under the care of the client will be charged at Cost plus 20%. On top of that, any spare parts will be charged at cost plus 20%.

**5. Adverse/ Corrosive Environment**

a. Customer is to advise on the existence of adverse and/or corrosive environments in their wells before the Works are being performed. Dimension Bid reserves the rights to suspend and/or cancel

**6. Mobilization/Demobilization**

a. Equipment will be suitably prepared/ protected/packed for transportation. Special packaging will be available at cost plus 20% upon request.

**7. Stop Work Policy**

a. Company implements a "Stop Work Policy" whereby Company and its Personnel reserves the right to stop the work if the condition at the time is considered unsafe. A copy of the said policy can

**8. Late Payment Charges**

a. In the event customer fails to pay Company the agreed amount within 30 days from the date of invoice , a penalty of one and half per centum (1.5%) per month of the outstanding amount shall

**9. Liabilities and Indemnity**

a. COMPANY will not be liable for any THIRD PARTY services being rendered thru our contract for the CLIENT.

b. The performance of the said tools/equipments/services is not guaranteed by COMPANY.

**10. Validity of Unit Price**

a. The quoted unit price is exclusive for once and only once for the well stated above, limited to the stated services above.

b. The quoted unit price shall not govern and control any future commercial terms and conditions.

**10. Validity of Unit Price**

a. The quoted unit price is exclusive for once and only once for the well stated above, limited to the stated services above.

b. The quoted unit price shall not govern and control any future commercial terms and conditions.

# DIMENSION BID

CLIENT : PETRONAS CARIGALI SDN BHD / PENINSULAR MALAYSIA ASSET / PETRONAS SUB SURFACE & WELL INTERVENTION
DB CTU Contract: CHO/2015/DR/1006(A)
Package : DB CTU PACKAGE # 1 COST ESTIMATION JULY 2024 # 24 HOURS OPERATION
Field / Location : DULANG B-7S
Job Scope : CTU - SCO
Mobilization Date : July
Updated Date : 8-Aug-24
Quotation No: DBCTS/DULANG/0724/Q-76

| ITEM | DESCRIPTION | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | SURFACE EQUIPMENT & MOB/DEMOB | Unit Price | UOM | Qty | Unit | | Amount |
| 1.1 | Mobilization Cost for CTU Package (Call Out Package) | MYR 33,075.00 | Mob | | | | MYR 0.00 |
| 1.2 | Demobilization Cost for CTU Package (Call Out Package) | MYR 33,075.00 | Demob | 1 | 1 | | MYR 33,075.00 |
| | | | | | SUBTOTAL | | MYR 33,075.00 |
| 2 | COILED TUBING UNIT (CTU # 02) -All Zone 2 Unit | Unit Price | UOM | Qty | Operational Day | Daily Rate | Amount |
| 2.2.1 | CT Reel 1-3/2 OD | MYR 24,350.00 | Month | 1 | 17 | MYR 805.00 | MYR 13,685.00 |
| 2.2.2 | Control Cabin | MYR 19,227.60 | Month | 1 | 17 | MYR 640.92 | MYR 10,895.64 |
| 2.2.3 | Extendable Jacking Frame | MYR 21,000.00 | Month | 1 | 17 | MYR 700.00 | MYR 11,900.00 |
| 2.2.5 | CTU Power Pack | MYR 23,066.40 | Month | 1 | 17 | MYR 768.88 | MYR 13,070.96 |
| 2.2.6 | Genset 60KVA Zone 2 | MYR 76,113.45 | Month | 1 | 17 | MYR 2,537.12 | MYR 43,130.96 |
| 2.2.7 | Air Compresser 175CFM Zone 2 | MYR 40,540.50 | Month | 1 | 17 | MYR 1,351.35 | MYR 22,972.95 |
| 2.3 | PRESSURE CONTROL EQUIPMENT (PCE) | Unit Price | UOM | Qty | Operational Day | Daily Rate | Amount |
| 2.3.1 | Injector Head Assembly | MYR 18,485.25 | Month | 1 | 17 | MYR 616.18 | MYR 10,474.98 |
| 2.3.2 | Stripper | MYR 4,725.00 | Month | 1 | 17 | MYR 157.50 | MYR 2,677.50 |
| 2.3.4 | 4-1/16 Single Shear/Seal BOP | MYR 3,103.80 | Month | 1 | 17 | MYR 103.46 | MYR 1,758.82 |
| 2.3.5 | 4-1/16 Combi BOP | MYR 5,221.75 | Month | 1 | 17 | MYR 174.13 | MYR 2,960.13 |
| 2.3.6 | PCE Accumulator System | MYR 5,250.00 | Month | 1 | 17 | MYR 175.00 | MYR 2,975.00 |
| 2.3.7 | Wellhead Crossover | MYR 15,750.00 | Month | 4 | 17 | MYR 2,100.00 | MYR 35,700.00 |
| 2.3.7 | Quick test sub | MYR 4,935.00 | Daily | 2 | 14 | MYR 9,870.00 | MYR 276,360.00 |
| 2.3.7 | CT Deployment system | MYR 293,400.00 | Month | 1 | 14 | MYR 9,780.00 | MYR 136,920.00 |
| 2.4 | PUMPING UNIT FACILITIES (PF) | Unit Price | UOM | Qty | Operational Day | Daily Rate | Amount |
| 2.4.1 | 125 BBLS Storage Tank | MYR 11,550.00 | Month | 2 | 17 | MYR 770.00 | MYR 13,090.00 |
| 2.4.2 | 100 BBLS Batch Mixer | MYR 9,770.25 | Month | 1 | 17 | MYR 325.68 | MYR 5,536.48 |
| 2.4.3 | Triplex Pump Unit | MYR 21,504.00 | Month | 1 | 17 | MYR 716.80 | MYR 12,185.60 |
| 2.4.4 | 2" Treating Irons for Pump rig up | MYR 11,025.00 | Month | 1 | 17 | MYR 367.50 | MYR 6,247.50 |
| 2.4.5 | 2" Crossovers for Treating Irons | MYR 15,750.00 | Month | 1 | 17 | MYR 525.00 | MYR 8,925.00 |
| 2.4.6 | Transfer Pump (Hire 3" Wilden Pump & 1ea 2" Wilden Pump) | MYR 1,485.75 | Month | 5 | 17 | MYR 247.63 | MYR 4,209.63 |
| 2.4.7 | Graco Pump | MYR 924.00 | Daily | 1 | 17 | MYR 924.00 | MYR 15,708.00 |
| 2.4.9 | Piping/Valves/Hoses for surface rig up | MYR 1,050.00 | Month | 10 | 17 | MYR 350.00 | MYR 5,950.00 |
| 2.5 | NITROGEN PUMPING FACILITIES | Unit Price | UOM | Qty | Operational Day | Daily Rate | Amount |
| 2.5.1 | N2 Tank | MYR 21,945.00 | Month | 4 | 17 | MYR 2,926.00 | MYR 49,742.00 |
| 2.5.1 | N2 Tank | MYR 735.00 | Daily | 4 | 17 | MYR 2,940.00 | MYR 49,980.00 |
| 2.5.2 | N2 Converter | MYR 31,500.00 | Month | 1 | 17 | MYR 1,050.00 | MYR 17,850.00 |
| 2.5.3 | Piping/ Hoses for N2 rig up (Cryogenic Hoses) | MYR 1,050.00 | Month | 4 | 17 | MYR 340.00 | MYR 2,380.00 |
| 2.6 | ADDITIONAL ITEM | Unit Price | UOM | Qty | Operational Day | Daily Rate | Amount |
| 2.6.1 | 10FT Toolbox Container | MYR 4,500.00 | Month | 2 | 17 | MYR 300.00 | MYR 5,100.00 |
| 2.6.2 | 10FT Cargo Basket | MYR 4,500.00 | Month | 8 | 17 | MYR 1,200.00 | MYR 20,400.00 |
| 2.6.3 | 10FT Cargo Basket | MYR 150.00 | Daily | 7 | 17 | MYR 1,050.00 | MYR 17,850.00 |
| 2.6.4 | 15FT Iron Transport Basket | MYR 5,850.00 | Month | 3 | 17 | MYR 585.00 | MYR 9,945.00 |
| 2.6.4 | 20 FT Iron Transport Basket | MYR 6,300.00 | Month | 1 | 17 | MYR 210.00 | MYR 3,570.00 |
| 2.6.5 | Air Tugger | MYR 10,440.00 | Month | 1 | 17 | MYR 348.00 | MYR 5,916.00 |
| 2.6.5 | Breathing Apparatus - Escape Set | MYR 280.00 | Day | 8 | 17 | MYR 2,240.00 | MYR 38,080.00 |
| 2.6.6 | H2S Detector - Personal Sensor | MYR 105.00 | Day | 16 | 17 | MYR 1,680.00 | MYR 28,560.00 |
| 2.6.10 | Psuedo Tornado price with 25% discount as per Contract - Starlink-Telecommunication Services | MYR 1,600.00 | Day | 1 | 17 | MYR 1,600.00 | MYR 27,200.00 |
| 2.6.10 | Logging Head, Bakke equivalent with 15% discount as per contract (Max Completion) | MYR 1,575.00 | Day | 1 | 17 | MYR 1,575.00 | MYR 26,775.00 |
| | | | | | SUBTOTAL | | MYR 360,682.13 |
| 2.7 | FLOWBACK EQUIPMENT | Unit Price | UOM | QTY | Operational Day | Daily Rate | Amount |
| 2.7.1 | Choke Manifold | MYR 47,250.00 | Month | 1 | 17 | MYR 1,575.00 | MYR 26,775.00 |
| 2.7.2 | Desanding hydrocyclone unit Dual Pot Sand Filter | MYR 92,400.00 | Month | 1 | 17 | MYR 3,080.00 | MYR 52,360.00 |
| 2.7.3 | Sand Screen Box | MYR 14,175.00 | Month | 1 | 17 | MYR 472.50 | MYR 8,032.50 |
| 2.7.4 | Emergency Shutdown Valve c/w Hydraulic Control Panel | MYR 34,650.00 | Month | 1 | 17 | MYR 1,155.00 | MYR 19,635.00 |
| 2.7.5 | Surge Tank, 30 bbls capacity | MYR 11,025.00 | Month | 1 | 17 | MYR 367.50 | MYR 6,247.50 |
| 2.7.6 | Sand rated Wilden Pump | MYR 11,025.00 | Month | 2 | 17 | MYR 735.00 | MYR 12,495.00 |
| 2.7.7 | Treating Irons | MYR 11,025.00 | Month | 1 | 17 | MYR 367.50 | MYR 6,247.50 |
| 2.7.8 | Low pressure hosses & valve - Hydrocarbon Transfer hose (20 barg rating) | MYR 1,312.50 | Month | 1 | 17 | MYR 43.75 | MYR 743.75 |
| 2.7.9 | Low pressure hosses & valve - Hydrocarbon Transfer hose (80 barg rating) | MYR 1,312.50 | Month | 1 | 17 | MYR 43.75 | MYR 743.75 |
| 2.7.10 | Necessary Crossover | MYR 15,750.00 | Month | 2 | 17 | MYR 1,050.00 | MYR 17,850.00 |
| 2.7.12 | 20 FT Iron Transport Basket | MYR 6,300.00 | Month | 1 | 17 | MYR 210.00 | MYR 3,570.00 |
| 2.7.13 | Sand Waste Container | MYR 6,237.00 | Month | 4 | 17 | MYR 831.60 | MYR 14,137.20 |
| | | | | | SUBTOTAL | | MYR 266,837.20 |

| GRAND TOTAL CTU SURFACE EQUIPMENT | MYR 1,162,594.93 |
|---|---|

Prepared by:
Muhammad Hafiz
DB Operation Engineer

Reviewed by:
Asf Adesun
DB General Manager

Acknowledge by:
Prawin Nair
PSS Dulang EIC

Approved by:
Eddy B. Samaile
Head, Well Intervention

[Open]

# DIMENSION BID

PETRONAS

CLIENT : PETRONAS CARIGALI SDN BHD / PENINSULAR MALAYSIA ASSET / PETRONAS SUB SURFACE & WELL INTERVENTION
DB CTU Contract: CHO/2015/DR/1006(A)
Package : DB CTU PACKAGE # 1 COST ESTIMATION JULY 2024 # 24 HOURS OPERATION
Field / Location : DULANG B-7S
Job Scope : CTU - SCO
Mobilization Date :
Updated Date : 8-Aug-24
Quotation No: DBCTS/DULANG/0724/Q-76

| ITEM | DESCRIPTION | | | | | | |
|---|---|---|---|---|---|---|---|
| 2 | CTU DOWNHOLE TOOL EQUIPMENT | Unit Price | UOM | Qty | Operational Day | Daily Rate | Amount |
| 2.1 | *Conventional Nozel* | | | | | | |
| 2.1.1 | 2-1/8" OD Single Bore Nozzle / Cleanout Nozzle (Monthly Rate) | MYR 179.55 | Monthly | 1 | 17 | MYR 5.99 | MYR 101.75 |
| 2.1.2 | 2-1/8" OD Single Bore Nozzle / Cleanout Nozzle (Call out - Standby Rate) | MYR 4.20 | Day | 1 | 17 | MYR 4.20 | MYR 71.40 |
| 2.1.3 | 2-1/8" OD Single Bore Nozzle / Cleanout Nozzle (Call out - Operating Rate) | MYR 5.36 | Day | 1 | 0 | MYR 5.36 | MYR 0.00 |
| 2.2 | *High Pressure Jetting Nozel* | | | | | | |
| 2.2.1 | 2-1/8" OD Multi-Jet Wash Nozzle (Monthly Rate) | MYR 5,490.45 | Monthly | 1 | 17 | MYR 183.02 | MYR 3,111.26 |
| 2.2.2 | 2-1/8" OD Multi-Jet Wash Nozzle (Call out - Standby Rate) | MYR 247.80 | Day | 1 | 15 | MYR 247.80 | MYR 3,717.00 |
| 2.2.3 | 2-1/8" OD Multi-Jet Wash Nozzle (Call out - Operating Rate) | MYR 353.85 | Day | 1 | 2 | MYR 353.85 | MYR 707.70 |
| 2.3 | *CT Connector* | | | | | | |
| 2.3.1 | Roll On Connector for 1-1/2" CT OD (Monthly Rate) | MYR 158.55 | Monthly | 1 | 17 | MYR 5.29 | MYR 89.85 |
| 2.3.2 | Roll On Connector for 1-1/2" CT OD (Call out - Standby Rate) | MYR 3.68 | Day | 1 | 17 | MYR 3.68 | MYR 62.56 |
| 2.3.3 | Roll On Connector for 1-1/2" CT OD (Call out - Operating Rate) | MYR 5.25 | Day | 1 | 17 | MYR 5.25 | MYR 89.25 |
| 2.3.4 | External Dimple Connector for 1-1/2" CT OD (Monthly Rate) | MYR 378.00 | Monthly | 1 | 17 | MYR 12.60 | MYR 214.20 |
| 2.3.5 | External Dimple Connector for 1-1/2" CT OD (Call out - Standby Rate) | MYR 9.45 | Day | 1 | 17 | MYR 9.45 | MYR 160.65 |
| 2.3.6 | External Dimple Connector for 1-1/2" CT OD (Call out - Operating Rate) | MYR 12.60 | Day | 1 | 17 | MYR 12.60 | MYR 214.20 |
| 2.3.7 | Internal Dimple Connector for 1-1/2" CT OD (Monthly Rate) | MYR 378.00 | Monthly | 1 | 17 | MYR 12.60 | MYR 214.20 |
| 2.3.8 | Internal Dimple Connector for 1-1/2" CT OD (Call out - Standby Rate) | MYR 7.42 | Day | 1 | 15 | MYR 7.42 | MYR 111.30 |
| 2.3.9 | Internal Dimple Connector for 1-1/2" CT OD (Call out - Operating Rate) | MYR 10.60 | Day | 1 | 2 | MYR 10.60 | MYR 21.20 |
| 2.4 | *Motor Head Assembly* | | | | | | |
| 2.4.1 | 2-1/8" OD MHA (Monthly Rate) | MYR 5,145.00 | Monthly | 1 | 17 | MYR 171.50 | MYR 2,915.50 |
| 2.4.2 | 1-11/16" OD MHA (Call out - Standby Rate) | MYR 720.30 | Day | 1 | 17 | MYR 720.30 | MYR 12,245.10 |
| 2.4.3 | 1-11/16" OD MHA (Call out - Standby Rate) | MYR 720.30 | Day | 1 | 15 | MYR 720.30 | MYR 10,804.50 |
| 2.4.4 | 1-11/16" OD MHA (Call out - Operating Rate) | MYR 1,029.00 | Day | 1 | 2 | MYR 1,029.00 | MYR 2,058.00 |
| 2.5 | *Straight Bar* | | | | | | |
| 2.5.1 | 1-11/16 to 2-1/8" OD Straight Bar (Monthly Rate) | MYR 96.60 | Monthly | 1 | 17 | MYR 3.22 | MYR 54.74 |
| 2.5.2 | 1-11/16 to 2-1/8" OD Straight Bar (Call out - Standby Rate) | MYR 31.50 | Day | 17 | 15 | MYR 535.50 | MYR 8,032.50 |
| 2.5.3 | 1-11/16 to 2-1/8" OD Straight Bar (Call out - Operating Rate) | MYR 44.10 | Day | 17 | 2 | MYR 749.70 | MYR 25,489.80 |
| 2.6 | *Cross Over* | | | | | | |
| 2.6.1 | Sufficient X-Over (Monthly Rate) | MYR 871.50 | Monthly | 1 | 17 | MYR 29.05 | MYR 493.85 |
| 2.6.2 | Sufficient X-Over (Call out - Standby Rate) | MYR 50.40 | Day | 1 | 17 | MYR 50.40 | MYR 856.80 |
| 2.6.3 | Sufficient X-Over (Call out - Operating Rate) | MYR 71.40 | Day | 1 | 0 | MYR 71.40 | MYR 0.00 |
| 2.7 | *SpinCAT Tool* | | | | | | |
| 2.7.1 | SpinCAT (Operating Rate) | MYR 4,410.00 | Day | 1 | 0 | MYR 4,410.00 | MYR 0.00 |
| 2.7.2 | SpinCAT (Call out - Standby Rate) | MYR 2,205.00 | Day | 1 | 0 | MYR 2,205.00 | MYR 0.00 |
| 2.7.3 | SpinCAT (Call out - Standby Rate) | MYR 2,205.00 | Day | 1 | 0 | MYR 2,205.00 | MYR 0.00 |
| 2.7.4 | Downhole Filter | MYR 564.90 | Day | 2 | 0 | MYR 1,129.80 | MYR 0.00 |
| 2.8 | *Deployment BHA* | | | | | | |
| 2.8.1 | Quick connect for deployment system (Call - out Standby Rate) | MYR 2,169.30 | Day | 2 | 14 | MYR 4,338.60 | MYR 60,740.40 |
| 2.8.2 | Quick connect for deployment system (Call - out Standby Rate) | MYR 2,169.30 | Day | 2 | 12 | MYR 4,338.60 | MYR 52,063.20 |
| 2.8.2 | Quick connect for deployment system (Operating Standby Rate) | MYR 3,099.60 | Day | 2 | 2 | MYR 6,199.20 | MYR 12,398.40 |
| | | | | | SUBTOTAL | | MYR 197,039.30 |
| 3 | CTU OPERATION COST / RUN IN HOLE CHARGES | | | | | | |
| 3.1 | Run-In-Hole Charges # 1 (SCO) | MYR 4.20 | feet | 5086 | 1 | MYR 21,359.31 | MYR 21,359.31 |
| | | | | | | | |
| | | | | | SUBTOTAL | | MYR 21,359.31 |
| | | | | | GRAND TOTAL CTU ADDITIONAL EQUIPMENT | | MYR 218,398.61 |

| Prepared by: | Reviewed by: | Acknowledge by: | Approved by: |
|---|---|---|---|
| Muhammad Hafiz<br>DB Operation Engineer | Alif Agenan<br>DB General Manager | Pravin Nair<br>PSS Dulang EIC | Eddy B. Samaile<br>Head, Well Intervention |

[Open]

# DIMENSION BID

PETRONAS

CLIENT : PETRONAS CARIGALI SDN BHD / PENINSULAR MALAYSIA ASSET / PETRONAS SUB SURFACE & WELL INTERVENTION
DB CTU Contract: CHO/2015/DR/1006(A)
Package : DB CTU PACKAGE # 1 COST ESTIMATION JULY 2024 # 24 HOURS OPERATION
Field / Location : DULANG B-7S
Job Scope : CTU - SCO
Mobilization Date :
Updated Date : 8-Aug-24
Quotation No: DBCTS/DULANG/0724/Q-76

| ITEM | DESCRIPTION | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | CTU PERSONNEL (24 hours Crew) | Unit Price | UOM | Qty | Day | Daily Rate | Amount |
| 1.1 | CTU Supervisor (Day) | MYR 46,725.00 | Month | 1 | 17 | MYR 1,557.50 | MYR 26,477.50 |
| | CTU Supervisor (Night) | MYR 46,725.00 | Month | 1 | 17 | MYR 1,557.50 | MYR 26,477.50 |
| 1.2 | CTU Operator (Day) | MYR 42,000.00 | Month | 1 | 17 | MYR 1,400.00 | MYR 23,800.00 |
| | CTU Operator (Night) | MYR 42,000.00 | Month | 1 | 17 | MYR 1,400.00 | MYR 23,800.00 |
| 1.3 | Pump Operator (Day) | MYR 28,875.00 | Month | 1 | 17 | MYR 962.50 | MYR 16,362.50 |
| | Pump Operator (Night) | MYR 28,875.00 | Month | 1 | 17 | MYR 962.50 | MYR 16,362.50 |
| 1.4 | Pump Operator (Day)(BMX) | MYR 28,875.00 | Month | 1 | 17 | MYR 962.50 | MYR 16,362.50 |
| | Pump Operator (Night)(BMX) | MYR 28,875.00 | Month | 1 | 17 | MYR 962.50 | MYR 16,362.50 |
| 1.5 | Nitrogen Operator (Day) | MYR 28,875.00 | Month | 1 | 17 | MYR 962.50 | MYR 16,362.50 |
| | Nitrogen Operator (Night) | MYR 28,875.00 | Month | 1 | 17 | MYR 962.50 | MYR 16,362.50 |
| 1.6 | Helper (Day) | MYR 12,600.00 | Month | 1 | 17 | MYR 420.00 | MYR 7,140.00 |
| | Helper (Night) | MYR 12,600.00 | Month | 1 | 17 | MYR 420.00 | MYR 7,140.00 |
| 1.7 | Safety Officer (Day) | MYR 78,750.00 | Month | 1 | 17 | MYR 2,625.00 | MYR 44,625.00 |
| | Safety Officer (Night) | MYR 78,750.00 | Month | 1 | 17 | MYR 2,625.00 | MYR 44,625.00 |
| 1.8 | Chargemen | MYR 1,800.00 | Month | 1 | 17 | MYR 1,800.00 | MYR 30,600.00 |
| 1.9 | Mechanic/ET | MYR 1,627.50 | Day | 1 | 17 | MYR 1,627.50 | MYR 27,667.50 |
| 1.9 | Tool Specialist | MYR 3,255.00 | Day | 1 | 10 | MYR 3,255.00 | MYR 32,550.00 |
| | | | | | | SUBTOTAL | MYR 393,077.50 |
| 2 | FLOWBACK PERSONNEL (24 hours Crew) | | | | | | |
| 2.1 | Sand Separation/Filtration System Operator (Day) | MYR 70,229.25 | Month | 1 | 17 | MYR 2,340.98 | MYR 39,796.58 |
| 2.2 | Sand Separation/Filtration System Operator (Day) | MYR 70,229.25 | Month | 1 | 17 | MYR 2,340.98 | MYR 39,796.58 |
| 2.4 | Sand Separation/Filtration System Operator (Night) | MYR 70,229.25 | Month | 1 | 17 | MYR 2,340.98 | MYR 39,796.58 |
| 2.5 | Sand Separation/Filtration System Operator (Night) | MYR 70,229.25 | Month | 1 | 17 | MYR 2,340.98 | MYR 39,796.58 |
| | | | | | | | |
| | | | | | | SUBTOTAL | MYR 159,186.30 |

| GRAND TOTAL CTU PERSONNEL OPERATION | MYR 552,263.80 |
|---|---|

| Prepared by: | Reviewed by: | Acknowledge by: | Approved by: |
|---|---|---|---|
| Muhammad Hafiz<br>DB Operation Engineer | Alif Adenan<br>DB General Manager | Pravin Nair<br>PSS Dulang EIC | Eddy B. Samaile<br>Head, Well Intervention |

[Open]

# DIMENSION BID

PETRONAS

**CLIENT :** PETRONAS CARIGALI SDN BHD / PENINSULAR MALAYSIA ASSET / PETRONAS SUB SURFACE
**DB CTU Contract:** CHO/2015/DR/1006(A)
**Package :** DB CTU PACKAGE # 1 COST ESTIMATION JULY 2024 # 24 HOURS OPERATION
**Field / Location :** DULANG B-7S
**Job Scope :** CTU - SCO
**Mobilization Date :**
**Updated Date :** 8-Aug-24
**Quotation No:** DBCTS/DULANG/0724/Q-76

| ITEM | DESCRIPTION | | | | |
|---|---|---|---|---|---|
| 1 | CTU CHEMICAL USED FOR OPERATIONS | Unit Price | UOM | Qty | Amount |
| 1.1 | Nitrogen | MYR 6.00 | gal | 8000 | MYR 48,000.00 |
| 1.2 | H2S/CO2 corrosion inhibitor | MYR 73.50 | gal | 220 | MYR 16,170.00 |
| 1.3 | Microbiocide | MYR 71.40 | gal | 220 | MYR 15,708.00 |
| 1.4 | Oxygen Scavenger | MYR 121.00 | gal | 220 | MYR 26,620.00 |
| 2 | ***Contingency Wax Dissolver*** | | | | |
| 2.1 | Wax/Paraffin Removal (WaxCLEN300) | MYR 165.90 | gal | 550 | MYR 91,245.00 |
| 3 | ***Contingency Lost Circulation Material*** | | | | |
| 3.1 | Calcium Carbonate | MYR 1.58 | lb | 1760 | MYR 2,780.80 |
| | | | | **SUBTOTAL** | **MYR 200,523.80** |

| | |
|---|---|
| GRAND TOTAL FOR CHEMICAL USED FOR CTU & PUMPING OPERATIONS | **MYR 200,523.80** |

| Prepared by: | Reviewed by: | Acknowledge by: | Approved by: |
|---|---|---|---|
| Muhammad Hafiz | Alif Adenan | Pravin Nair | Eddy B. Samaile |
| DB Operation Engineer | DB General Manager | PSS Dulang EIC | Head, Well Intervention |

# DIMENSION BID

PETRONAS

CTU - SCO

| A | EQUIPMENT RENTAL CHARGES | MYR |
|---|---|---|
| 1 | Mobilization CTU & Pumping package | 33,075.00 |
| 2 | CTU Surface Equipment, PCE, Pumping, Nitrogen Pumping | 960,682.13 |
| 3 | Flowback / Sand Filtration System Equipment | 168,837.20 |
| | **Total Charges** | **1,162,594.33** |
| | | |
| **B** | **DOWNHOLE TOOLS & OPERATION CHARGES** | MYR |
| 1 | Call Out Downhole Tools | 197,039.30 |
| 2 | Operating / Run In Hole, Logging Services Charges | 21,359.31 |
| | **Total Charges** | **218,398.61** |
| | | |
| **C** | **MANPOWER CHARGES** | MYR |
| 1 | CTU Manpower, 24Hrs Operation | 393,077.50 |
| 2 | Flowback / Sand Filtration Manpower, 24Hrs Operation | 159,186.30 |
| | **Total Charges** | **552,263.80** |
| | | |
| **D** | **CHEMICAL & CONSUMMABLE CHARGES** | MYR |
| 1 | Chemical Supplied & Used | 200,523.80 |
| | | |
| | **Total Charges** | **200,523.80** |
| | | |
| | **Grand Total (A + B + C + D)** | **2,133,780.53** |

Neu Dimension
Your Integrated Solutions Partner

# DULANG B07S
# SAND CLEANOUT
# Rev.0

Neu Dimension
Your Integrated Solutions Partner

# Table of content:

Neu Dimension
Your Integrated Solutions Partner

# Introduction & well overview

## Problem statement

Decline in production rate, suspected sand accumulate outside of the tubing in short string

## Operation objective

1. To perform CT Sand/Scale cleanout inside casing until 17 m below btm perforation, depth 1,545 m,

**Note:**

All depth stated is m-MDTHF

Neu Dimension
Your Integrated Solutions Partner

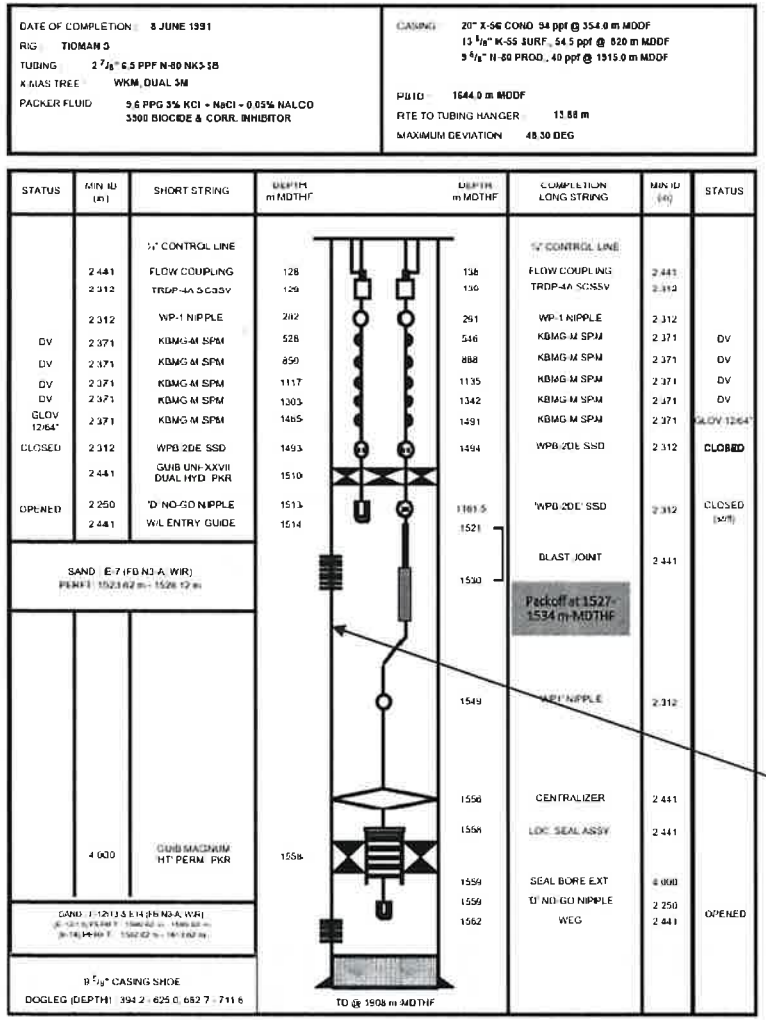
LATEST UPDATE: MAR 2022



# Well schematic

**DULANG WELL COMPLETION DIAGRAM**

WELL B-7, DUAL OIL PRODUCER IN 9 5/8" CASING (TYPE 5)

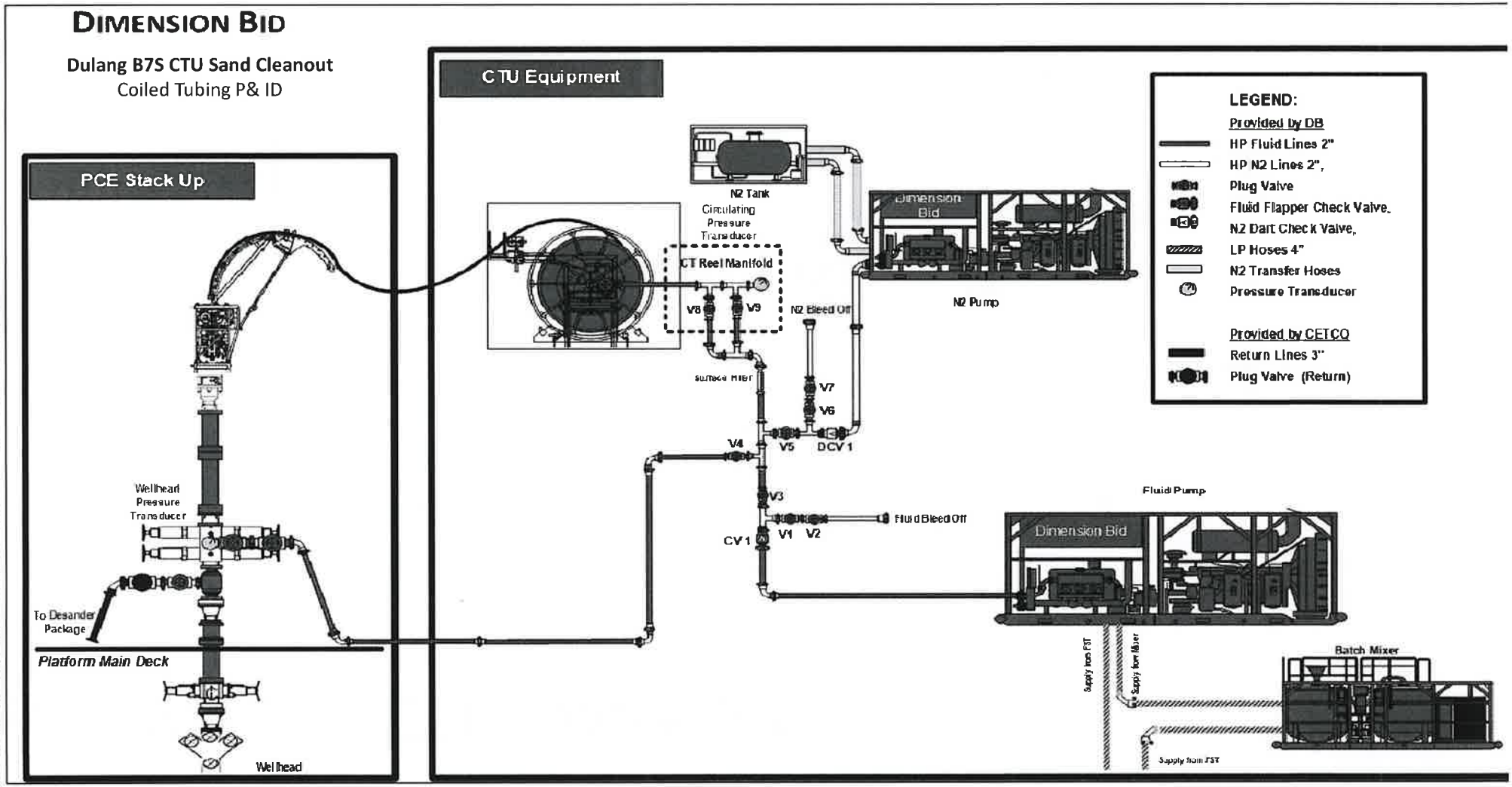



| Input Parameter | Parameter Value |
|---|---|
| **Field** | Dulang Bravo |
| **Max. Deviation (degrees)** | 48.3 degree |
| **Min. Restriction (inch)** | 2.25" @ No Go nipple |
| **Type of Fluid & Density** | 9.6 ppg (based on data in Well Diagram) |
| **Top of Fluid** | N/A |
| **Current Well Status** | Production decline, assume sand accumulated outside of the tubing |
| **Reservoir Pressure** | 1600-1900 psi |
| **Fracture Gradient** | 0.72 |
| **H2S Content** | H2S - 0 ppm |
| **CO2 Content** | CO2 - 15-30 mole% (oil), 50-60 mole% (gas) |
| **Mercury, HG** | N/A |

Target depth 1,545m

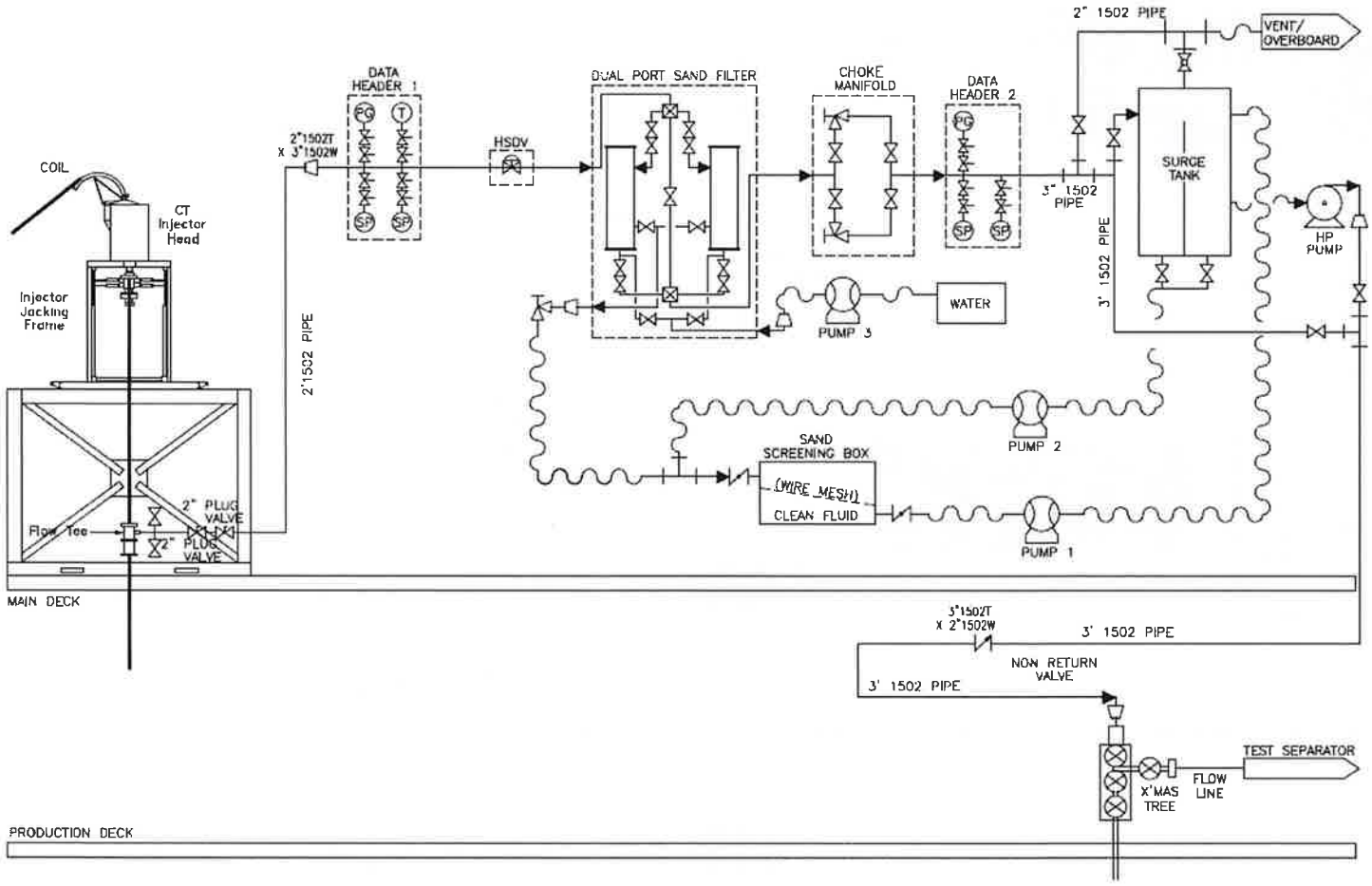
Neu Dimension
Your Integrated Solutions Partner

# P&ID – CTU cleanout



Neu Dimension
Your Integrated Solutions Partner

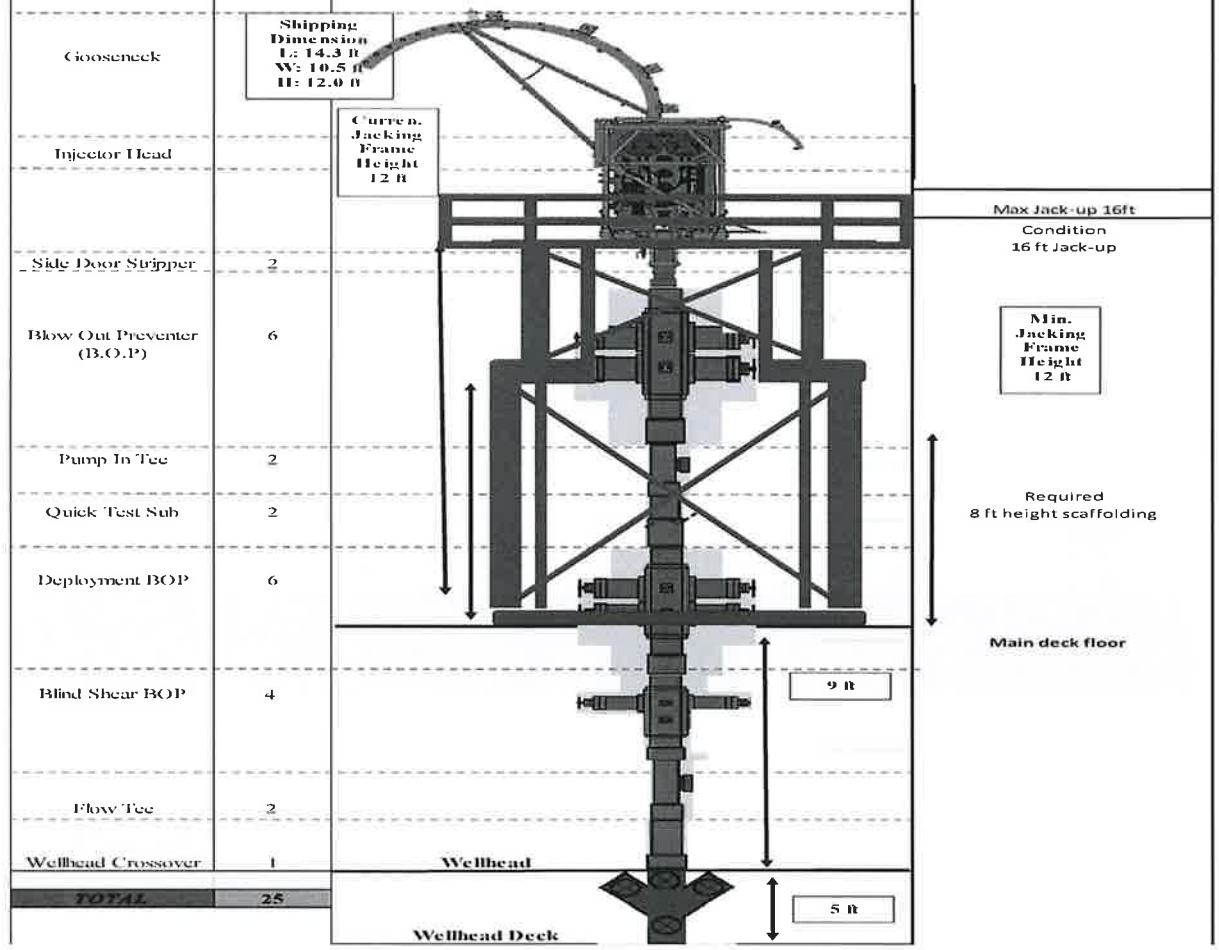
# P&ID – CTU cleanout



Neu
Dimension
Your Integrated Solutions Partner

# Well stack-up

| DIMENSION BID | | Well Name | Dulang B-7S | DIMENSION BID |
|---|---|---|---|---|
| Component Description | Component Length | Job Type | SCO | |
| | | Client | PCSB | |
| ft | ft | Revision | 0 | |
| PCE STACK-UP | | | | |
| ft | ft | | | |
| Gooseneck | | | | |
| Injector Head | | | | |
| Side Door Stripper | 2 | | | |
| Blow Out Preventer (B.O.P) | 6 | | | |
| Pump In Tee | 2 | | | |
| Quick Test Sub | 2 | | | |
| Deployment BOP | 6 | | | |
| Blind Shear BOP | 4 | | | |
| Flow Tee | 2 | | | |
| Wellhead Crossover | 1 | | | |
| TOTAL | 25 | | | |



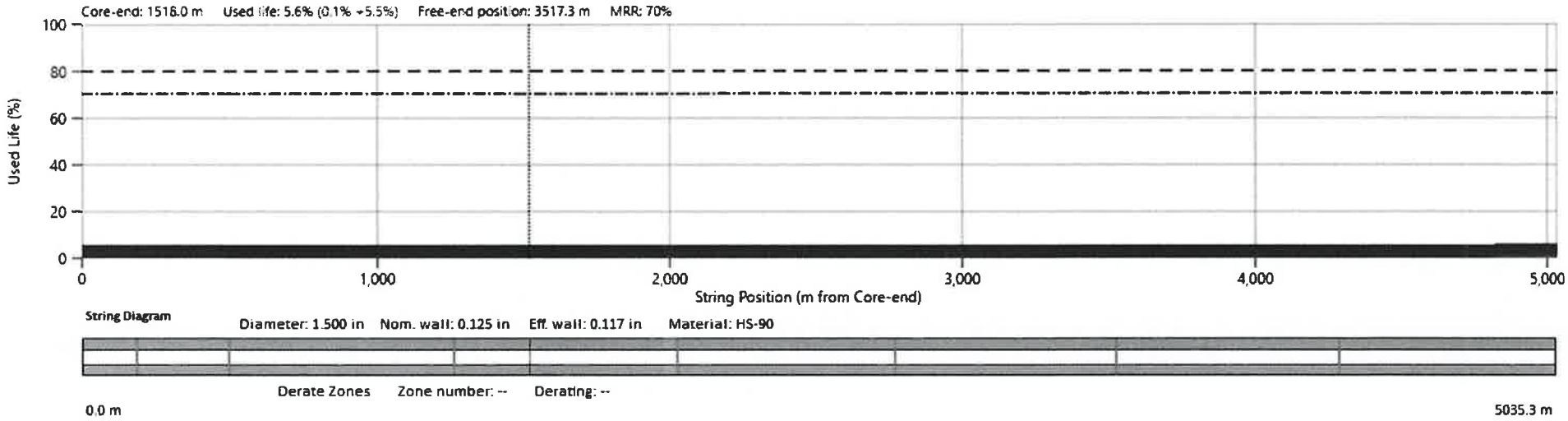
Neu Dimension
Your Integrated Solutions Partner

# Volume calculation

| Volume | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type | External Pipe | | | Internal Pipe 1 | | | Internal Pipe 2 | | | Caps | From | To | From | To | Length | Total Volume (bbls) |
| | OD (inch) | ID (inch) | W(lb/ft) | OD (inch) | ID (inch) | W(lb/ft) | OD (inch) | ID (inch) | W(lb/ft) | Barrel/lin (ft) | m | m | ft | ft | ft | |
| Tubing volume until EOT | 2 7/8 | 2.441 | | | | | | | | 0.00579 | 0 | 1,514 | 0 | 4,967 | 4,967 | **28.75** |
| Wellbore volume | 9 5/8 | 8.835 | | 2 7/8 | | | | | | 0.07582 | 1,510 | 1,558 | 4,954 | 5,112 | 157 | **11.94** |
| PCP volume | 9 5/8 | 8.835 | | 2 7/8 | | | 2 7/8 | | | 0.05977 | 0 | 1,510 | 0 | 4,954 | 4,954 | **296.10** |

Neu Dimension
Your Integrated Solutions Partner

# String details



Neu Dimension
Your Integrated Solutions Partner

# String details

## CT String Details

| | |
|---|---|
| String | #40423 |
| Manufacturer | TENARIS |
| OD | 1.5" |
| Grade | HS 90 |
| Initial Spooled Length, ft | 16,520 |
| Cable (length/ID Num) | |
| Weld Type | BIAS WELD |
| Tubing Weight | 30399lbs |
| Commision Date | 18-Apr-23 |

| Run # | Date | Client Name | Field Name | Well Num | Job type | CT leng ft | Job Fatigue % | Job Corrosion % | Cum Fatigue | Cum. Corrosion % | Used String Life % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 15/7/2023 | PCSB | OPEN YARD | NA | Received CT String from Manufacturer | 16520 | 0 | 0 | 0 | 0 | 0 |
| | 1/9/2023 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 0.5 | 0.5 |
| | 1/10/2023 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 1 | 1 |
| | 1-Nov-23 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 1.5 | 1.5 |
| | 1-Dec-23 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 2 | 2 |
| | 1-Jan-24 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 2.5 | 2.5 |
| | 1-Feb-24 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 3 | 3 |
| | 1-Mar-24 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 3.5 | 3.5 |
| | 1-Apr-24 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 4 | 4 |
| | 1-May-24 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 4.5 | 4.5 |
| | 1-Jun-24 | PCSB | OPEN YARD | NA | 1 Month storage at Open yard | 16,520 | 0 | 0.5 | 0 | 5 | 5 |
| | 13-Jul-24 | PCSB | OPEN YARD | NA | SPOOLING INTO CTR DRUM | 16,520 | 0 | 0.5 | 0 | 5.5 | 5.5 |
| | 14-Jul-24 | PCSB | OPEN YARD | NA | DROB BALL/MAKE UP/PT/CI/PURGE | 16,513 | 0 | 0 | 0 | 5.5 | 5.5 |

Neu Dimension
Your Integrated Solutions Partner

# Job execution summary

| Operation | Job summary |
|---|---|
| Slickline operation | 1. TCC (depends on client job execution plan) |
| CT operation | 1. Sand cleanout from EOT(1,514 m) until 17 m below perforation zone (1,545m) |
| Slickline operation | 1. TCC (depends on client job execution plan) |

Neu Dimension
Your Integrated Solutions Partner

# Job execution plan – Deployment BOP

- Run#1 – Sand cleanout from EOT at 1,514m until 1,545m using multi-jet nozzle;
  1. Make up BHA consist of the following tool:

First section

| # | Description (OPTION 1 BHA) | $OD_{(max)}$ | Length , ft | Length , m |
|---|---|---|---|---|
| 1 | End connector: Internal dimple | 1.69" | 0.3 | 0.1 |
| 2 | Motorhead assembly (MHA) | 1.69" | 2.3 | 0.7 |
| 3 | Carsac | 1.69" | 1.6 | 0.49 |
| 4 | Kelly Cock Valve | 1.69" | 1.6 | 0.49 |
| 5 | Deployment bar | 1.5" | 6 | 1.83 |
| 6 | Straight Bar | 1.69" | 90 | 27.4 |
| 7 | Multi jet nozzle | 1.69" | 1.0 | 0.3 |
| | | Cumulative Length | 102.8 | 32.61 |

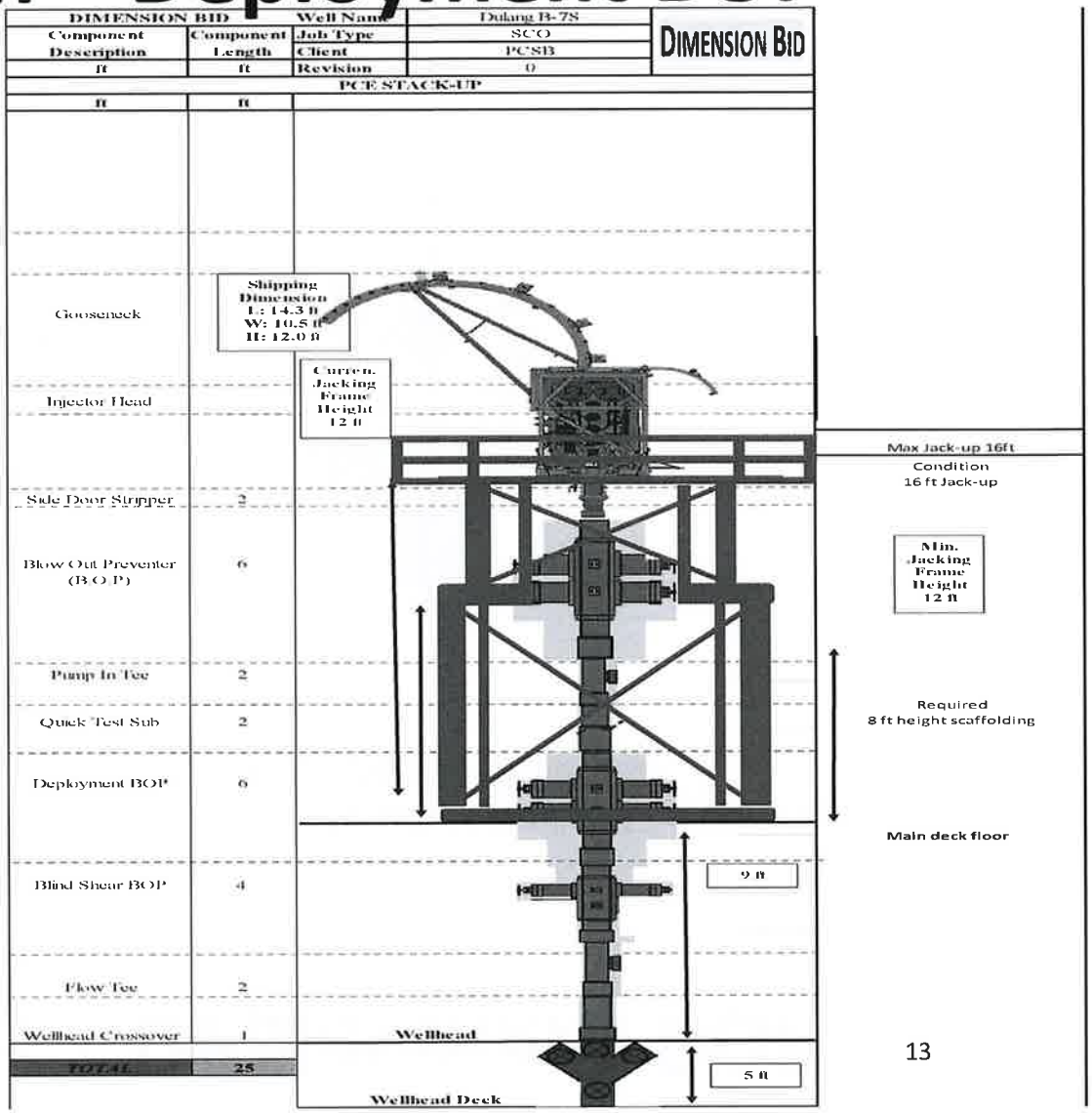
  2. Refer to next slide for Rig-up/rig-down procedure

Neu Dimension
Your Integrated Solutions Partner

# Job execution plan – Deployment BOP

- Run#1 – Continue..

  - After perform pressure test stack-up, break off at QTS as per diagram below

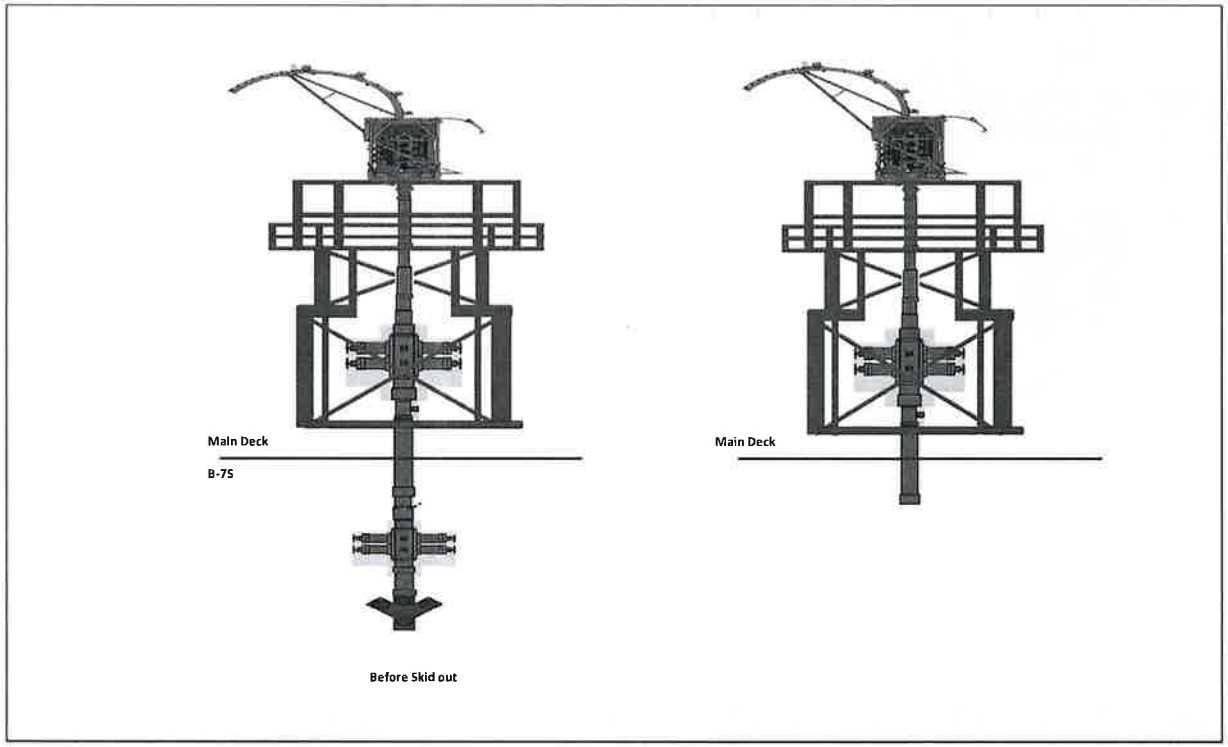


Neu Dimension
Your Integrated Solutions Partner

# Job execution plan – Deployment BOP

- Run#1 – Continue..

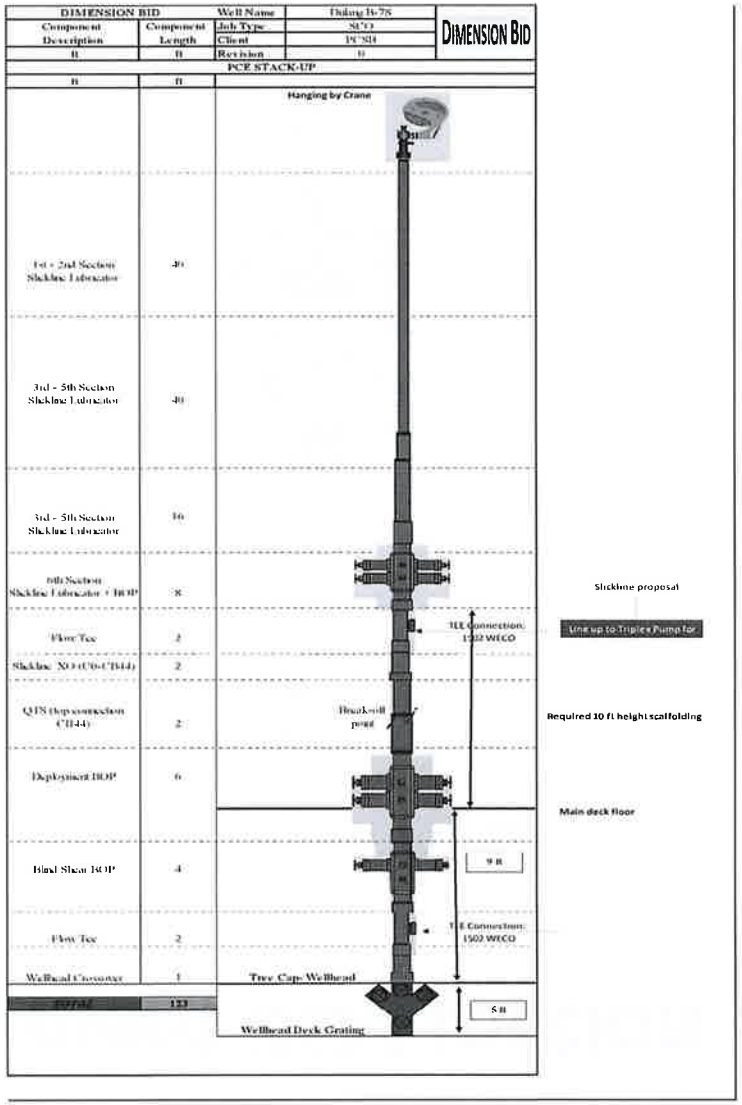
  - After skid out from B-7S, place the CT PCE stack up into other well slot by opening the hatch cover in order to hang the riser (below main deck) temporarily



Neu Dimension
Your Integrated Solutions Partner

# Job execution plan – Deployment BOP (option 1)

- Run#1 – Continue..(*Note, total lubricator height subject to discussion with slickline*)
  - Make-up slickline lubricator on top of Lower QTS
  - Deploy the BHA using Slickline
  - Slowly RIH and open well, once the first deployment bar section at Deployment BOP, stop RIH

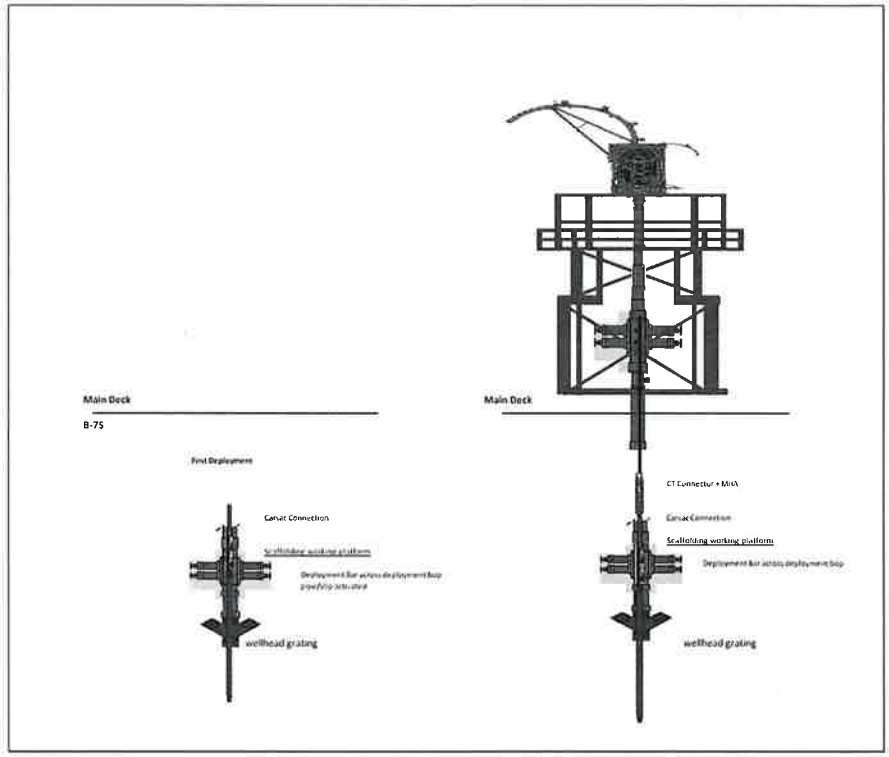


Neu Dimension
Your Integrated Solutions Partner

# Job execution plan – Deployment BOP (option 1)

- Run#1 – Continue..

- Active deployment BOP to anchor and hold at deployment bar.
- Break-off at QTS, rig-down slickline PCE, and rig up full CTU stack-up.
- Connect MHA with the Carsac, and Open Kelly cock valve on BHA section.
- Perform pressure test at QTS.



Neu Dimension
Your Integrated Solutions Partner

# Rig-up procedure with barrier (Option 1)

| No. | Job step | Primary / Active barrier | Secondary Barrier | Tertiary Barrier |
|---|---|---|---|---|
| 1. | Disconnect at slickline crossover that attached together with QTS | 1. Crown Valve<br>2. Master Valve<br>~~3. SCSSV~~<br>4. SSV | 1. SBOP (Blind/shear) | |
| 2. | Make-up 100 ft BHA consist of Nozzle, Straight bar, DKCV and Carsac. Swallow all first section BHA into slickline lubricator. | 1. Crown Valve<br>2. Master Valve<br>~~3. SCSSV~~<br>4. SSV | 1. SBOP (Blind/shear) | |
| 3. | Box in and connect slickline XO and flow tee into top QTS XO to slickline PCE. Perform pressure test. | 1. Crown Valve<br>2. Master Valve<br>~~3. SCSSV~~<br>4. SSV | 1. SBOP (Blind/shear) | |
| 4. | Open CV and MV, RIH until deployment Bar at Deployment BOP section | ~~1. SCSSV~~<br>2. DKCV<br>3. Stuffing box - Slickline | 1. SBOP (Blind/shear) | |
| 5. | Engage deployment BOP to hold deployment bar in first section BHA | ~~1. SCSSV~~<br>2. DKCV<br>3. Stuffing box - Slickline | 1. SBOP (Blind/shear) | |
| 6. | Disconnect at slickline crossover | ~~1. SCSSV~~<br>2. DKCV<br>3. Deployment BOP (Dual Pipe/slip ram) | 1. SBOP (Blind/shear) | |

Neu Dimension
Your Integrated Solutions Partner

# Rig-up procedure with barrier (Option 1)

| No. | Job step | Primary / Active barrier | Secondary Barrier | Tertiary Barrier |
|---|---|---|---|---|
| 7. | Rig-up CT PCE on top of QTS | ~~1. SCSSV~~<br>2. DKCV<br>3. Deployment BOP (Dual Pipe/slip ram) | 1. SBOP (Blind/shear) | |
| 8. | Make-up CT connector and MHA | ~~1. SCSSV~~<br>2. DKCV<br>3. Deployment BOP (Dual Pipe/slip ram) | 1. SBOP (Blind/shear) | |
| 9. | RIH MHA and connect to the Carsac at first deployment BHA section | ~~1. SCSSV~~<br>2. DKCV<br>3. Deployment BOP (Dual Pipe/slip ram) | 1. SBOP (Blind/shear) | |
| 10. | Open DKCV and Box-in to connect PCE, perform pressure test stack-up | ~~1. SCSSV~~<br>2. Deployment BOP (Dual Pipe/slip ram)<br>3. Stripper | 1. SBOP (Blind/shear) | |
| 11. | Disengage deployment BOP | ~~1. SCSSV~~<br>2. Stripper | 1. SBOP (Blind/shear)<br>2. COMBI BOP (Pipe/Slip) + (Blind/Shear) | |
| 12. | Start RIH | 1. Stripper | 1. SBOP (Blind/shear)<br>2. COMBI BOP (Pipe/Slip) + (Blind/Shear) | |

Neu Dimension
Your Integrated Solutions Partner

# Job execution plan – Deployment BOP (option 1)

- Reverse deployment method

a. Once CT at surface, proceed for reverse deployment for dummy/Gun using same approach during deployment rig-up.
b. Once CT tag stripper, RIH back slowly until deployment bar at deployment BOP
c. Cross the pipe slips ram, of the deployment BOP, Manually lock it.
d. Bleed the remaining pressure inside riser through flowback line.
e. Close the DKCV
f. Secure the 1st section BHA with C- plate and disconnect at Carsac connection.
g. Skid aside injector head, stripper, combi BOP and riser.
h. Rig- up back the lubricator as per agreed with slickline (Geowell)
i. RIH slickline wire and connect at Carsac connection. Remove the C-Plate.
j. Box-in and pressure test at QTS.
k. Open pipe slip/ram of the deployment BOP
l. POOH until tag stuffing box
m. Secure the well.
n. Break-off QTS connection and retrieve the gun.

Neu Dimension
Your Integrated Solutions Partner

# Job execution plan

- Run#1 – Continue..

3. Open up well and start RIH (pump idle rate TSW / IW (Fluid selection subject to client Approval)) until reaching 10m above EOT at depth 1,514m. Slow down coil speed to 10ft/min, 50ft before and after passing through completion accessories.
4. Perform pull test and pump 2bbls of drag reducer for every 1000ft interval .
5. At EOT, increase pump rate to **1.1bpm with 300scfm** nitrified TSW/IW. Establish return at surface first prior to entering the casing section and to penetrate the HUD.
    - During establishing the return at surface, line up the flowback line to surge tank and monitor the return volume and calculate the flowrate. (bbl/min)
    - If unable to establish the return, stop pumping N2 and continue to fill up tubing + wellbore and re-attempt to establish the circulation with nitrified TSW / IW
    - Mark the flowrate as baseline and fill up the additional flowback data monitoring table

Neu Dimension
Your Integrated Solutions Partner

# Job execution plan

- Run#1 – Continue..

5. Penetrate the HUD with 1ft/min as per CIRCA simulation. Monitor the THP, return and RIH weight. (Start Cleanout from EOT, assume Sand at EOT)
6. Circulate 5 bbls of gel (D801) for every 5 m penetration. Perform pull test 5ft/min to previous HUD for each bite taken. Repeat the step until 1,545m .
7. *Note: after every 5m bite, pull test to EOT as a precautionary steps.*
8. In the event of lost return, POOH CT to 10m above EOT at depth 1,505m and re-establish the circulation before resume the cleanout
9. Once at 1,545m, flag coil at surface as Flag#1. Do not set down more than 200lbf if experience hard tag. (downhole force)
10. Pump 30 bbl of gel and continue CBU for 3 hours as per CIRCA. To perform pull test 10m for every 30 minutes.
11. Once completed CBU, POOH to EOT at depth 1,545m with 5 ft/min of tripping speed and using pump rate 1.1bpm, 300scfm.
12. At EOT, CBU for another 2 hours, continue to POOH to surface with 30-50ft/min of tripping speed, stop N2 and continue pumping TSW with 1.4bpm.

Neu Dimension
Your Integrated Solutions Partner

# Job execution plan

- Cleanout table until 1,545m

| No. | Stage | Fluid | Liquid Rate | Total Liquid | N2 Rate | CT Speed | Duration | Depth | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| | | | BPM | BBL | SCFM | ft/min | Minute | m | |
| 1 | CT at 10m above EOT | TSW / IW | 1.1 | 16.5 | 300 | 0 | 15 | 10m above EOT | Establish return on surface |
| 2 | RIH to HUD and Penetrate HUD/Fill | TSW / IW | 1.1 | 17.6 | 300 | 1 | 16 | HUD + 5m | Monitor return & CT weight on surface |
| 3 | Circulate | Gel | 1.1 | 5.0 | 300 | 0 | 5 | | Provide suspension to the fill and lift to surface |
| Pull Test to EOT after 5m bites | | | | | | | | | |
| 4 | RIH to last HUD and Penetrate HUD/Fill | TSW / IW | 1.1 | 17.6 | 300 | 1 | 30 | HUD + 5m | Monitor return & CT weight on surface |
| 5 | Circulate | Gel | 1.1 | 5.0 | 300 | 0 | 5 | | Provide suspension to the fill and lift to surface |
| Pull Test to previous HUD | | | | | | | | | |
| Repeat above step until reached 1,545m. Flag CT at surface. | | | | | | | | | |
| 6 | At depth 1,545 m | Gel | 1.1 | 30 | 300 | 0 | | Stationary at 3160m | Pump 1tbg volume of D801 gel |
| 7 | Bottoms Up (Circulate) | TSW / IW | 1.1 | | 300 | 0 | 180 | Stationary at 3160m | CBU remaining 3 hrs |
| POOH to EOT while maintaining 5 ft/min and pump rate 1.1bpm, 300scfm, Continue CBU for another 2 hours | | | | | | | | | |
| stop N2, continue POOH to surface with 30-50ft/min tripping speed by pumping high rate TSW / IW only | | | | | | | | | |

Neu Dimension
Your Integrated Solutions Partner

# Loss return scenario

1. Procedure for loss return during cleanout operation;
   - Pick-up CT to less deviated section at range of 400m or attempt at 10m above EOT.
   - Re-establish the circulation until stable return is observed.
   - During establishing the return at surface, line up the flowback line to surge tank and monitor the return volume and calculate the flowrate. (bbl/min)
   - Mark the flowrate as our new baseline and fill up the flowback data monitoring as per below table;

| CTS FLOWBACK DATA LOGSHEET | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Job Type | | Date | | Run Details | | DIMENSION BID | | | |
| Run No. | | Location | | Shift | | | | | |
| Time | Fluid type | Fluid Pump rate, (bpm) | N2 rate, (scfm) | THP (psi) | Circ Press, (psi) | Choke Size | Volume Return (At Surge tank) | Flowmeter flowrate | Remarks |
| | | | | | | | | | |
| | | | | | | | | | |

   - RIH back to last penetrated HUD and resume cleanout operation.

Neu Dimension
Your Integrated Solutions Partner

# Reduction in THP during cleanout

1. Procedure for addressing the reduction in THP during cleanout operation:
   - Pick-up CT 10m above 1st HUD
   - Vary the;
     - Decrease the liquid rate
     - Increase nitrogen rate
   - Manipulate choke size
   - Re-establish continuous return and stable THP
   - Resume cleanout operation

Neu Dimension
Your Integrated Solutions Partner

# Job execution plan

- Run#1 – BHA Diagram – Deployment

## DIMENSION BID

**BHA DIAGRAM #1 - 1.69" MULTIJET NOZZLE**

| | |
|---|---|
| Client | Petronas Carigali |
| Field | Dulang Bravo |
| Job Type | |
| Job No. | Run#1 |

| | |
|---|---|
| Well | B7S |
| Min Restriction | |
| BHP | |
| BHT | |

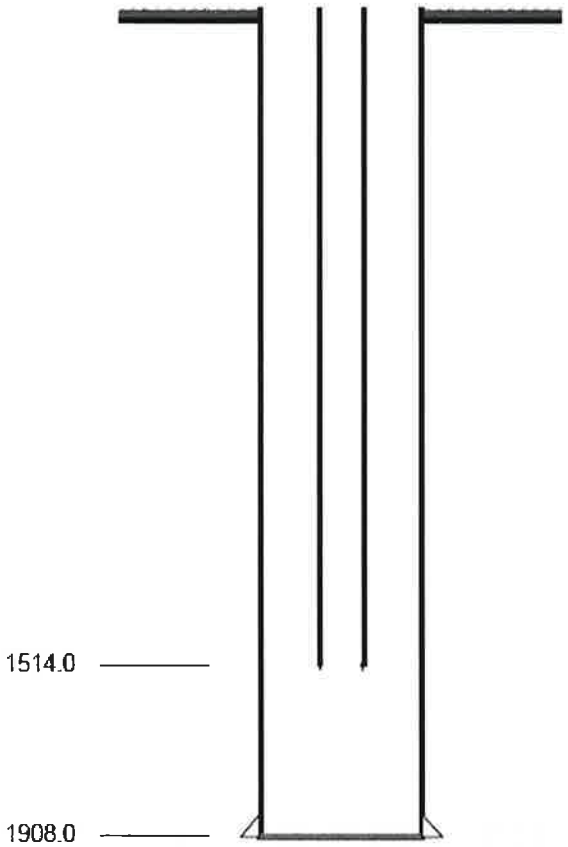
| BHA DRAWING | DESCRIPTION | CONNECTION | | ID | OD | TOOL LENGTH | CUMULATIVE LENGTH |
|---|---|---|---|---|---|---|---|
| | | UPHOLE | DOWNHOLE | INCH | INCH | FT | FT |
|  | Dimple Connector | 1.5" CT | 1.0" AMMT PIN | | 1.690 | 0.3 | 0.3 |
| | MHA<br>Disconnect drop ball 5/8"<br>Circulating drop ball 1/2"<br>Burst Disc 5000 psi | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 2.3 | 2.6 |
| | Carsac | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 1.6 | 4.18 |
| | Kelly Cock Valve | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 1.6 | 5.76 |
| | 6 ft Deployment Bar | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.500 | 6.0 | 11.76 |
| | Straight Bar | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 92.0 | 103.76 |
| | MultiJet | 1.0" AMMT BOX | | | 1.690 | 1.0 | 104.8 |

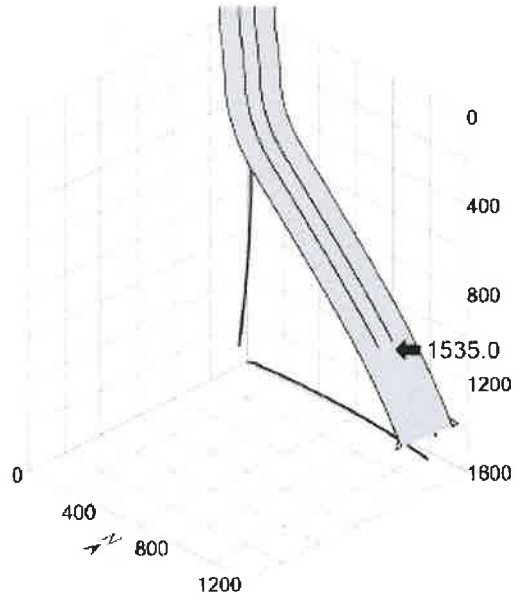
| | |
|---|---|
| BHA LENGTH | 104.76 |
| MAXIMUM OD | 1.69 |
| MINIMUM ID | |

Neu Dimension
Your Integrated Solutions Partner

# Tubing force analysis-well geometry

A1 ■ The job can probably be performed with the current input parameters.



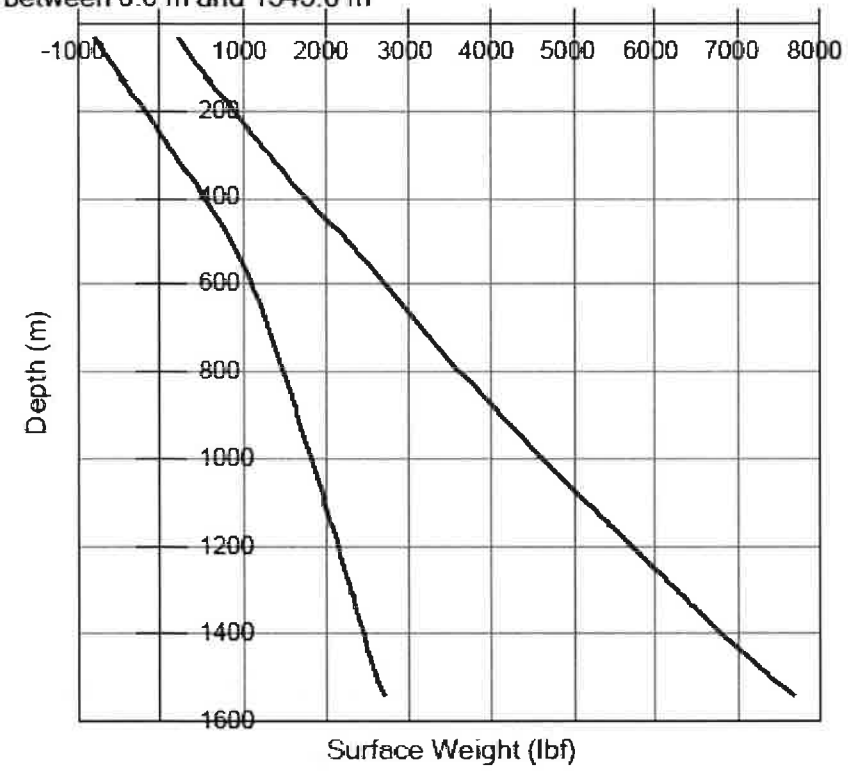

Well name: Dulang B07S
Total depth: 1908.0 m
Max Inclination: 48.4° at 1353.0 m
Max DLS: 4.678 °/100ft at 371.0 m
Min ID: 2.250 in at 1513.0 m
WHP: 150 psi

Neu Dimension
Your Integrated Solutions Partner

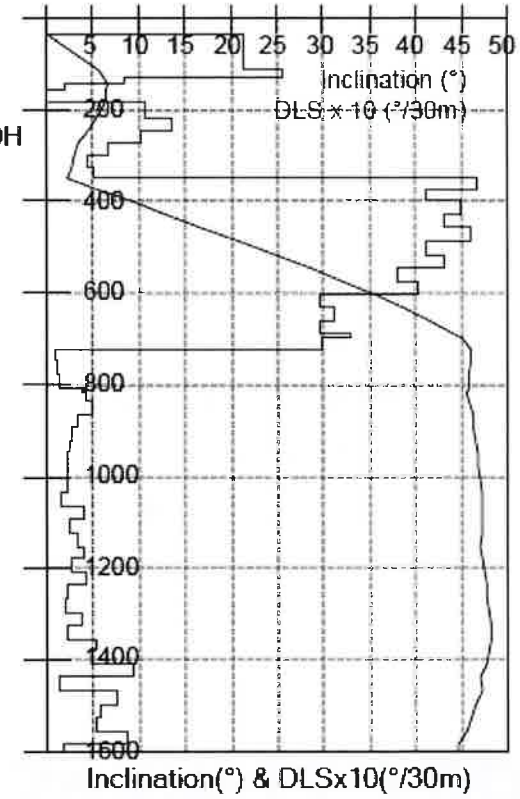
# Tubing force analysis- till 1,545m (1.1bpm 300scfm)

## Reaching Depth

RIH and POOH
between 0.0 m and 1545.0 m

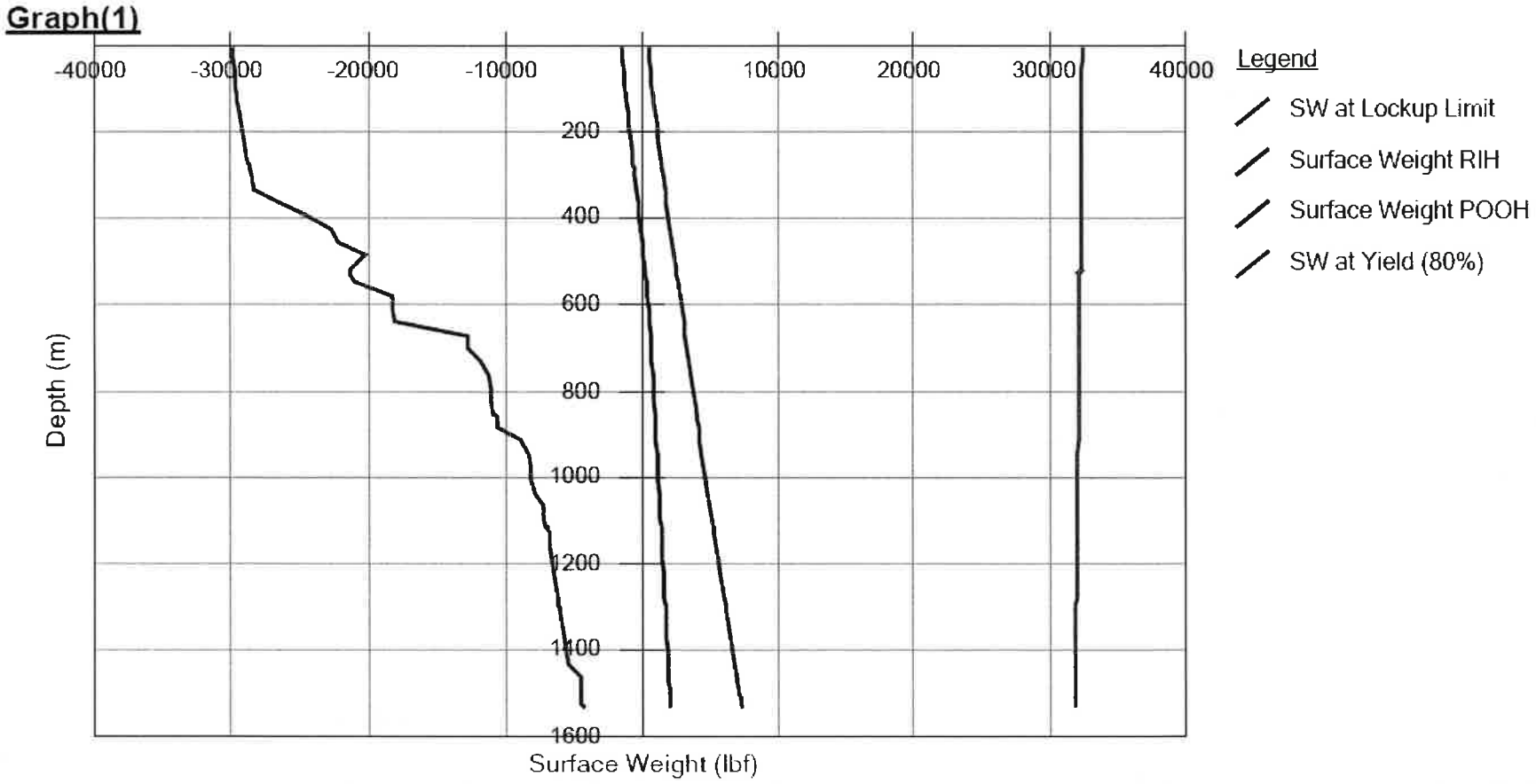



Legend
Surface Weight RIH
Surface Weight POOH



Neu Dimension
Your Integrated Solutions Partner

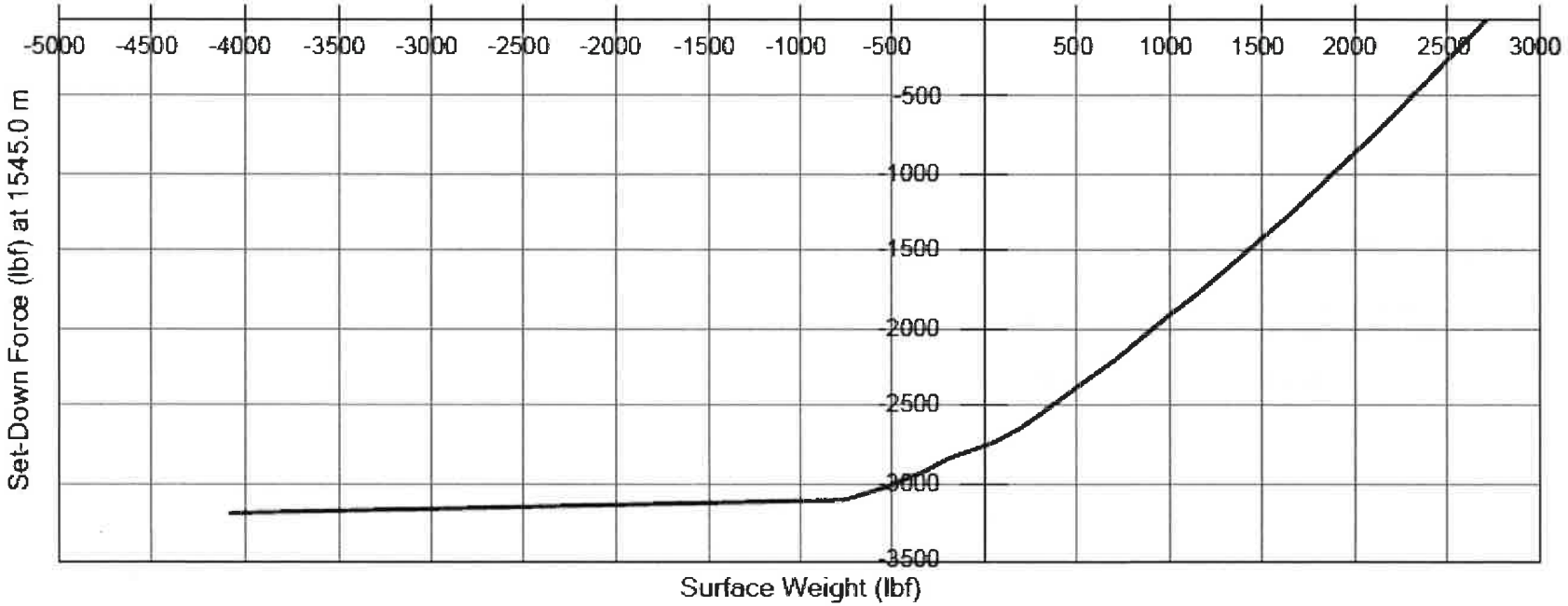
# Tubing force analysis- till 1,545m (1.1bpm 300scfm)



Neu Dimension
Your Integrated Solutions Partner

# Tubing force analysis-set down graph

MD3 The available set-down force at 1545.0 m is -3272 lbf at the end of the string.
The weight indicator reading will be -4090 lbf on surface.
The minimum available set-down force is -3159 lbf at 1433.7 m.

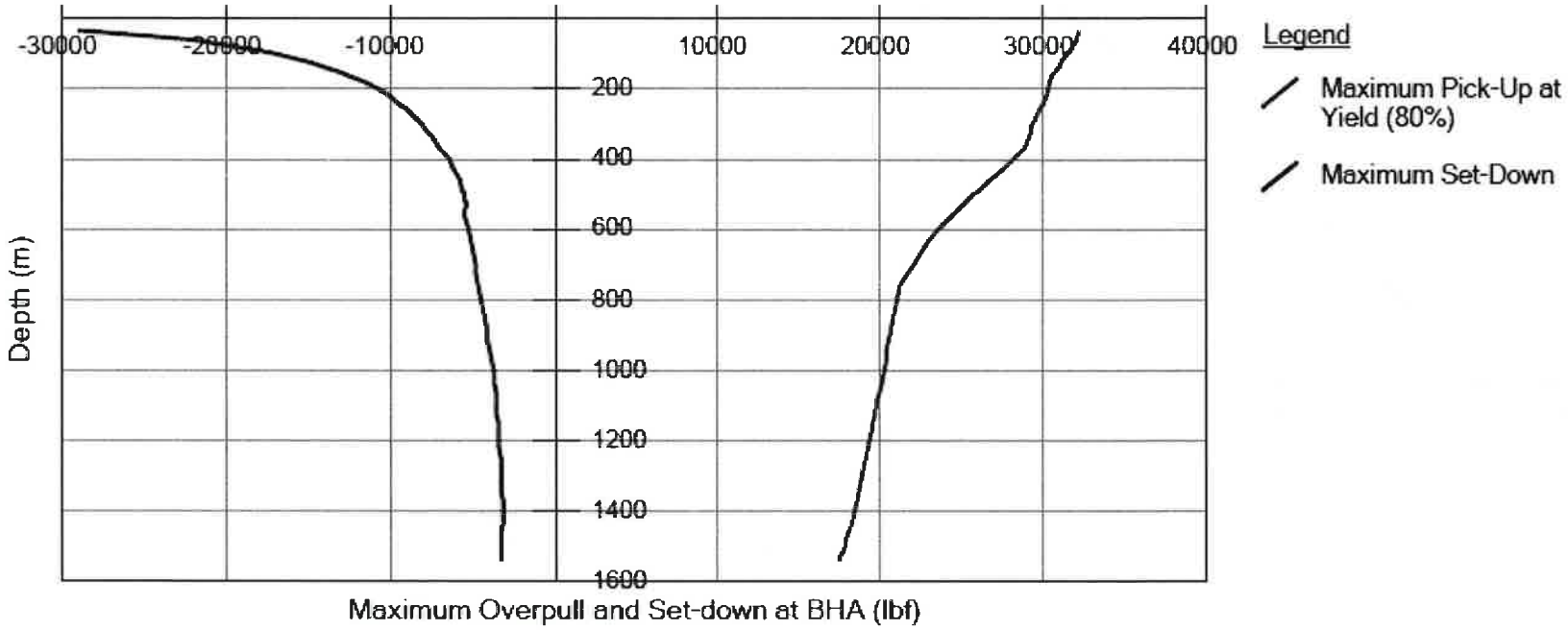


Neu Dimension
Your Integrated Solutions Partner

# Tubing force analysis- overpull graph

Calculations at 1545.0 m

MD1 The available pick-up at 1545.0 m based on 80% of yield strength is 17502 lbf.
The weight indicator reading will then be 31786 lbf.



Neu Dimension
Your Integrated Solutions Partner

# CIRCA simulation- 1.1bpm, 300scfm

Project: New Project  Field-Well: Unknown

*Flow Summary*

SUMMARY OF FLOW RESULTS

| | |
|---|---|
| Produced Fluids | |
| Pressure known at: | Perforations |
| Production Mode: | No Production |
| Fluid Composition: | Oil and Gas |
| Circulated Fluids | |
| Fluid Composition: | Nitrified Water |
| Liquid: | 1.10 bbl/min |
| Solids: | 0.00 bbl/min |
| Gas: | 300.0 scf/min |
| Circulation Point: | 1544.00 m |
| HHP Required : | 79.86 KW |

COMPLETION:

| | |
|---|---|
| Wellhead Pressure | 129.9 psi g |
| Hydrostatic pressure loss | 953.8 psi |
| Friction pressure loss | 514.5 psi |
| Kinetic pressure loss | -0.4 psi |
| Restriction pressure loss | 2.2 psi |
| Equivalent Circulation Density[ECD] | 7.07 lb/gal (US) |
| Perforation Pressure | 1600.0 psi g |
| Hydrostatic pressure loss | 356.4 psi |
| Friction pressure loss | 0.1 psi |
| Bottom Hole Pressure | 1986.5 psi g |

FROM CIRCULATION POINT TO WELLHEAD:

| | |
|---|---|
| Liquid transit time | 9 min |
| Gas transit time | 8 min |
| Annular volume | 21.0 bbl |
| Volume below circulation point | 41.2 bbl |
| Total liquid volume | 53.1 bbl |
| Total gas volume | 9.1 bbl |
| (Surface equivalent) | 2485.0 scf |

WORKSTRING:

| | |
|---|---|
| Liquid: | 1584.0 bbl/day |
| Gas: | 0.43 MMscf/day |
| Pressure at reel rotating joint | 3959.0 psi g |
| Friction pressure loss on reel | 1941.6 psi |
| Pressure inside WS at Gooseneck | 2017.3 psi g |
| Hydrostatic pressure loss | -1103.9 psi |
| Friction pressure loss | 1012.3 psi |
| Equivalent Circulation Density[ECD] | 1.46 lb/gal (US) |
| BHA total pressure loss | 487.3 psi |
| BHA Hydrostatic loss | -18.5 psi |
| BHA Friction loss | 226.6 psi |
| BHA Kinetic loss | 6.8 psi |
| Nozzle | 272.4 psi |
| Circulation Point pressure | 1621.6 psi g |

FROM REEL ROTATING JOINT TO CIRCULATION POINT:

| | |
|---|---|
| Liquid transit time | 12 min |
| Gas transit time | 15 min |
| Displacement Volume | 11.1 bbl |
| Internal Volume | 18.6 bbl |
| Internal liquid volume | 13.2 bbl |
| Internal gas volume | 5.4 bbl |
| (Surface equivalent) | 4439.2 scf |
| Length of Workstring on reel | 2131.78 m |

Neu Dimension
Your Integrated Solutions Partner

# CLEANOUT ANALYSIS

Flow State

| Measured Depth[Flow] m | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocity ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 0.0 | 95.0 | 129.9 | 2017.3 | 0.0 | 1622 | 1163 | 0 |
| 4.0 | 95.4 | 135.2 | 2018.4 | 0.0 | 1638 | 1163 | 0 |
| 29.0 | 97.7 | 166.0 | 2025.2 | 0.0 | 1422 | 1164 | 0 |
| 54.0 | 100.1 | 194.7 | 2032.0 | 0.0 | 1278 | 1165 | 0 |
| 79.0 | 102.5 | 222.3 | 2038.7 | 0.0 | 1173 | 1166 | 0 |
| 104.0 | 104.8 | 249.1 | 2045.5 | 0.0 | 1092 | 1168 | 0 |
| 129.0 | 107.2 | 275.4 | 2052.1 | 0.0 | 1232 | 1169 | 0 |
| 132.0 | 107.4 | 278.9 | 2052.9 | 0.0 | 1019 | 1170 | 0 |
| 157.0 | 109.8 | 304.9 | 2059.5 | 0.0 | 967 | 1171 | 0 |
| 182.0 | 112.1 | 330.6 | 2066.1 | 0.0 | 923 | 1172 | 0 |
| 207.0 | 114.5 | 356.3 | 2072.7 | 0.0 | 885 | 1173 | 0 |
| 232.0 | 116.8 | 381.9 | 2079.3 | 0.0 | 853 | 1174 | 0 |
| 257.0 | 119.2 | 407.6 | 2085.9 | 0.0 | 824 | 1175 | 0 |
| 282.0 | 121.5 | 433.3 | 2092.6 | 0.0 | 956 | 1176 | 0 |
| 303.1 | 123.5 | 455.3 | 2098.2 | 0.0 | 779 | 1177 | 0 |
| 328.1 | 125.9 | 481.1 | 2104.8 | 0.0 | 758 | 1178 | 0 |
| 353.0 | 128.2 | 507.1 | 2111.4 | 0.0 | 739 | 1179 | 0 |
| 378.0 | 130.6 | 533.1 | 2117.9 | 0.0 | 722 | 1181 | 0 |
| 403.0 | 132.9 | 559.1 | 2124.3 | 0.0 | 706 | 1183 | 0 |
| 428.0 | 135.2 | 585.2 | 2130.4 | 0.0 | 693 | 1187 | 0 |
| 453.0 | 137.5 | 611.3 | 2136.2 | 0.0 | 681 | 1191 | 0 |
| 478.0 | 139.8 | 637.4 | 2141.6 | 0.0 | 670 | 1195 | 0 |
| 503.0 | 142.0 | 663.3 | 2146.4 | 0.0 | 660 | 1201 | 0 |

Flow State (continued)

| Measured Depth[Flow] m | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocity ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 528.0 | 144.1 | 689.2 | 2150.7 | 0.0 | 781 | 1206 | 0 |
| 534.1 | 144.6 | 695.7 | 2151.7 | 0.0 | 650 | 1209 | 0 |
| 559.1 | 146.7 | 721.2 | 2155.1 | 0.0 | 642 | 1213 | 0 |
| 584.1 | 148.7 | 746.3 | 2158.0 | 0.0 | 636 | 1218 | 0 |
| 609.1 | 150.6 | 770.7 | 2160.1 | 0.0 | 631 | 1222 | 0 |
| 634.1 | 152.5 | 794.6 | 2161.5 | 0.0 | 626 | 1225 | 0 |
| 659.1 | 154.3 | 817.9 | 2162.3 | 0.0 | 621 | 1228 | 0 |
| 684.0 | 156.0 | 840.7 | 2162.5 | 0.0 | 617 | 1230 | 0 |
| 709.0 | 157.7 | 862.9 | 2162.0 | 0.0 | 613 | 1232 | 0 |
| 734.0 | 159.3 | 885.0 | 2161.2 | 0.0 | 609 | 1233 | 0 |
| 759.0 | 160.9 | 907.0 | 2160.3 | 0.0 | 604 | 1235 | 0 |
| 784.0 | 162.6 | 929.2 | 2159.5 | 0.0 | 599 | 1236 | 0 |
| 809.0 | 164.2 | 951.4 | 2158.6 | 0.0 | 594 | 1237 | 0 |
| 834.0 | 165.9 | 973.7 | 2157.7 | 0.0 | 590 | 1239 | 0 |
| 859.0 | 167.5 | 995.9 | 2156.7 | 0.0 | 702 | 1240 | 0 |
| 867.1 | 168.0 | 1003.2 | 2156.3 | 0.0 | 585 | 1240 | 0 |
| 892.1 | 169.7 | 1025.5 | 2155.2 | 0.0 | 581 | 1242 | 0 |
| 917.1 | 171.3 | 1047.7 | 2154.0 | 0.0 | 577 | 1243 | 0 |
| 942.0 | 172.9 | 1069.9 | 2152.7 | 0.0 | 574 | 1245 | 0 |
| 967.0 | 174.5 | 1092.2 | 2151.4 | 0.0 | 571 | 1246 | 0 |
| 992.0 | 176.1 | 1114.4 | 2150.0 | 0.0 | 568 | 1247 | 0 |
| 1017.0 | 177.7 | 1136.7 | 2148.5 | 0.0 | 565 | 1249 | 0 |
| 1042.0 | 179.3 | 1158.9 | 2146.9 | 0.0 | 562 | 1250 | 0 |

Neu Dimension
Your Integrated Solutions Partner

# CLEANOUT ANALYSIS

Flow State (continued)

| Measured Depth[Flow] m | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocity ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 1067.0 | 180.9 | 1181.2 | 2145.3 | 0.0 | 559 | 251 | 0 |
| 1092.0 | 182.5 | 1203.6 | 2143.6 | 0.0 | 556 | 253 | 0 |
| 1117.0 | 184.1 | 1225.9 | 2141.9 | 0.0 | 663 | 254 | 0 |
| 1128.0 | 184.8 | 1236.0 | 2141.2 | 0.0 | 552 | 255 | 0 |
| 1153.0 | 186.5 | 1258.5 | 2139.5 | 0.0 | 549 | 256 | 0 |
| 1178.0 | 188.1 | 1280.9 | 2137.7 | 0.0 | 547 | 258 | 0 |
| 1203.0 | 189.6 | 1303.4 | 2135.8 | 0.0 | 545 | 259 | 0 |
| 1228.0 | 191.2 | 1325.8 | 2133.9 | 0.0 | 542 | 260 | 0 |
| 1253.0 | 192.8 | 1348.3 | 2131.9 | 0.0 | 540 | 262 | 0 |
| 1278.0 | 194.4 | 1370.7 | 2129.8 | 0.0 | 538 | 263 | 0 |
| 1303.0 | 196.0 | 1393.2 | 2127.6 | 0.0 | 643 | 264 | 0 |
| 1315.0 | 196.7 | 1404.2 | 2126.5 | 0.0 | 536 | 265 | 0 |
| 1340.0 | 198.3 | 1426.6 | 2124.3 | 0.0 | 534 | 266 | 0 |
| 1365.0 | 199.9 | 1449.0 | 2121.9 | 0.0 | 532 | 268 | 0 |
| 1390.0 | 201.5 | 1471.6 | 2119.6 | 0.0 | 530 | 269 | 0 |
| 1415.0 | 203.0 | 1494.2 | 2117.3 | 0.0 | 527 | 271 | 0 |
| 1440.0 | 204.6 | 1517.0 | 2115.1 | 0.0 | 524 | 272 | 0 |
| 1465.0 | 206.2 | 1539.9 | 2112.9 | 0.0 | 626 | 274 | 0 |
| 1468.0 | 206.4 | 1542.8 | 2112.7 | 0.0 | 522 | 274 | 0 |
| 1493.0 | 208.0 | 1565.9 | 2110.5 | 0.0 | 622 | 276 | 0 |
| 1513.0 | 209.3 | 1584.6 | 2108.9 | 0.0 | 682 | 277 | 0 |
| 1513.2 | 209.4 | 1585.1 | 2108.9 | 0.0 | 517 | 277 | 0 |
| 1514.0 | 209.4 | 1585.8 | 2098.9 | 0.0 | 616 | 3157 | 0 |

Flow State (continued)

| Measured Depth[Flow] m | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocity ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 1515.0 | 209.5 | 1588.0 | 2090.3 | 0.0 | 85 | 3159 | 0 |
| 1526.0 | 210.2 | 1600.0 | 2016.7 | 0.0 | 84 | 3182 | 0 |
| 1543.7 | 211.4 | 1621.2 | 1896.0 | 0.0 | 89 | 3222 | 0 |
| 1544.0 | 211.4 | 1621.6 | 1893.9 | 0.0 | 88 | 13354 | 0 |
| 1558.1 | 212.3 | 1635.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1583.1 | 214.0 | 1659.1 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1608.1 | 215.7 | 1683.4 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1633.1 | 217.3 | 1707.7 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1658.1 | 219.0 | 1732.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1683.1 | 220.7 | 1756.7 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1708.1 | 222.5 | 1781.6 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1733.0 | 224.2 | 1806.9 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1758.0 | 226.0 | 1832.3 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1783.0 | 227.8 | 1857.9 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1808.0 | 229.5 | 1883.6 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1833.0 | 231.3 | 1909.3 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1858.0 | 233.1 | 1935.1 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1883.0 | 234.9 | 1960.9 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1908.0 | 236.7 | 1986.5 | 0.0 | 0.0 | 0 | 0 | 0 |

Neu Dimension
Your Integrated Solutions Partner

# CLEANOUT ANALYSIS

*Ctran Summary*

SUMMARY OF HOLE CLEANING RESULTS

| | |
|---|---|
| Initial Condition: | |
| % of fill interval occupied by solids before cleanout ... | 100.0 % |
| Top of fill ..... | 1515.01 m |
| Deepest Circulation point ..... | 1543.99 m |
| Bottom of fill ..... | 1543.99 m |
| Initial Volume of Solids..... | 3.3 bbl |
| Initial Mass of Solids..... | 1682.4 lb |
| Solids type: | Mud Residue/Formation Fines |
| Fluid Description: | Nitrified Water |
| Penetration Hole Cleaning Mode: | |
| Penetration rate..... | 1.0 ft/min |
| Penetration time..... | 1.59 hr |
| Solids volume in the well after penetration ..... | 2.7 bbl |
| Solids mass in the well after penetration ..... | 1370.4 lb |
| Circulation Hole Cleaning Mode: | |
| Hole circulation time ..... | 3.25 hr |
| Solids volume in the well after circulation..... | 0.5 bbl |
| Solids mass in the well after circulation..... | 245.4 lb |
| Wiper Trip Hole Cleaning Mode: | |
| Wiper Trip Scheme: | User Specified rate, Tornado not |
| Wiper trip time ..... | 0.20 hr |
| Solids volume in the well after wiper trip ..... | 0.5 bbl |
| Solids mass in the well after wiper trip ..... | 245.4 lb |
| Volume of Fluids Pumped During Penetration, Circulation & Wiper Trip: | |
| Gas volume ..... | 90679.2 scf |
| Liquid Volume ..... | 332.5 bbl |
| Penetration, Circulation & Wiper Trip time ..... | 5.04 hr |

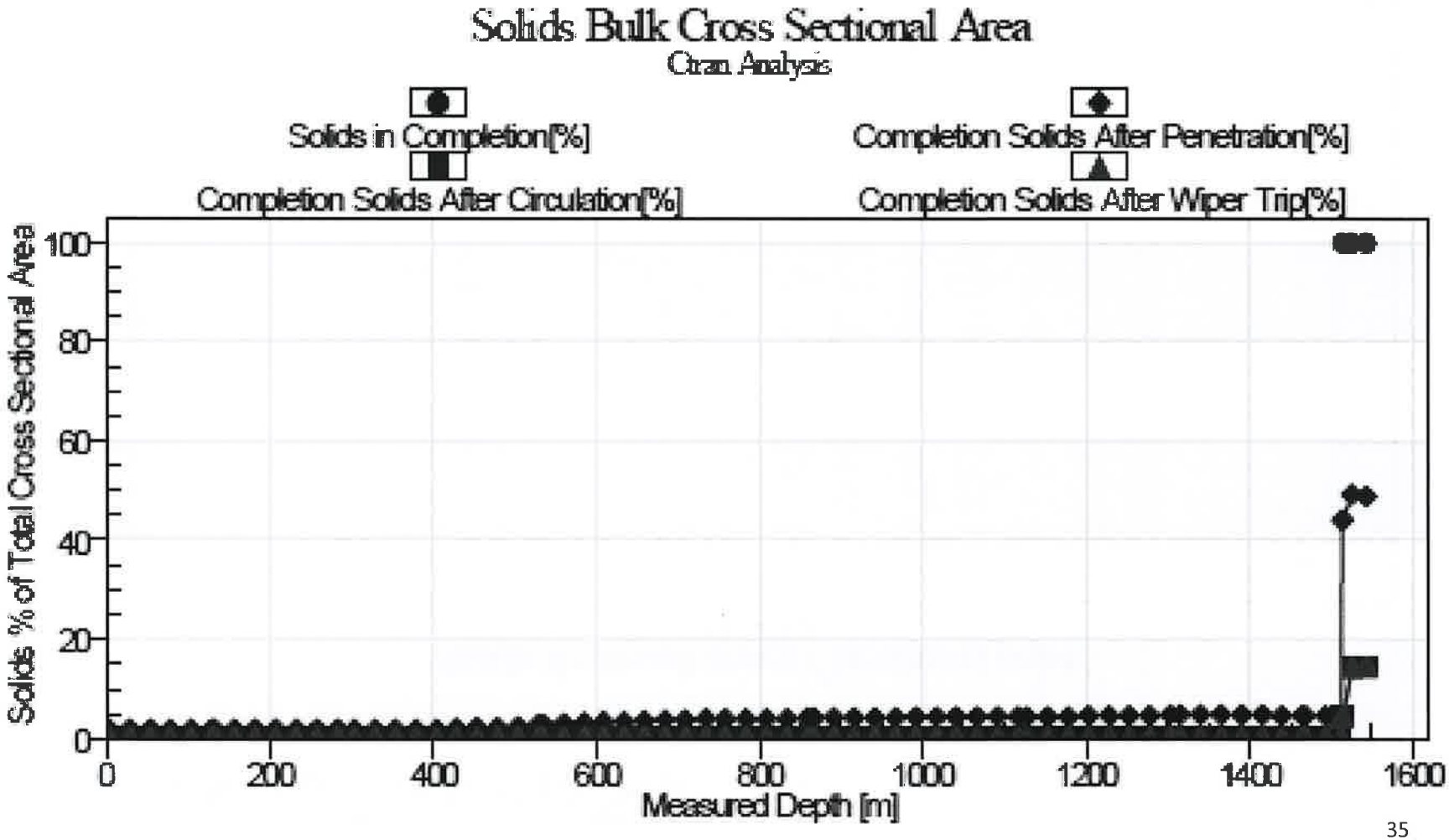
Circulation results at point of Maximum Solids Head:

| Percentage initial fill | % Left in hole after CBU |
|---|---|
| 100% | 14.6 |
| 90% | 16.9 |
| 50% | 30.1 |

**Cleanout unable to lift 100% solid inside well!**

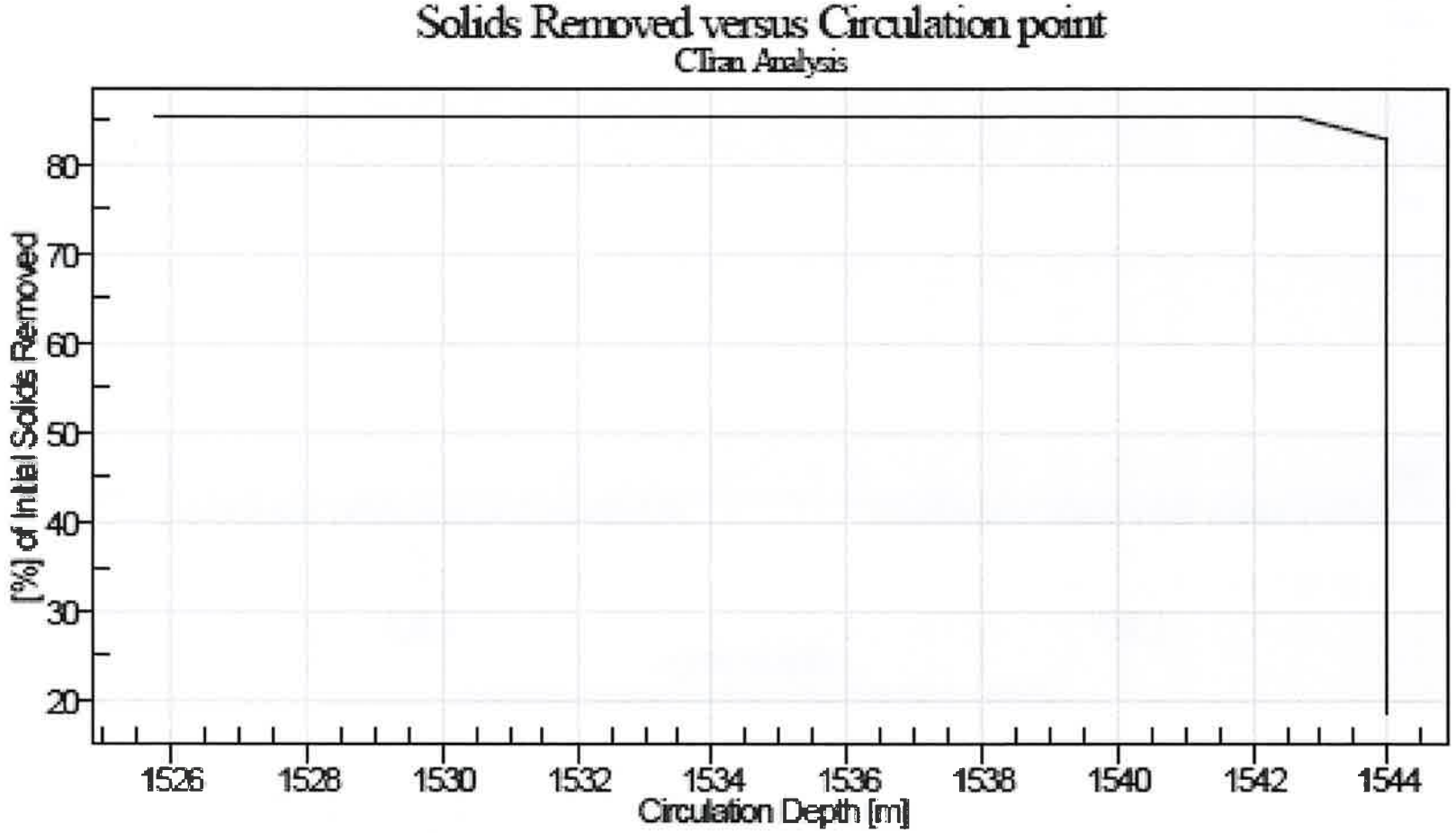
Neu Dimension
Your Integrated Solution

# CLEANOUT ANALYSIS



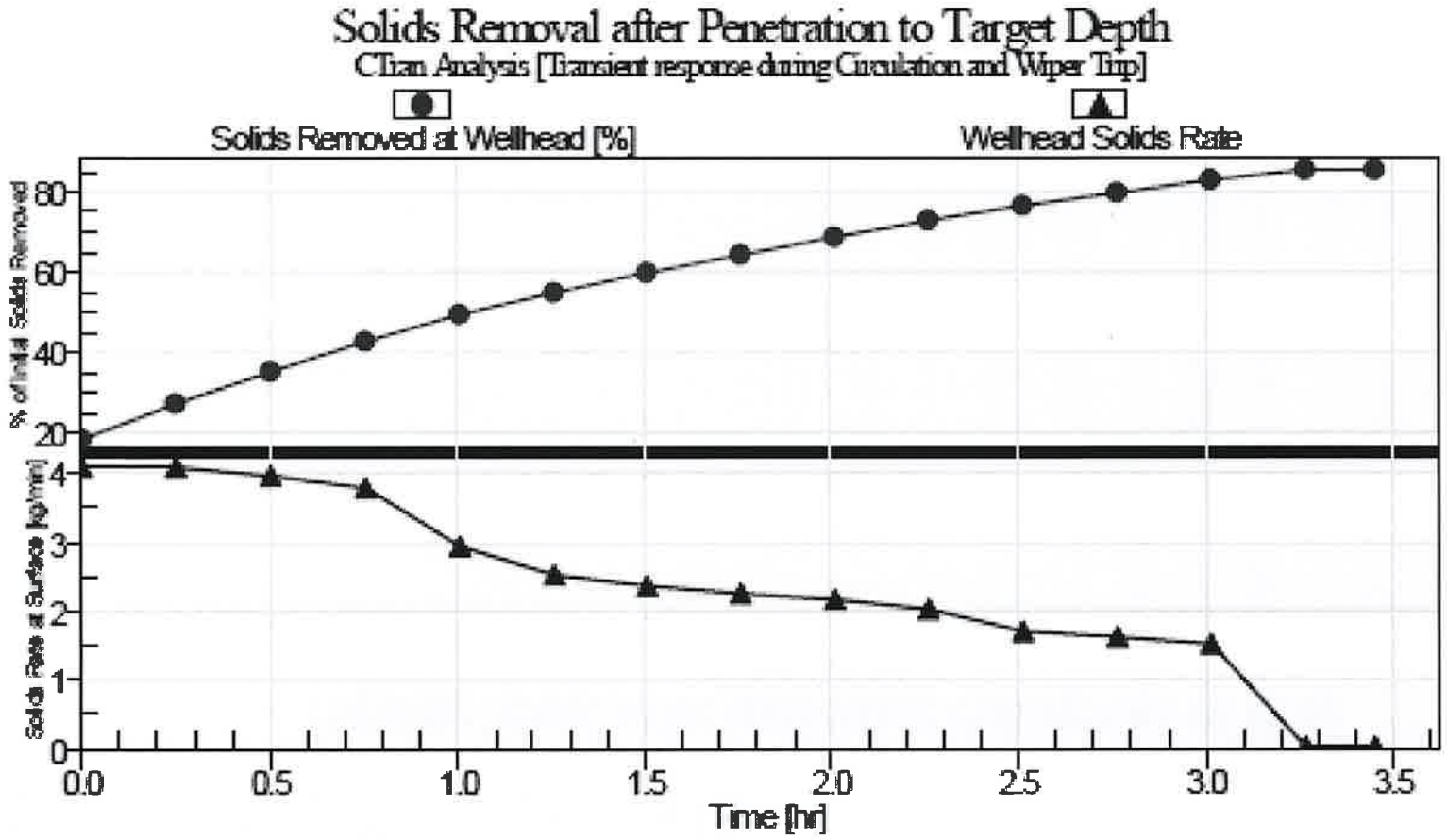
Neu
Dimension
Your Integrated Solutions Partner

# CLEANOUT ANALYSIS



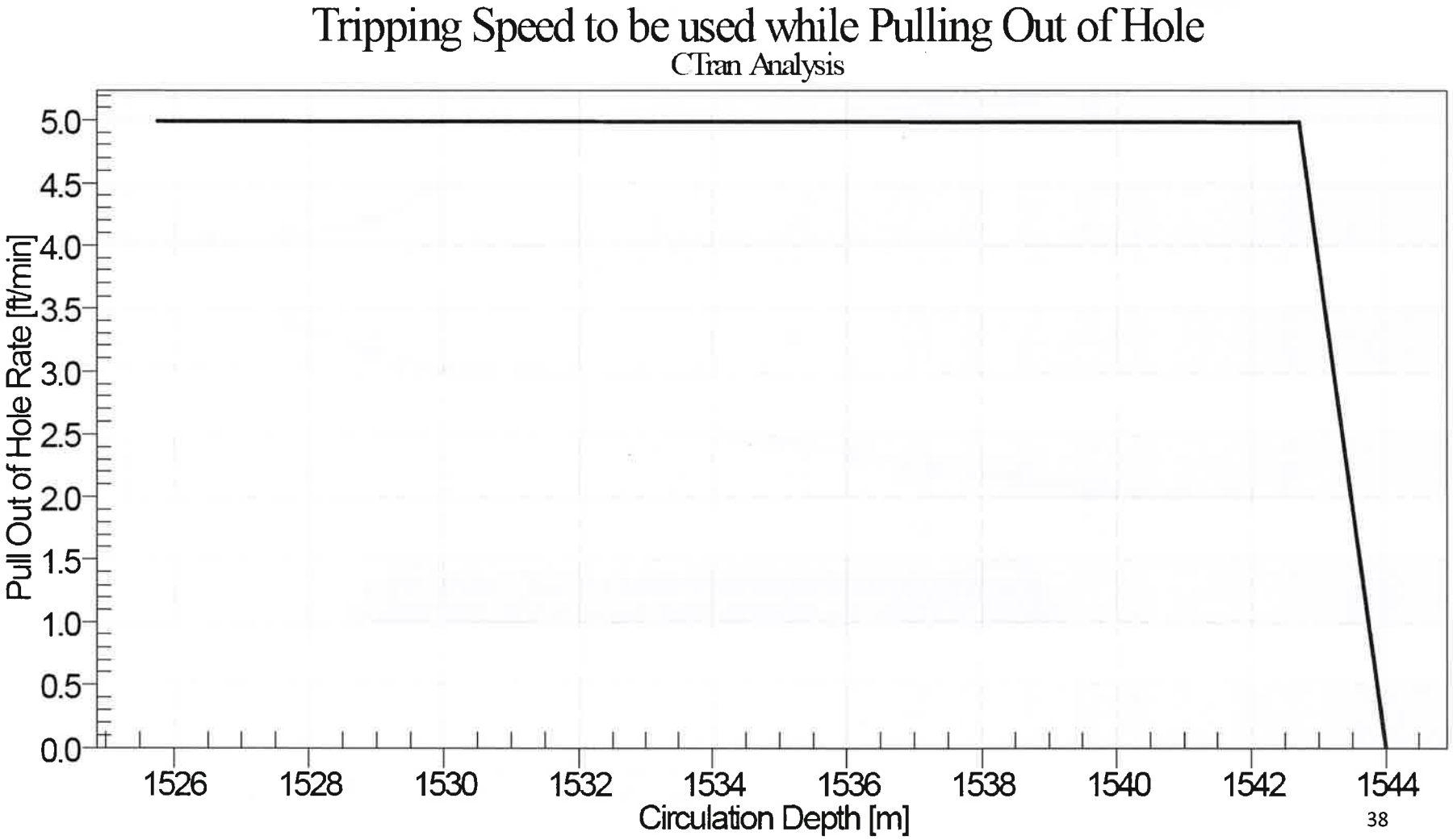
Neu
Dimension
Your Integrated Solutions Partner

# CLEANOUT ANALYSIS



Neu Dimension
Your Integrated Solutions Partner

# CLEANOUT ANALYSIS

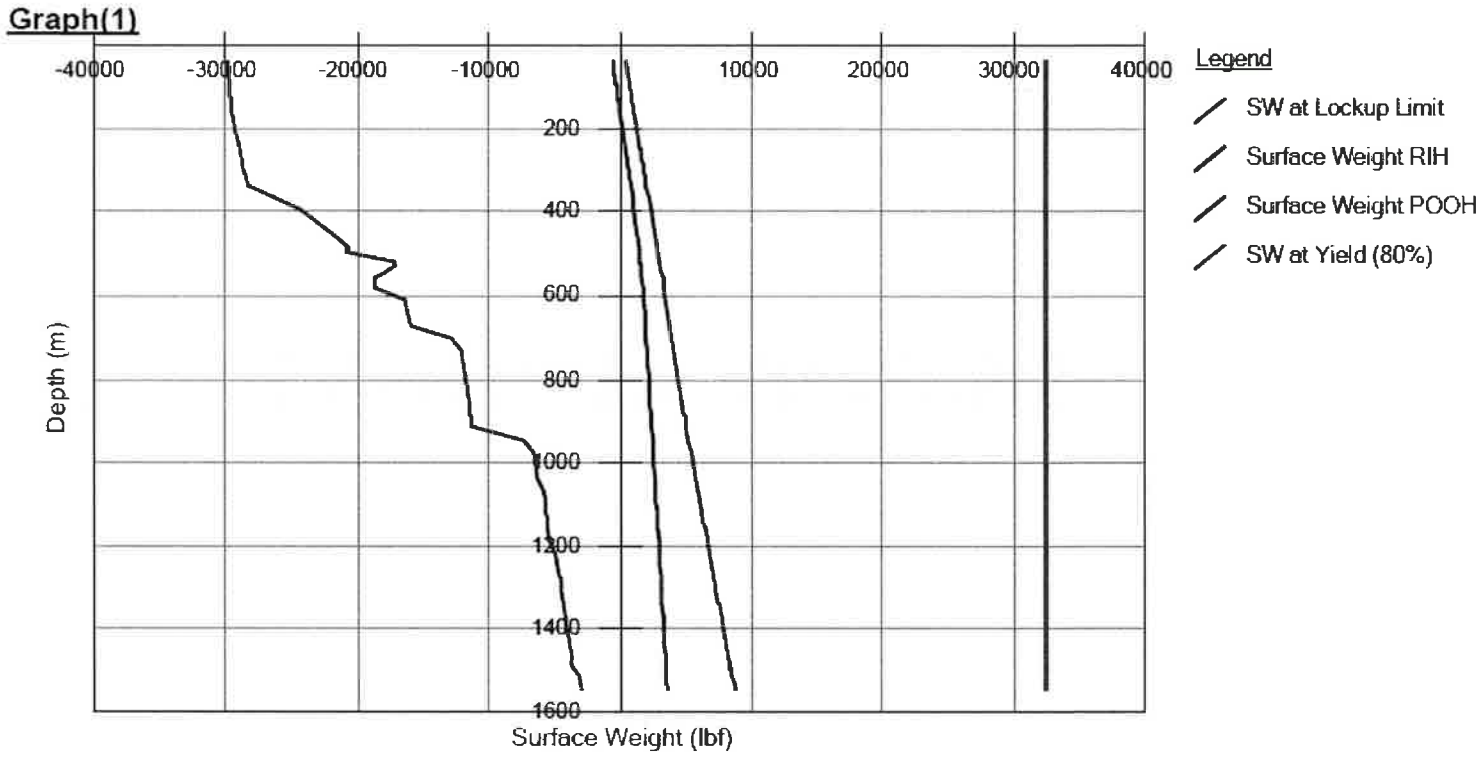


Neu
Dimension
Your Integrated Solutions Partner

# TFA SENSITIVITY ANALYSIS

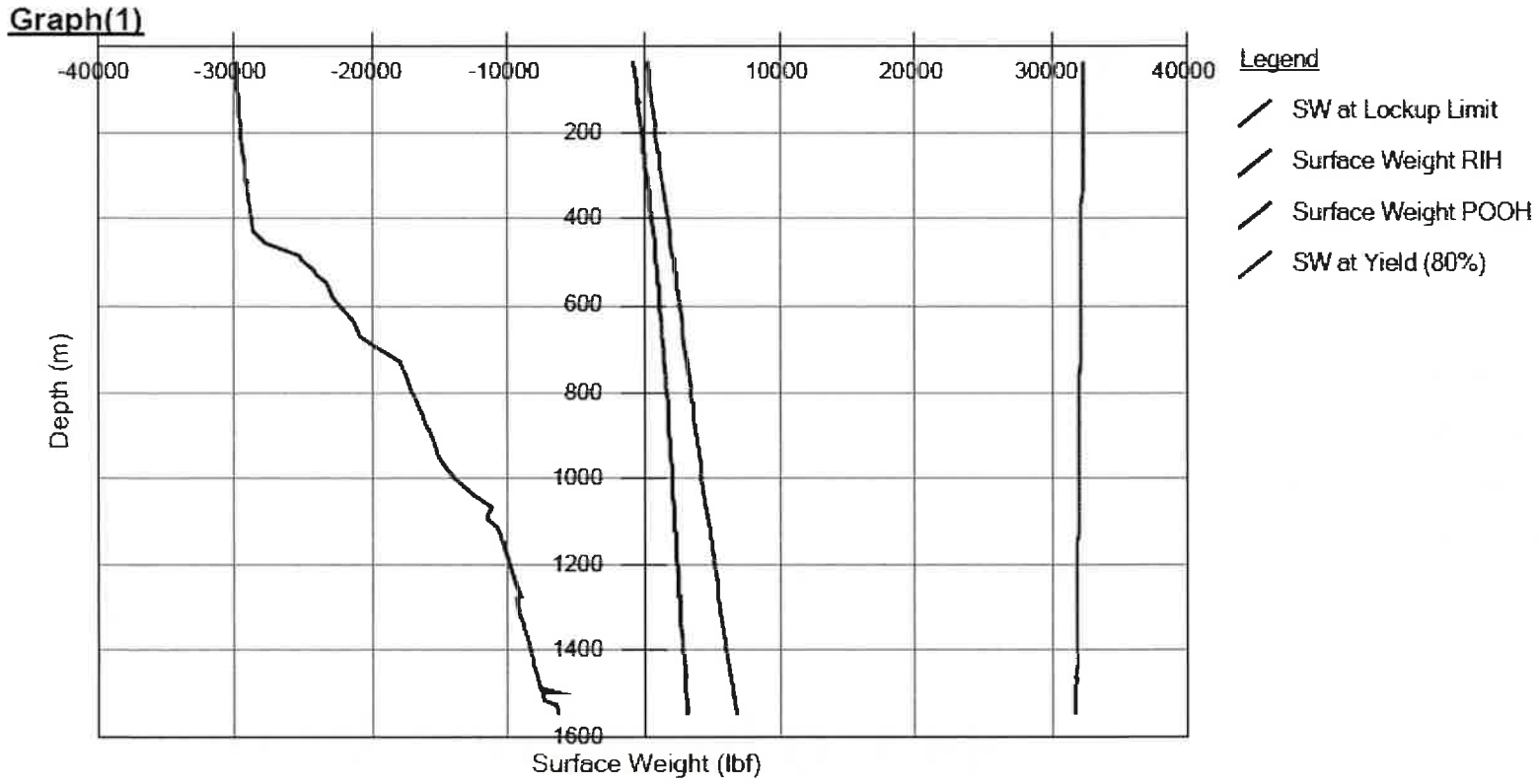
Neu
Dimension
Your Integrated Solutions Partner

# TFA SENSITIVITY ANALYSIS – IDLE RATE



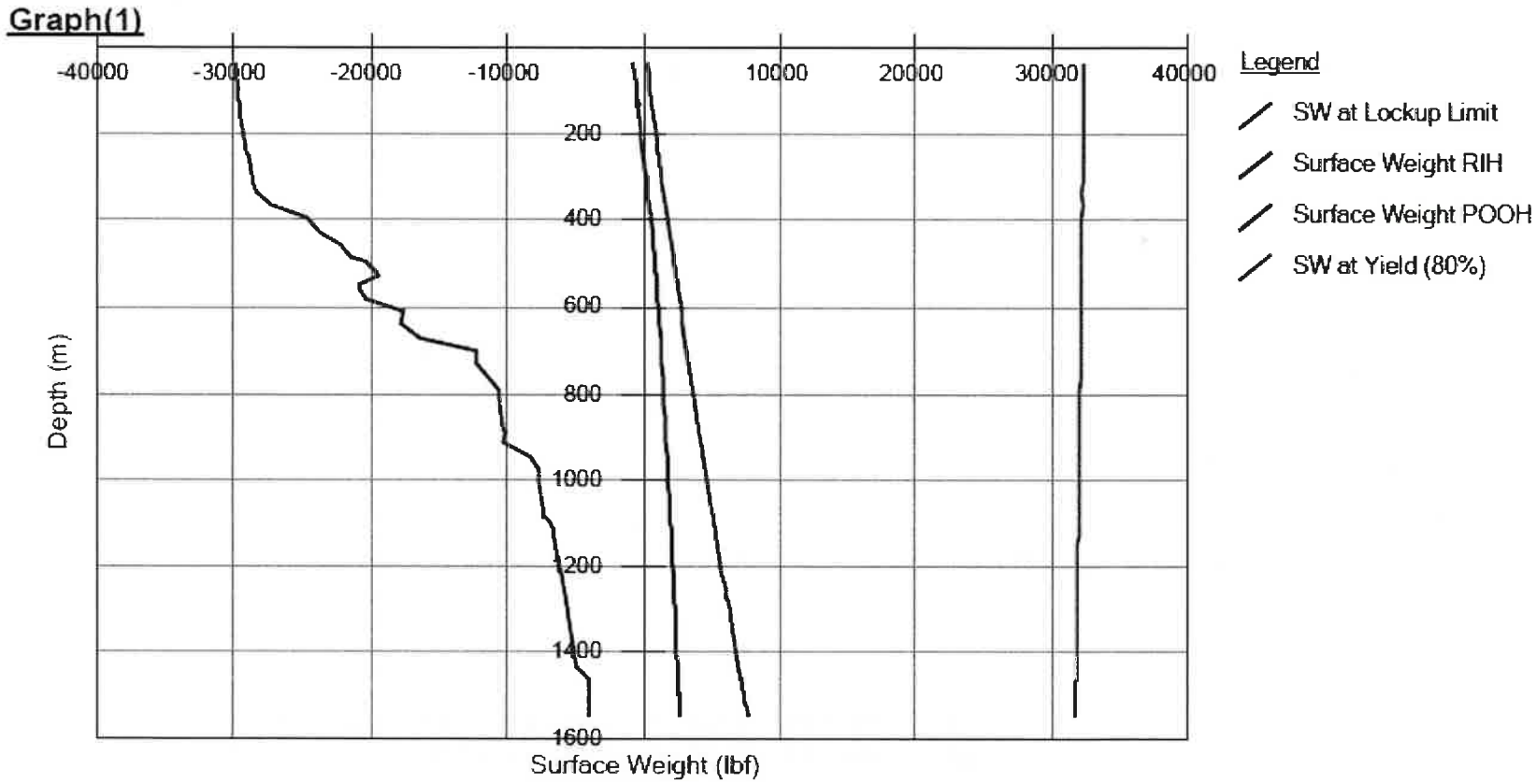
Neu Dimension
Your Integrated Solutions Partner

# TFA SENSITIVITY ANALYSIS – 1.1 BPM 300 SCFM 0.2 FF



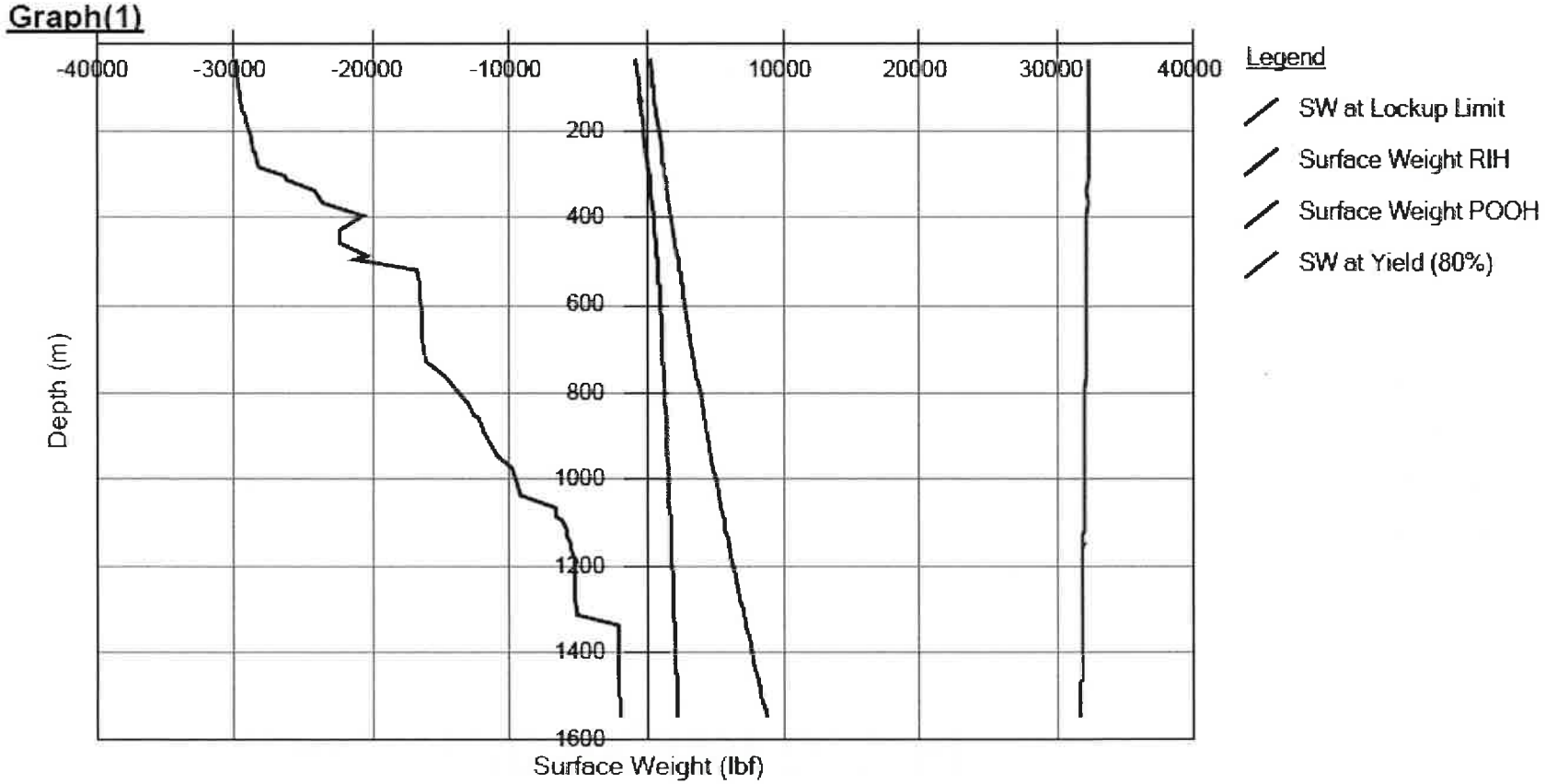
Neu Dimension
Your Integrated Solutions Partner

# TFA SENSITIVITY ANALYSIS – 1.1 BPM 300 SCFM 0.3 FF



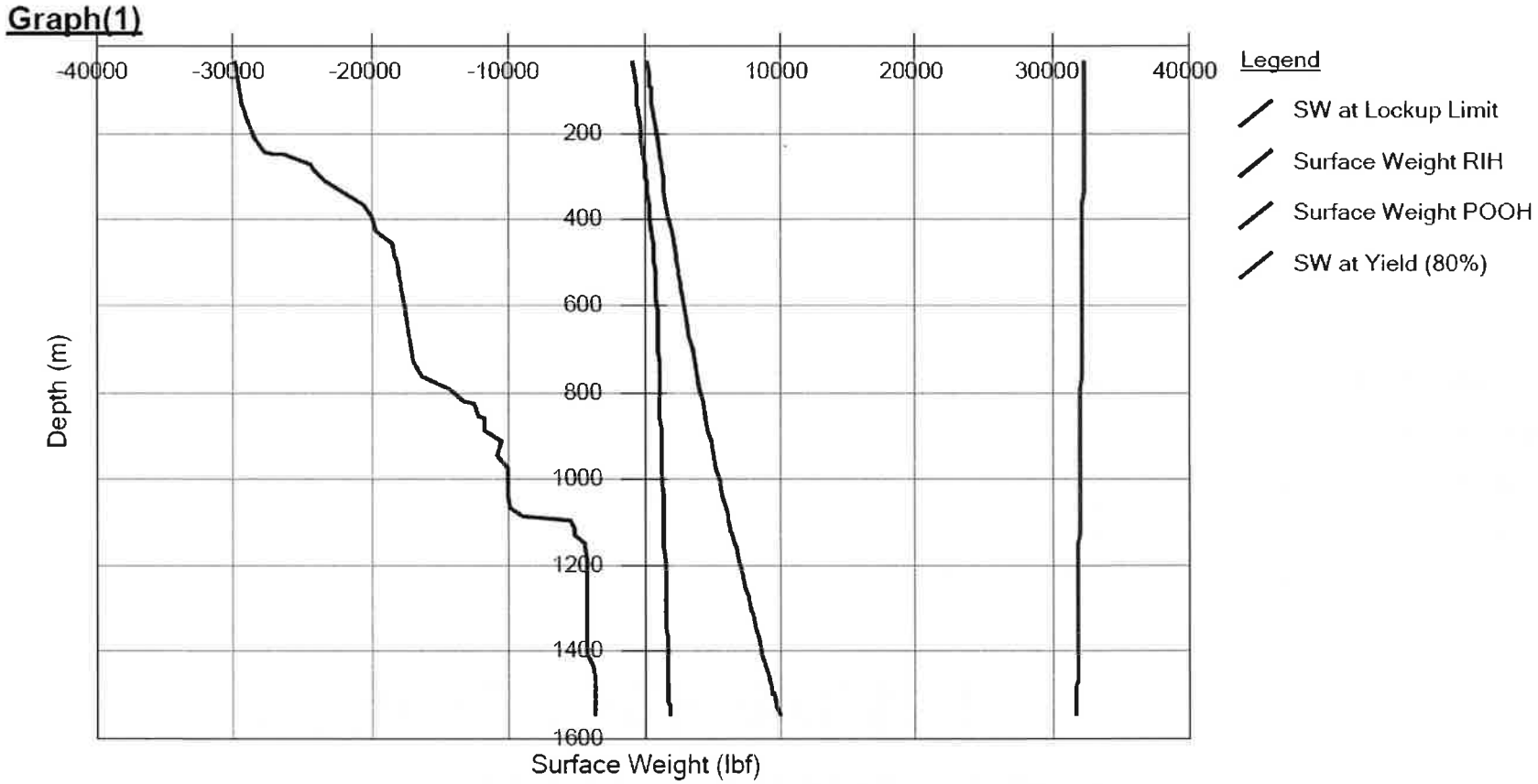
Neu Dimension
Your Integrated Solutions Partner

# TFA SENSITIVITY ANALYSIS – 1.1 BPM 300 SCFM 0.4 FF



Neu Dimension
Your Integrated Solutions Partner

# TFA SENSITIVITY ANALYSIS – 1.1 BPM 300 SCFM 0.5 FF



Neu Dimension
Your Integrated Solutions Partner

# TFA SENSITIVITY ANALYSIS – SUMMARY

| Friction Factor | Depth (m) | Lock-up Limit (lbf) | RIH Weight (lbf) | POOH Weight (lbf) | Max Pulling Weight at 80% Yield Limit |
|---|---|---|---|---|---|
| 0.2 | 500 | -25,230 | 903 | 2,167 | 32,214 |
| | 1000 | -13,788 | 2,066 | 4,273 | 32,034 |
| | 1,545 | -6,300 | 3,178 | 6,794 | 31,773 |
| 0.3 | 500 | -20,439 | 843 | 2,240 | 32,230 |
| | 1000 | -7,675 | 1,819 | 4,653 | 32,010 |
| | 1,545 | -4,089 | 2,710 | 7,707 | 31,786 |
| 0.4 | 500 | -21,369 | 786 | 2,317 | 32,213 |
| | 1000 | -9,586 | 1,587 | 5,077 | 32,019 |
| | 1,545 | -1,968 | 2,286 | 8,758 | 31,774 |
| 0.5 | 500 | -18,142 | 136 | 2,392 | 32,213 |
| | 1000 | -9,954 | 1,363 | 5,553 | 32,043 |
| | 1,545 | -3,635 | 1,893 | 9,963 | 31,784 |

Neu
Dimension
Your Integrated Solutions Partner

# Pro & Cons Deployment vs conventional

Neu Dimension
Your Integrated Solutions Partner

# Conventional BHA

| Pro | Cons |
|---|---|
| 1. Crew familiarity<br>2. Minimal rig up/down time (1 additional item – Deployment BOP +/- xover)<br>3. Faster BHA makeup / strip down<br>4. Regular CT operational/standby charges | 1. Does not address likelihood of CT string entangled and helical lock against well long string.<br>2. Unable to disconnect using MHA disconnect. IF stuck in completion annulus, disconnect will likely be below entanglement depth.<br>3. Will be forced to use chemical cutters if desire to disconnect on stuck. Expansive, difficult and very time-consuming intervention.<br>4. Extremely difficult/almost impossible to retrieve whole FISH if forced to sever the CT string using plasma cutter.<br>5. CT string will be left downhole. If cut is only feasible at depth inside the completion tubing, additional resistance to producing well with fish left in hole.<br>6. Additional lost in hole charges for CT string.<br>7. If extended lengths of CT string is left in hole, the remaining string will no longer be usable as is. Time, effort and additional cost to demob reel, spool out remaining string, spool in new string, reinspect and mob back to location etc. |

Neu Dimension
Your Integrated Solutions Partner

# Extended BHA

| Pro | Cons |
|---|---|
| 1. Addresses likelihood of CT string entanglement and helical lock against well long string.<br>2. Gain ability to disconnect IF stuck in completion annulus<br>3. Disconnecting is a fast and easy process.<br>4. Only BHA will be left downhole if disconnect. Lesser resistance to producing well with fish left in hole.<br>5. Easier to retrieve FISH if disconnect at MHA.<br>6. CT string can be immediately used for subsequent wells with zero additional effort, time or cost. As such no delay to subsequent CT intervention plan after disconnect. | 1. Minimal rig up/down time (1 additional item – Deployment BOP)<br>2. Additional extended BHA makeup / strip down.<br>3. Additional CT operational/standby charges. |

Neu
Dimension
Your Integrated Solutions Partner

# Previous History for Dulang B7S

Neu Dimension
Your Integrated Solutions Partner

# Summary

9 May 2020

1. CT RIH to Tag No-GO nipple.
2. CT able to tag the NO-GO without any issue after slickline fish has been retrieved.

10 May 2020

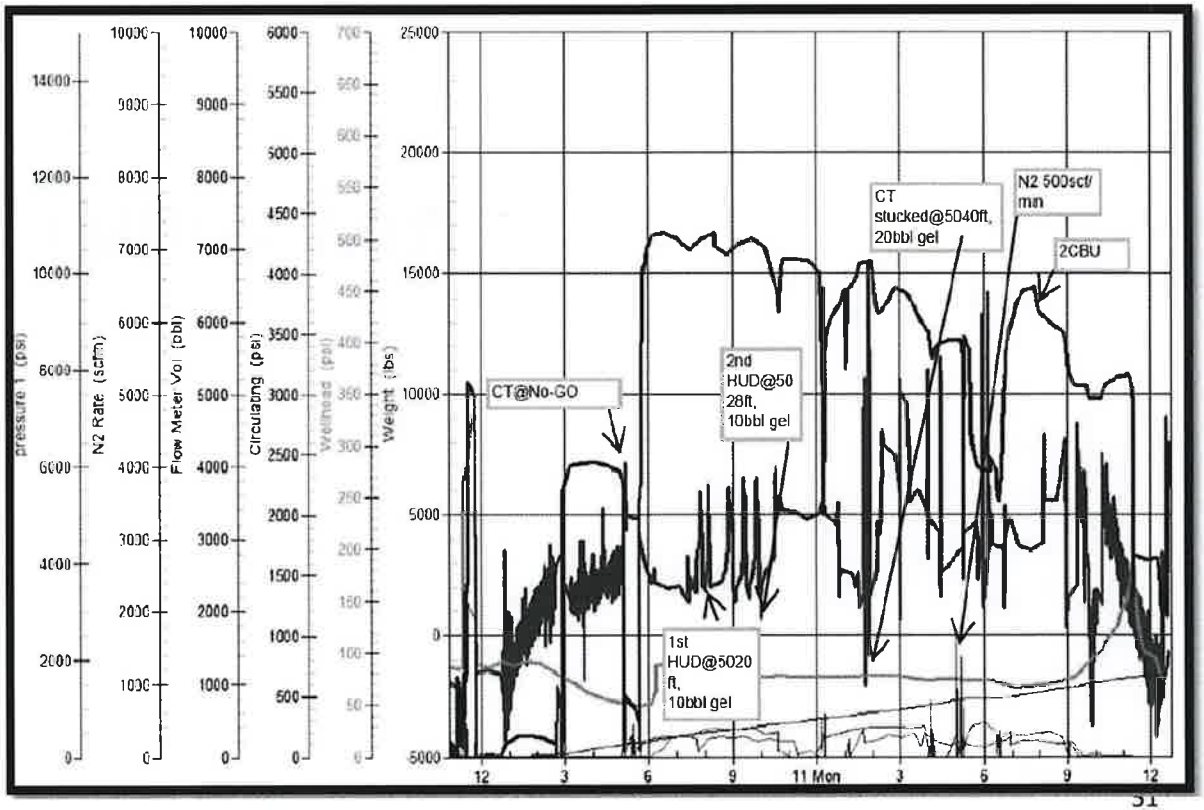
1. CT RIH to perform SCO inside casing.
2. CT weight during entering casing RW:2200lbs
3. CT get return 0.3% sand with D801 gel at depth 5020ft
4. CT continue RIH at HUD at depth 5028ft and continue penetrate and experienced HPW at depth 5040ft. CT able to release with overpull 14500lbs. (Target SCO depth: 5052ft)
5. After CT is free, straight POOH inside tubing and CBU6
6. POOH to surface

Neu Dimension
Your Integrated Solutions Partner

# Summary

10 May 2020

1. 4 hours stuck during cleanout stage inside casing
2. Overpull 9,500 lbs
3. Normal pick-up weight, 5,000 lb

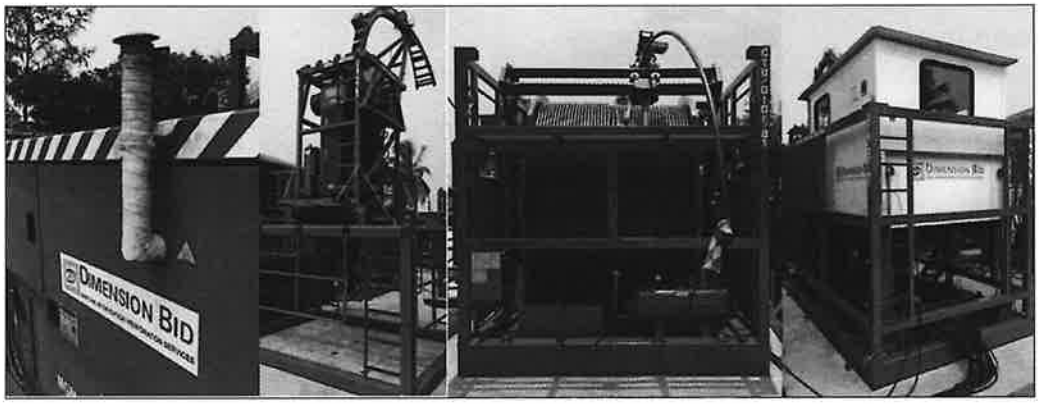


Neu
Dimension
Your Integrated Solutions Partner

# Thank you

# DIMENSION BID

PETRONAS




# DULANG B-7S
# SAND CLEAN OUT


Revision: 4
Prepared for: Pravin Nair / Rahila
Date Prepared: 30th July 2024
Well: B-7S
Field: DULANG
Operation Region: PMA
Prepared by: Muhammad Hafiz
Phone: +6019-2640410
Email: Hafiz.saharuddin@neudimension.com

**DESIGN VERIFICATION**

| | | |
|---|---|---|
| **PREPARED BY DB**<br>CTS Operation Engineer | Muhammad Hafiz | 20/8/2024<br>Date |
| **REVIEWED BY DB**<br>CTS Technical Advisor | Kung Yee Han | 20/8/2024<br>Date |
| **APPROVED BY DB**<br>CTS General Manager | Aliff Adenan | 20/8/2024<br>Date |
| **APPROVED BY PCSB**<br>Dulang<br>Well Intervention Engineer | Pravin Nair / Rahila | Date |
| **APPROVED BY PCSB**<br>Technical Professional<br>Well Intervention, PMA | Izwan Jalil | Date |
| **APPROVED BY PCSB**<br>Head of Cluster 2<br>Well Intervention, PMA | Hafizi Zaini | Date |

**Remark: Do not execute the procedures in this document if it is not fully approved and signed by all parties.**

**DISTRIBUTION LIST**

| No | Personnel | Company | Name | Email |
|---|---|---|---|---|
| 1 | Well Intervention Engineer | PCSB | Pravin Nair<br>Rahila | pravin.venugopalan@petronas.com<br>rahila.mrafe@petronas.com |
| 2 | Well Service Supervisor (WSS) | PCSB | TBA | TBA |
| 3 | Offshore Installation Manager (OIM) | PCSB | TBA | TBA |
| 4 | Tech Professional | PCSB | Izwan Jalil | Izwanjalil@petronas.com |
| 5 | Cluster Head | PCSB | Hafizi Zaini | Hafizi.zaini@petronas.com |
| 6 | Head of well Intervention | PCSB | Eddy Samaile | Eddysamaile@petronas.com |
| 7 | Material Coordinator (Logistics) | DB – Kemaman | Marzokey | marzokey@neudimension.com |
| 8 | Service Supervisor | DB – Kemaman | TBA | TBA |
| 9 | Operation Engineer CT Services | DB – Kemaman | Muhammad Hafiz | hafiz.saharuddin@neudimension.com |
| 10 | Operation Engineer CT Services | DB – Kemaman | Mohammad Faizal Ali | faizal.ali@neudimension.com |
| 11 | Technical Advisor CT Services | DB – Kemaman | Kung Yee Han | yeehan.kung@neudimension.com |
| 12 | Field Service Manager CT Services | DB – Kemaman | Mohd Khairul Ridhwan | khairul.ridhwan@neudimension.com |
| 13 | General Manager CT Services | DB – Kemaman | Aliff Amirul Adenan | aliff.adenan@neudimension.com |
| 14 | HSE Supervisor | DB – Kemaman | Ahmad | ahmad@neudimension.com |

**PERSONNEL CONTACT**

Any means of following doubt / unusual parameters / Emergency, please contact Dimension Bid personnel in onshore immediately.

| No | Name | Position | Company | Location | Contact No |
|---|---|---|---|---|---|
| 1 | Muhammad Hafiz | Operation Engineer | DB | Kemaman | 019 – 264 0410 |
| 2 | Mohammad Faizal Ali | Operation Engineer | DB | Kemaman | 013 – 736 1046 |
| 3 | Kung Yee Han | Technical Advisor | DB | Kemaman | 019 – 610 2088 |
| 4 | Mohd Khairul Ridhwan | Field Services Manager | DB | Kemaman | 014 – 515 4452 |
| 5 | Alif Adenan | General Manager | DB | Kemaman | 011 – 1225 7044 |

**REVISION HISTORY**

| Rev. No | Section | Date | Revised By |
|---|---|---|---|
| 0 | All | 30/7/2024 | Muhammad Hafiz |
| 1 | 1. Perform pressure test against DKCV after make-up MHA to Carsac<br>2. Flag CT String after make-up MHA to Carsac<br>3. Revise Slickline deployment stack-up (remove BOP) | 15/8/2024 | Muhammad Hafiz |
| 2 | 4. To include offline pressure test DKCV before Deployment | 16/8/2024 | Muhammad Hafiz |
| 3 | 5. change pressure test to 15 minutes<br>6. Include BHA diagram during Pressure test Deployment BOP before slickline deployment.<br>7. Revise overpull weight by slickline cable to 1.2 x 2nd Section BHA length (900 lbs)<br>8. include pressure test Pipe/Slip ram after engage during reverse deployment. | 17/8/2024 | Muhammad Hafiz |
| 4 | 9. To include additional pressure test to lower ram during reverse deployment.<br>10. To perform MultiJet Surface function test prior before deployment using slickline.<br>11. To include positive pressure test against the DKCV during reverse deployment. | 20/8/2024 | Muhammad Hafiz |

**ACRONYM**

| Acronym | Abbreviation |
|---|---|
| BHA | Bottom Hole Assembly |
| RIH | Run In Hole |
| POOH | Pull Out of Hole |
| HUD | Hang Up Depth |
| TCC | Tubing Clearance Check |
| SCO | Sand Clean Out |
| TIT | Tubing Integrity Test |
| BOP | Blow Out Preventer |
| CT | Coiled Tubing |
| ID | Internal Diameter |
| MDTHF | Measure Depth Tubing Head Flange |
| TOP | Top of Plug |
| MASTP | Maximum Allowable Surface Treating Pressure |
| STP | Surface Treating Pressure |
| IH | Injector Head |
| JF | Jacking Frame |
| DKCV | Dual Kelly Cock Valve |
| MHA | Motor Head Assembly |
| IW | Injection Water |
| TSW | Treated Sea Water |
| | |
| | |

**TABLE OF CONTENT**

## OBJECTIVES

1. To perform sand cleanout inside casing, until 17m below bottom perforation (1,545m).

***Note: All depth mention inside this job program in MDTHF***

## WELL DATA

| Input Parameter | Parameter Value |
|---|---|
| Field | Dulang Bravo |
| Max. Deviation (degrees) | 48.3 degrees |
| Min. Restriction (inch) | 2.25" @ No Go nipple |
| Type of Fluid & Density | 9.6 ppg based on data in well diagram |
| Top of Fluid | N/A |
| Current Well Status | Production decline, assume sand accumulated outside of the tubing |
| Reservoir Pressure | 1600-1900 psi |
| Fracture Gradient | 0.72 psi/ft |
| $H_2S$ Content | 0 – ppm |
| $CO_2$ Content | $CO_2$ - 15-30 mole% (oil), 50-60 mole% (gas) |
| Mercury, HG | N/A |

## OPERATION SUMMARY

| Item | Job Description | Remark |
|---|---|---|
| A | CT Operation | SCO using MultiJet nozzle:<br><br>From: 1,514m (EOT)<br>To: 1,545m (17m below bottom perforation zone) |

## WELL DIAGRAM



LATEST UPDATE: MAR 2022

### DULANG WELL COMPLETION DIAGRAM

WELL B-7: DUAL OIL PRODUCER IN 9 5/8" CASING (TYPE 5)

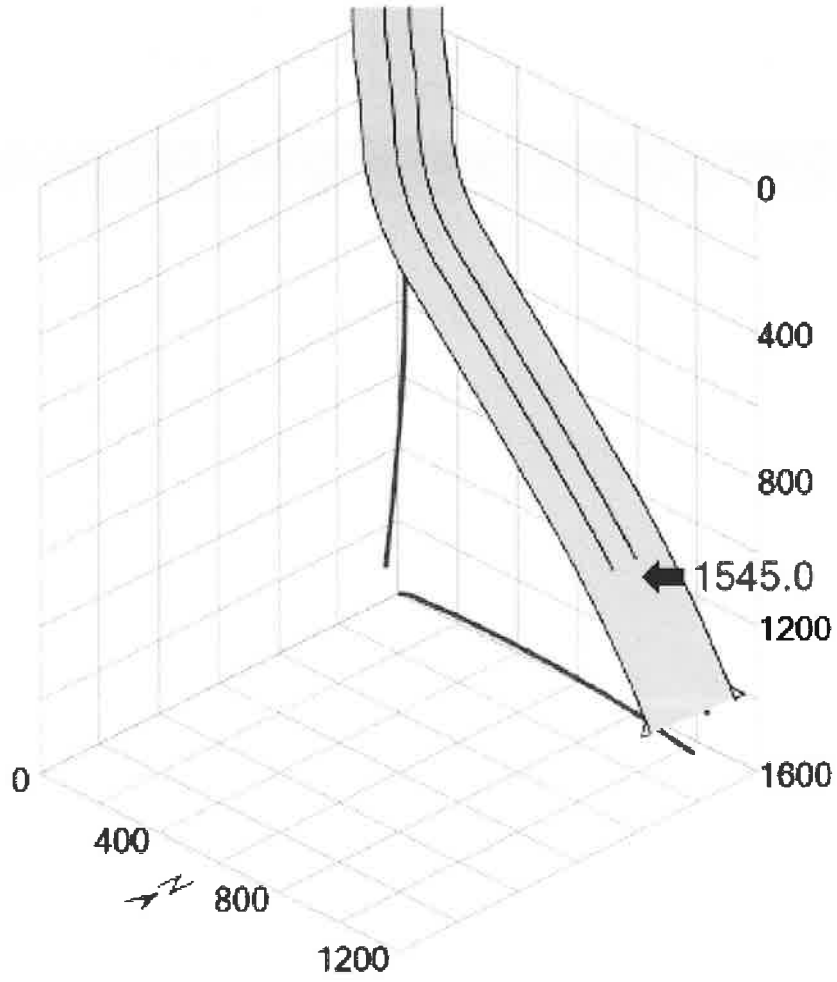
DATE OF COMPLETION : 8 JUNE 1991
RIG : TIOMAN 3
TUBING : 2 7/8" 6.5 PPF N-80 NK3 SB
X-MAS TREE : WKM, DUAL 3M
PACKER FLUID : 9.6 PPG 3% KCl + NaCl + 0.05% NALCO 3900 BIOCIDE & CORR. INHIBITOR

CASING : 20" X-56 COND. 94 ppf @ 354.0 m MDDF
13 3/8" K-55 SURF., 54.5 ppf @ 820 m MDDF
9 5/8" N-80 PROD., 40 ppf @ 1915.0 m MDDF

PBTD : 1644.0 m MDDF
RTE TO TUBING HANGER : 13.88 m
MAXIMUM DEVIATION : 48.30 DEG

| STATUS | MIN ID (in) | SHORT STRING | DEPTH m MDTHF | DEPTH m MDTHF | COMPLETION LONG STRING | MIN ID (in) | STATUS |
|---|---|---|---|---|---|---|---|
| | | ¼" CONTROL LINE | | | ¼" CONTROL LINE | | |
| | 2.441 | FLOW COUPLING | 128 | 138 | FLOW COUPLING | 2.441 | |
| | 2.312 | TRDP-4A SCSSV | 129 | 139 | TRDP-4A SCSSV | 2.312 | |
| | 2.312 | WP-1 NIPPLE | 282 | 291 | WP-1 NIPPLE | 2.312 | |
| DV | 2.371 | KBMG-M SPM | 528 | 548 | KBMG-M SPM | 2.371 | DV |
| DV | 2.371 | KBMG-M SPM | 859 | 888 | KBMG-M SPM | 2.371 | DV |
| DV | 2.371 | KBMG-M SPM | 1117 | 1135 | KBMG-M SPM | 2.371 | DV |
| DV | 2.371 | KBMG-M SPM | 1303 | 1342 | KBMG-M SPM | 2.371 | DV |
| GLOV 12/64" | 2.371 | KBMG-M SPM | 1465 | 1491 | KBMG-M SPM | 2.371 | GLOV 12/64" |
| CLOSED | 2.312 | WPB-2DE SSD | 1493 | 1494 | WPB-2DE SSD | 2.312 | CLOSED |
| | 2.441 | GUIB UNI-XXVII DUAL HYD. PKR | 1510 | | | | |
| OPENED | 2.250 | 'D' NO-GO NIPPLE | 1513 | 1161.5 | 'WPB-2DE' SSD | 2.312 | CLOSED (stiff) |
| | 2.441 | W/L ENTRY GUIDE | 1514 | 1521 | | | |
| SAND : E-7 (FB N3-A; WIR)<br>PERFT: 1521.62 m - 1528.12 m | | | | 1530 | BLAST JOINT | 2.441 | |
| | | | | | Packoff at 1527-1534 m-MDTHF | | |
| | | | | 1549 | 'WP1' NIPPLE | 2.312 | |
| | | | | 1556 | CENTRALIZER | 2.441 | |
| | | | | 1558 | LOC. SEAL ASSY. | 2.441 | |
| | 4.000 | GUIB MAGNUM 'HT' PERM. PKR | 1558 | 1559 | SEAL BORE EXT. | 4.000 | |
| | | | | 1559 | 'D' NO-GO NIPPLE | 2.250 | |
| SAND : E-12/13 & E14 (FB N3-A; WIR)<br>(E-12/13) PERFT : 1589.62 m - 1589.62 m<br>(E-14) PERFT : 1592.62 m - 1613.62 m | | | | 1562 | WEG | 2.441 | OPENED |
| 9 5/8" CASING SHOE<br>DOGLEG (DEPTH) : 394.2 - 625.0, 682.7 - 711.6 | | | | TD @ 1908 m MDTHF | | | |

**WELL 3D PLOT**




| | |
|---|---|
| Well name: | Dulang B07S |
| Max Inclination: | 48.4° at 1353.0 m |
| Max DLS: | 4.678 °/100ft at 371.0 m |
| Min ID: | 2.250 in at 1513.0 m |
| WHP: | 150 psi |

**TREATMENT VOLUME**

| Description | Details |
|---|---|
| Tubing Specification | 2-7/8" 6.5 ppf |
| Production Casing Specification | 9-5/8" 40 ppf# N80 |

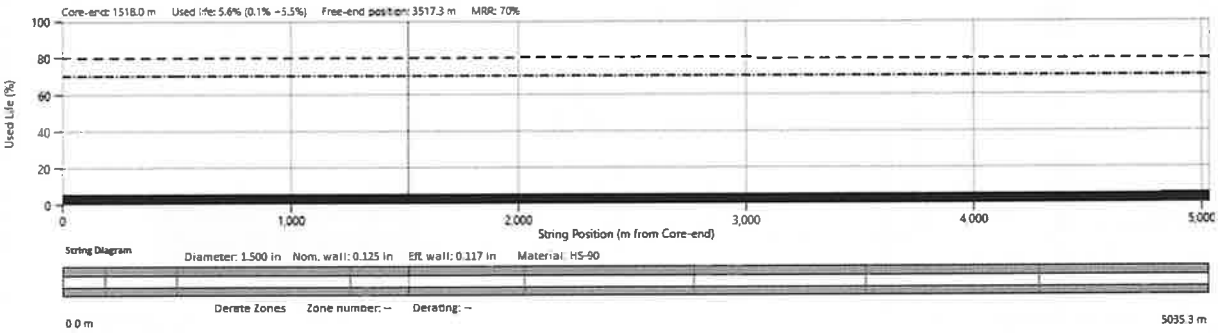
| Type | External Pipe | | | External Pipe 1 | | | External Pipe 2 | | | Capacity | From | To | From | To | Length | Total Volume (bbls) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | OD (inch) | ID (inch) | Wt (lb/ft) | OD (inch) | ID (inch) | Wt (lb/ft) | OD (inch) | ID (inch) | Wt (lb/ft) | Bbl/ft (bbl/ft) | m | m | ft | ft | ft | |
| Tubing volume until EOT | 2 7/8 | 2.441 | | | | | | | | 0.00579 | 0 | 1,514 | 0 | 4,967 | 4,967 | **28.75** |
| Wellbore volume | 9 5/8 | 8.835 | | 2 7/8 | | | | | | 0.07582 | 1,510 | 1,558 | 4,954 | 5,112 | 157 | **11.94** |
| PCP volume | 9 5/8 | 8.835 | | 2 7/8 | | | 2 7/8 | | | 0.05977 | 0 | 1,510 | 0 | 4,954 | 4,954 | **296.10** |

## CT STRING INFORMATION

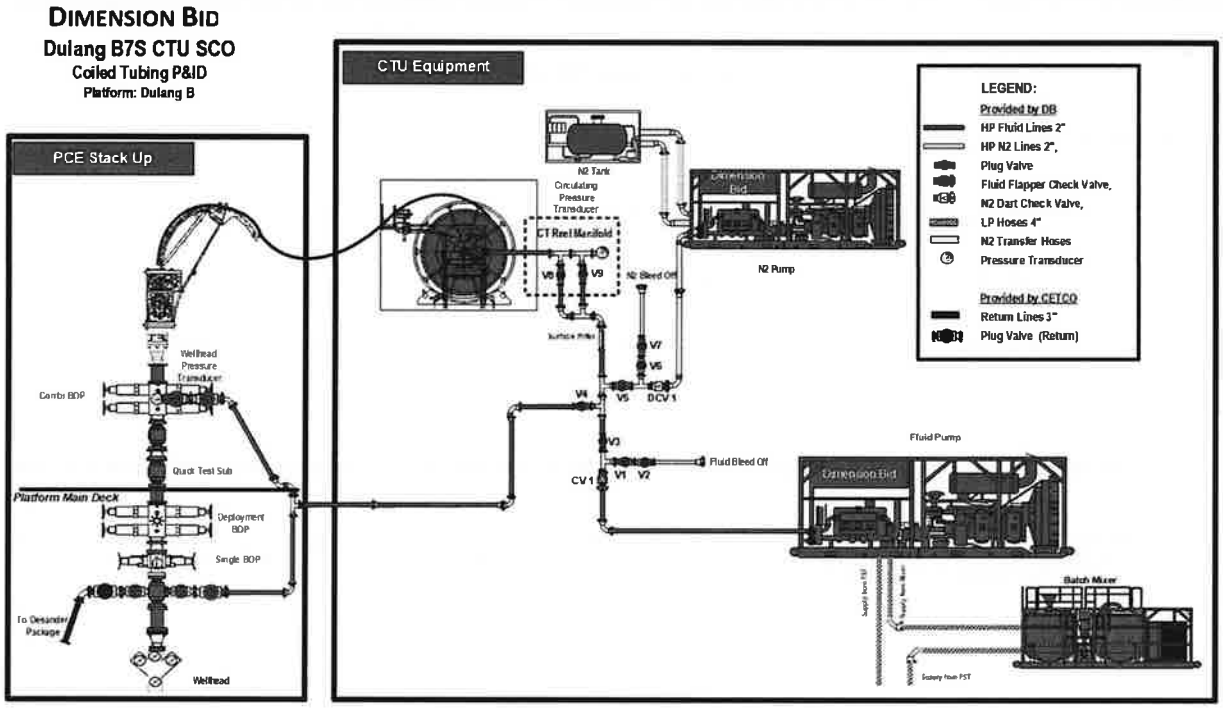
| OD (in) | Spec | W/T (in) | ID (in) | Length (ft) |
|---|---|---|---|---|
| 1.5 | HS – 90 | 0.125 | 1.25 | 16,513 |
| **CT Volume: 25 bbls** | | | | |

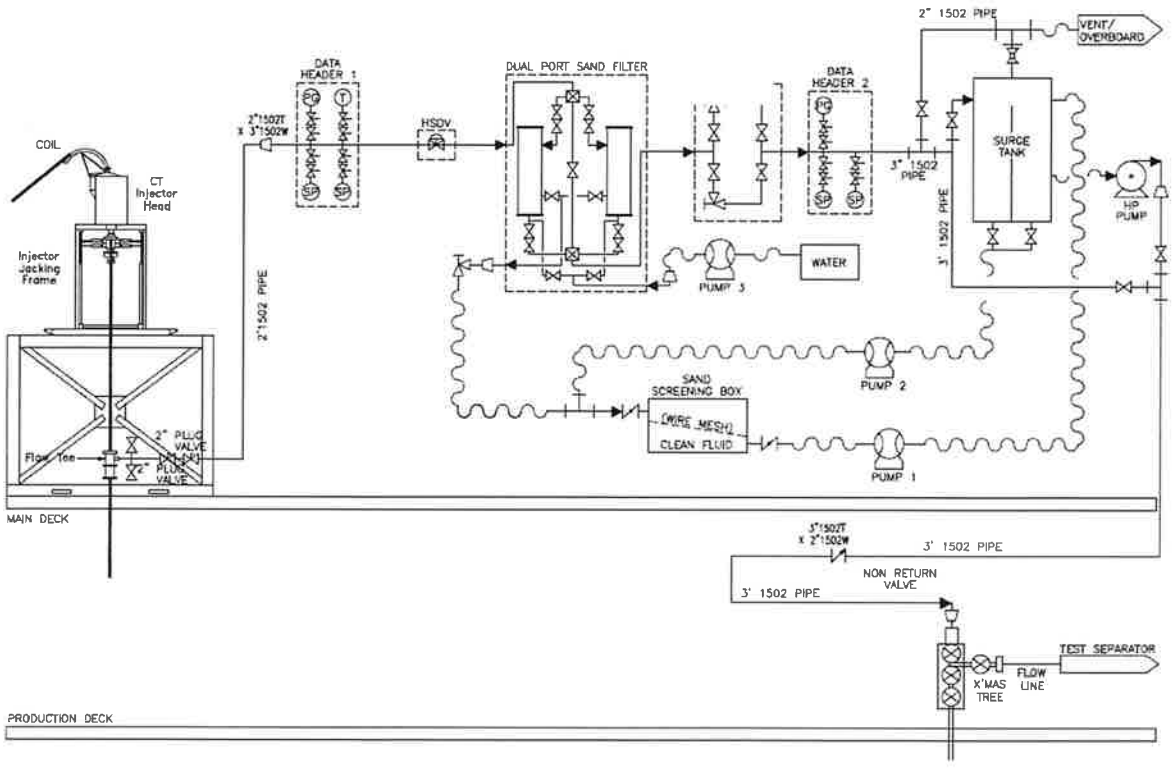
## CT STRING FATIGUE

- Current **used life** for Tenaris #40423 is at **5.5%**



## PROCESS FLOW DIAGRAM



## SAFETY OPERATIONAL PROCEDURES

**Prior to commencement of the CT / Bullheading operation, a pre-job meeting will be held. This should be attended by the following parties as a minimum:**

OIM, WSS, CT Supervisor, Representatives of other service companies involved and others as necessary.

**Safety meetings should be held at the start of every shift and risk assessments must be evaluated during this time. Tool box talks should be held immediately prior to the job execution.**

**Note: The safety meeting must be driven by DB Supervisor addressing the following topics as a minimum:**

1. Muster point.
2. Take list of personnel on site (Head count)
3. All personnel should review and be familiar with escape routes and emergency procedures.
4. Describe the **job objective, fluids and volumes to be pumped, pressures expected** during the job, and others.
5. Review **Dimension Bid Operations Policy and Procedure Manual.**
   - 5.1. Ensure at all steps carried out during the operations comply with this Manual.
   - 5.2. Management of change MUST be applied any time there is a need to deviate from the steps contained this procedure.
   - 5.3. A document MUST be created describing each the step of the deviation. This document shall also include the deviation Risk Assessment and it MUST be approved and signed by PCSB – Head of Well Intervention and Dimension Bid General Manager.
6. Exercise Stop work authority if unsafe condition occurs and assess situation with all team members, resume operation after mitigation plan is in place.
7. Personnel responsibilities throughout the job.
8. Spills, fire, blow out, unexpected well behaviour.
9. Emergency shower station and eye wash station location.
10. Trapped potential energy such as pressure or CT stiffness.
11. Prepare related Job Hazard Analysis (JHA) prior commencement of any work, get approval from Client Site Representative (CSR) and review it with all personnel involved as well as to review Risk Assessment.
12. Discuss the well $H_2S$, $CO_2$, Hg (Mercury) content (if applicable).
13. Adhere all **PCSB Zeto Rules** and other guidelines.
14. Take a physical count of inventory and make sure all required materials are available on site.
15. **Barricade** the work area and display the appropriate **warning sign**.
16. On chemical mixing and handling; all personnel involved shall hold **safety meeting** and review **Safety Data Sheet** (SDS).
    - 16.1. Personnel involve during chemical handling shall be briefed by DB Chemical Specialist onsite and extra precautions must be taken. All SDS must be available on site and reviewed prior chemical handling.
    - 16.2. All non-essential personnel shall stay away from mixing site.
    - 16.3. Use PPE including respirators, hard hats, eye protection and steel-toed boots.
    - 16.4. Verify if there is any **dead volume** in the mixing tanks and adjust volumes to account for non-usable volume in the blender / mix tank.
    - 16.5. Consider wind direction and note all trip hazards in the mix / pumping area.

16.6. Prior to mixing chemicals, clean and verify the tank/batch mixer and lines are free of any debris and or contaminants.

16.7. In case of spill; wash the place where any chemical has been spilt with available spill kit.

16.8. Take care to prevent leakage due to ejection from valves, fittings, flanges, or other joints flexible chemical hoses and pumps. Never repair the equipment during transfer into mixing tank/container.

17. Take reading of Shut in / Flowing Tubing Head Pressure (SI/FTHP), Casing Head Pressure (CHP) and fluid sample (if available) prior to operation.
18. Check gas lift condition and capability with Site Operation Representative (SOR).
19. Ensure fitness prior to perform duties assigned.
20. Ensure all barriers are in place and followed.

## HEALTH, SAFETY & ENVIRONMENT

1. Evaluate possible risks to arise during the job execution.
2. Evaluate risk assessment. Report any abnormal or insecure condition on site, taking into account all the steps or procedures to follow. Discuss with PCSB HSE coordinator, the execution or suspension of the job.
3. Review SDS of each product that will be used. Verify that all personnel on location handling toxic or corrosive products have the proper PPE.
4. Review the contingency plan for spills.
5. Do not vent / release any hydrocarbons from the well to atmosphere. Returns from the well should be handled safely by Flowback Company.
6. Prior to DB personnel walking on upper deck, DB Supervisor to inspect upper deck and ensure that the area it is in good condition (Gratings, Hatches, etc.)

## EQUIPMENT RIG UP PROCEDURE

Conduct safety meeting with all personnel on location detailing the program, pressure limitations, and personnel responsibilities, well control emergency drill and safety precautions.

1. Spot the equipment accordingly to space availability (as per lifting plan), ensure reel position is aligned with the well.
2. Spot JF at available space with sufficient height and crane capacity to rig up the IH and gooseneck.
3. Rig up the 4" LP hoses from fluid storage tanks to batch mixer and single pump unit
4. Rig up 2" HP treating line as per DB Technical Standard from single pump unit and N2 converter unit to CT reel manifold. Include bleed off line on both lines as well.
5. Install correct wellhead crossover on the wellhead. Ensure well is fully secure and record the MV and CV turns.
6. Install Blowout Preventer (BOPs):
   - 6.1. Rig up Single BOP with necessary length of risers on top of the wellhead crossover.
   - 6.2. Rig up Combi BOP with flow tee above the risers
   - 6.3. Hook up BOP hoses and conduct function test for each ram.
7. Rig up 2" kill line from single pump unit line to BOP kill port.
8. Rig up flow back line from flow tee to Choke manifold -> desander unit -> High pressure flowback pump -> flowback Well
9. Spot IH assembly (c/w stripper) with JF on top of wellhead area. Ensure the gooseneck is aligned with the reel position
10. Inspect the chain and gripper block condition and ensure the alignment is correct
11. Rig up the following hydraulic hoses:
    - 11.1. From CT Power Pack to CT Control Cabin
    - 11.2. From CT Power Pack to CT Injector hose reel
    - 11.3. From CT Control Cabin to CT Reel
    - 11.4. From CT Control Cabin to CT BOPs
    - 11.5. From CT Power Pack to JF
12. Perform EMC 1 for all equipment. Start up and run all equipment for few minutes.
13. Jack up CT control cabin.
14. Function test BOP rams (primary and deployment).

    *Observe indicator pin to confirm that all rams are in good working condition.
15. Install the stab-in-guide on the CT then stab the string into IH.
16. Record the total cut length of CT String in Cerberus and Pipe Management for future reference.
17. Make up the CT connector and perform pull test at least 15,000 lbs as per DB SOP. This test to be recorded in OrionNET.

    *Do not perform pull test more than 80% from CT string Limit.
18. Install pressure test plate onto the CT connector.
19. Circulate the string with water until clean return is seen prior to proceed with pressure test CT Connector.
20. Pressure up the CT string to 5,000 psi gradually by 500 psi increment then hold for 10 minutes.

21. Open the needle valve to release the pressure slowly.
22. To address long term inactivity (CT string idle >2 weeks), pickle CT String with 10 bbls of 7.5% HCl, neutralization fluid to remove internal rust / foreign debris inside the CT string.

| 7.5% HCl (CT Pickle) | | | 420 | gals | 10 | bbls | Description |
|---|---|---|---|---|---|---|---|
| Products | Concentration | | Volume | | | | |
| IW | 794 | gptg | 333 | gals | 7.92 | bbls | Base Fluid |
| 33% HCl | 202 | gptg | 84 | gals | 2.00 | bbls | Raw acid |
| Corr 400 | 4 | gptg | 2 | gals | 0.01 | bbls | Corrosion Inhibitor |

**Mixing Instruction:**
1. Fill up tank with IW
2. Add 33% HCl & Corr 400 into the tank
3. Agitate until the mixture is homogenous

***Notes: All acid to be neutralized prior to flowing back to system.***

23. Make up the BHA onto the string as per BHA diagram provided.
24. Secure down the injector assembly with chains.
25. Measure the following length to set the CT depth:

| Distance | Length (ft) |
|---|---|
| **A**: Tubing Hanger (THF) to RKB | |
| **B**: Tubing Hanger (THF) to Stripper | |
| **C**: BHA Length | |

26. Pick up CT and tag the stripper to set CT depth based on this calculation "A-B+C".

## GENERAL EQUIPMENT PRESSURE TESTING PROCEDURE

Conduct safety meeting with all personnel on location detailing the program, pressure limitations, and personnel responsibilities, well control emergency drill and safety precautions. Refer the following procedure to pressure test BOP Body, Blind Ram, Surface Line and Wellhead connection.

1. Isolate the line to CT. Double confirm the valve is closed.
2. Fill and pressure test the treating line with IW/TSW (subject to IW availability) to 500 psi and hold for 5 minutes. Inspect the lines for leaks and observe for any pressure drop.
3. Increase pressure to 3,000 psi and hold for 15 minutes. Inspect the lines for leaks and observe for any pressure drop.
4. Fill the pressure control equipment and ensure air is vented from the system by leaving the blind ram and blind ram equalizing valves open.
5. Close blind ram and equalizing valve. Pressure up the surface lines, BOP body, blind rams and wellhead connection to 500 psi then increase gradually to 3,000 psi through the kill line, hold for 15 minutes. Inspect the lines for leaks and observe for any pressure drop.
6. Once test complete, open blind ram pressure equalizing port then bleed off any residual pressure and open the blind rams.

Conduct safety meeting with all personnel on location detailing the program, pressure limitations, and personnel responsibilities, well control emergency drill and safety precautions. Refer the following procedure to pressure test BOP Body, Blind Ram, Surface Line and Wellhead connection.

1. Fill up the CT string and stack up until leak can be seen at stripper.
2. Energize the stripper and begin pressure test the complete stack up (CT string, stripper, CT stack and risers) to 3,000 psi against Crown Valve, hold for 15 minutes.
3. Bleed off pressure inside PCE stack up to 1,500psi. Thereafter, bleed off pressure inside CT string to 0psi to test the Double Flapper Check Valve (DFCV) with DP of 1,500psi and hold for 15 minutes.
4. Bleed off the pressure from BOP kill port side.

   *Step 4-8 can be neglected if pipe ram has been pressure tested prior to the job.
5. Place CT string across pipe ram then close the pipe ram.
6. Open pipe ram equalizing valve then fill up the BOP slowly.
7. Close the equalizing valve and begin pressure test the pipe ram to 3,000 psi, hold for 15 minutes.
8. When the tests are complete, bleed off the pressure.

## DUAL KELLY COCK VALVE (DKCV) OFFLINE PRESSURE TEST


Perform offline pressure test DKCV before deployment system.

9. Rig up the following BHA sections to pressure test individually DCKV. Fill up BHA with FW. Close valve #1 and pressure test using Hand Pump or pump unit.

   9.1. For low pressure:

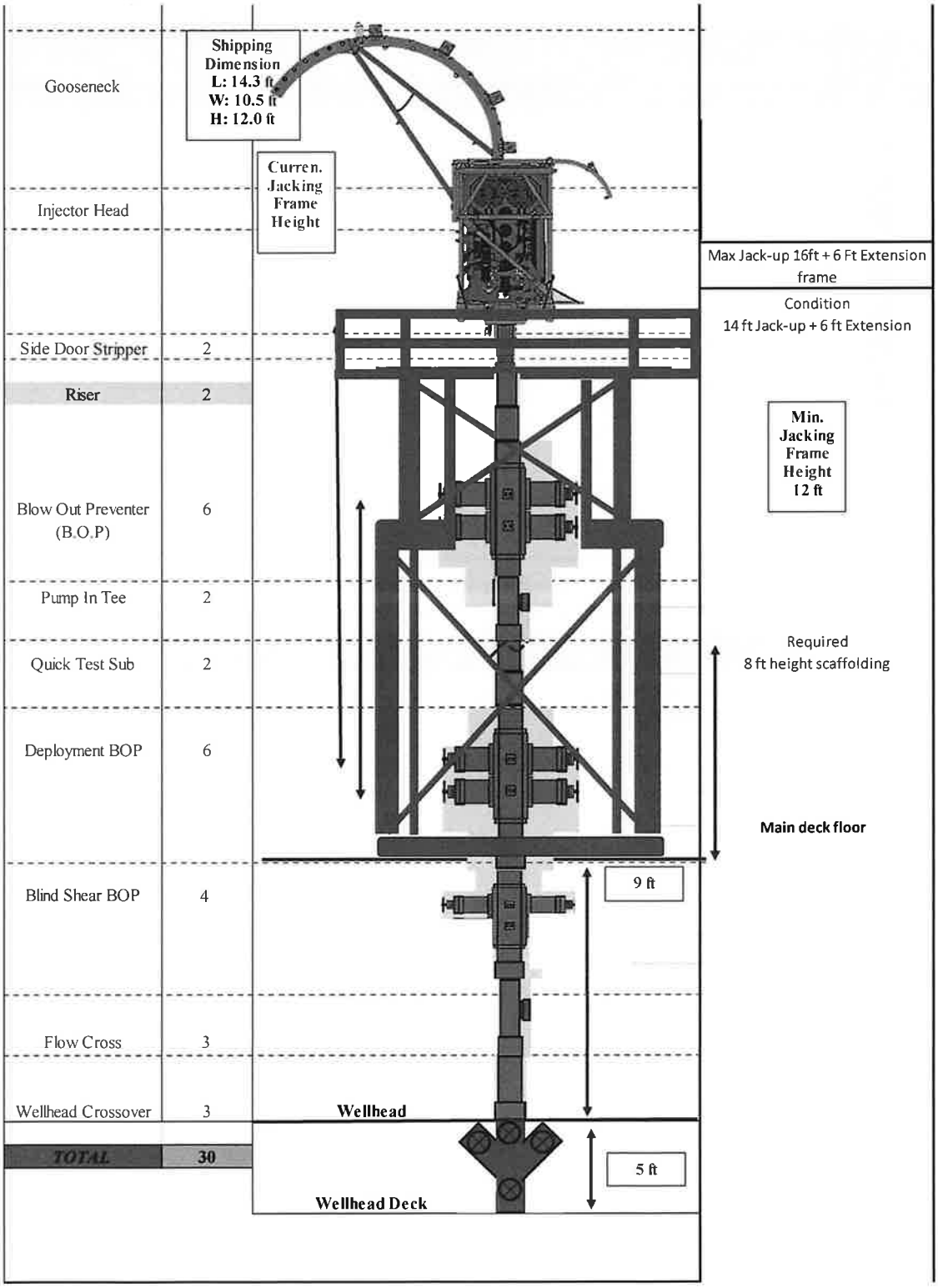
   Acceptance criteria: No visible leaks. Pressure drop is less than 10% (above 270 psi) over 5-minutes test interval after the pressure stabilizes.

   9.2. For high pressure:

   Acceptance criteria: No visible leaks. Pressure drop is less than 10% (above 2,700 psi) over the 15-minutes test interval after the pressure stabilizes.

10. On successful pressure test, bleed off pressure and proceed to step #18. Else rectify and redo step #16.
11. Test valve #2 as per step #15. Ensure only valve #2 is closed while valve #1 remains open.
12. On successful pressure test, bleed off internal pressure

## DEPLOYMENT RIG UP PROCEDURE



1. Rig-up CT PCE stack-up as per proposal above.
2. Rig-up treating line and flowback line to Flow cross at Wellhead area. (Contingency Kill well if required)
3. Connect CT connector, MHA MultiJet nozzle as per below schematic.

| BHA DRAWING | DESCRIPTION | CONNECTION | | ID | OD | TOOL LENGTH | CUMULATIVE LENGTH | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| | | UPHOLE | DOWNHOLE | INCH | INCH | FT | FT | KG |
|  | Dimple Connector | 1.5" CT | 1.0" AMMT PIN | | 1.690 | 0.3 | 0.3 | 2.0 |
| | MHA<br>Disconnect drop ball 5/8"<br>Circulating drop ball 1/2"<br>Burst Disc 5000 psi | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 2.3 | 2.6 | 6.5 |
| | MutiJet Nozzle | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 1.0 | 1.00 | 1.0 |
| | | | | | | | | Total<br>9.50 |

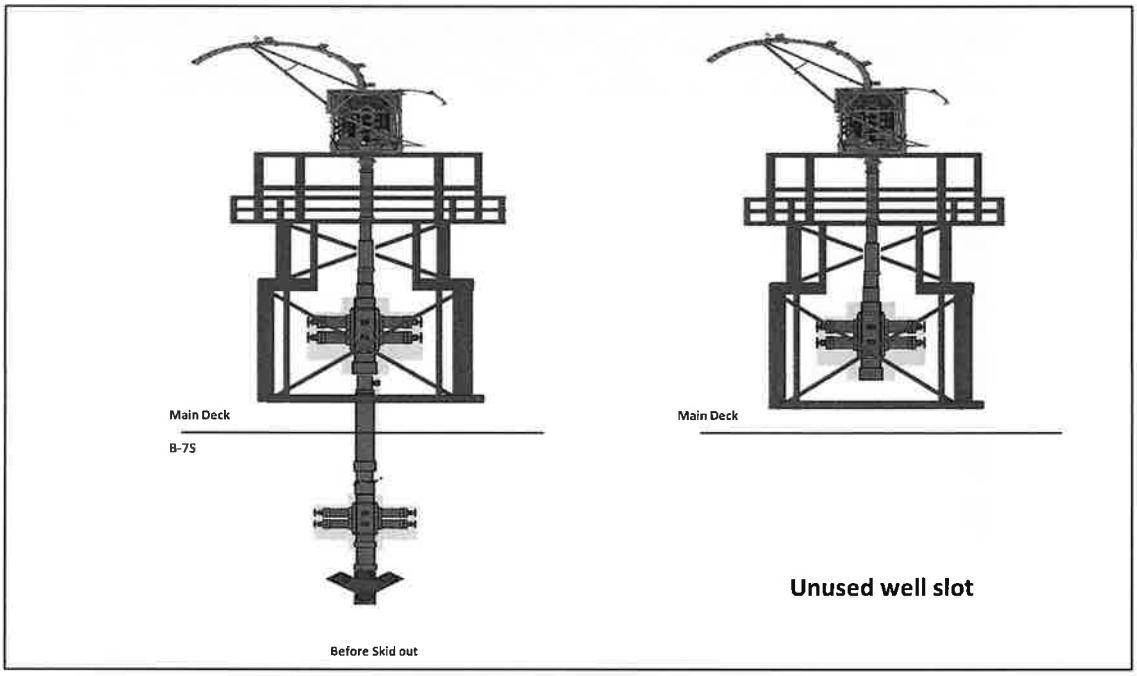
4. Function tests the MultiJet Nozzle to determine the surface operating pumping parameter. Record the data in the table below, do not exceed 5,000psi.

| Flow rates (bpm) | Pressure (psi) | Remark |
|---|---|---|
| … (as minimum as possible) | | |
| 0.3 | | |
| 0.5 | | |
| 0.7 | | |
| 1.0 | | |
| 1.1 | | |
| 1.3 | | |
| … (as maximum as possible, below 5,000 psi) | | |

5. Upon successful pressure test, disconnect the MultiJet nozzle and connect the deployment bar as per below schematic:-

| BHA DRAWING | DESCRIPTION | CONNECTION | | ID | OD | TOOL LENGTH | CUMULATIVE LENGTH | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| | | UPHOLE | DOWNHOLE | INCH | INCH | FT | FT | KG |
|  | Dimple Connector | 1.5" CT | 1.0" AMMT PIN | | 1.690 | 0.3 | 0.3 | 2.0 |
| | MHA<br>Disconnect drop ball 5/8"<br>Circulating drop ball 1/2"<br>Burst Disc 5000 psi | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 2.3 | 2.6 | 6.5 |
| | 6 ft Deployment Bar | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.500 | 6.0 | 6.00 | 20.0 |
| | | | | | | | | 1.0 |
| | | | | | | | | Total<br>29.50 |

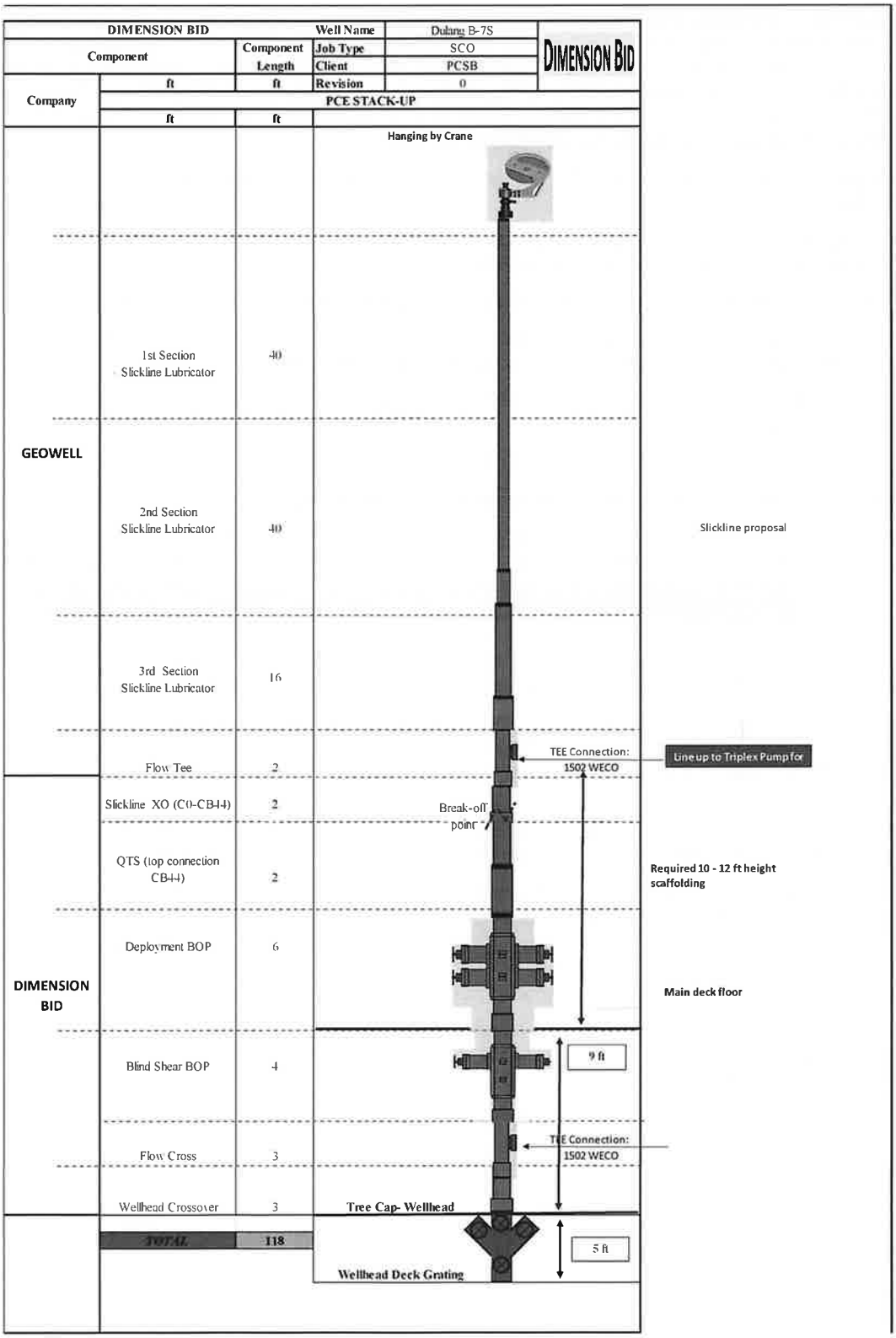
6. Pressure test CT PCE stack up / riser against the crown valve, low pressure (300 psi) and High pressure (3,000 psi) for 15 minutes each after stabilization. Record the pressure test.
7. Upon successful test, bleed off the pressure and test DFCV as per GENERAL EQUIPMENT PRESSURE TEST PROCEDURE step.
8. Once complete test DFCV, Slowly RIH and engage deployment bar at deployment BOP.
9. Once Upper pipe/slip ram engage, pressure test through Flow Cross above the Wellhead crossover.
10. Fill-up the line and low pressure test the upper pipe/slip ram to 500 psi and hold for 5 minutes. Inspect the lines for leaks and observe for any pressure drop.
11. Increase pressure to 3,000 psi and hold for 15 minutes. Inspect the lines for leaks and observe for any pressure drop.
12. Once confirm pressure holding good, disengage upper pipe/slip ram. Bleed off pressure.
13. Proceed to engage lower pipe/slip ram, pressure test through Flow Cross above the Wellhead crossover.
14. Fill-up the line and low pressure test the upper pipe/slip ram to 500 psi and hold for 5 minutes. Inspect the lines for leaks and observe for any pressure drop.
15. Increase pressure to 3,000 psi and hold for 15 minutes. Inspect the lines for leaks and observe for any pressure drop.
16. Once confirm pressure holding good, disengage lower pipe/slip ram. Bleed off pressure.
17. Break the riser section at QTS connection and skid aside the IH, stripper, combi BOP and riser as per picture below to another well slot.




18. The BHA will be deployed in 2 separate sections as per below:

| Section | Items | | Description | BHA OD, Inch | Length, ft | Deploy by |
|---|---|---|---|---|---|---|
| 1 | 1 | DB | Dimple End Connector | 1.687 | 2.6 | CT |
| | 2 | DB | CT MHA | 1.687 | | |
| 2 | 3 | DB | Torque-Thru Deployment Connector / CARSAC High-Torque Connectors | 1.687 | 102. 2 | Slickline |
| | 4 | DB | Dual-ball Kelly cock valve | 1.687 | | |
| | 5 | DB | Deployment bar | 1.5 | | |
| | 6 | DB | Straight bar | 1.687 | | |
| | 7 | DB | MultiJet Nozzle | 1.687 | | |

19. Slickline to prepare PCE stack for deploying section #2.
20. Slickline PCE stack will make up to top of QTS, CT deployment BOP as per below picture.




21. Manually make up BHA on the platform main deck from Torque-Thru Deployment Connector / CARSAC High-Torque Connector until deployment bar.

22. Slickline to physically space out BHA beside PCE stack and mark/flag wire accordingly. This will serve as a visual guide during the next deployment procedure. The position of the 1.5" OD deployment bar, which is the main focus, should span across both the pipe and slip ram of the CT deployment BOP.RIH wireline thru PCE stack and connect to Torque-Thru Deployment Connector / CARSAC High-Torque Connector. POOH wireline and retrieve/swallow the attached BHA into the slickline lubricator. Lower BHA and cross reference vertically the deploy bar vs deployment BOP.
23. Engage the deployment bar with the deployment BOP, slickline to overpull 800 lbs (1.2 x 2nd Section BHA weight).
24. Disengage the deployment BOP, make-up full BHA as per 2nd section CT BHA. (POOH wireline and swallow piece by piece until Multi-Jet Nozzle).
25. Lower the slickline PCE stack up and connect the slickline crossover at upper QTS section.
26. Fill and pressure test the treating line with IW/TSW (subject to IW availability) to 500 psi and hold for 5 minutes. Inspect the lines for leaks and observe for any pressure drop.
27. Increase pressure to 3,000 psi and hold for 15 minutes. Inspect the lines for leaks and observe for any pressure drop.
28. Bleed off the pressure to the current SITHP of the well.
29. Confirm all wellhead valves are in open position via physical check.

    29.1. During the opening process, count the number of turns made by the wellhead valves and document this in the operation report. This record will serve as a reference for future operations.

| CV Opening Turns | LMV Opening Turns |
|---|---|
| | |

    29.2. Record initial SITHP and all annulus pressure (PCP, ICP, SCP etc) in the Daily Operation Report (DOR).

30. RIH slickline and deploy BHA section #2. Earlier wire mark/flag to be used as guide to ensure the 1.5" OD deployment bar spans across both the pipe and slip ram of the CT deployment BOP.
31. On confirming deployment bar position, close pipe/slip ram on **LOWER** section of deployment bop and manually lock the ram. Observe for 15 minutes, any pressure builds up above the upper section of deployment BOP. Once confirm no pressure build, proceed for next step.
32. Perform light weight check by pulling the slickline cable to observe the weight increase to make sure that pipe slip ram is functioning good and holding.
33. Pump IW thru the 2" Flow Tee and pressure test against the upper pipe/slip ram, 3000 psi for 15 minutes.
34. After successfully pressure test, bleed of PCE stack pressure to zero.
35. Activate and close **UPPER** section of pipe/slip ram of the CT deployment BOP. Perform pressure test (3,000 psi) through the kill port between the deployment BOP for 15 minutes. On successfully pressure test, bleed off the pressure.
36. Disconnect PCE stack at slickline crossover that attach to QTS. Rig a side slickline stack-up.
37. Skid in injector frame with IH and CT PCE stack-up to wellhead slot for Dulang B7S.
38. Make up Section 1- BHA to CT String.
39. Lower section #1 BHA until it meets the 2nd BHA at the Torque-Thru Deployment Connector / CARSAC High-Torque Connector connection.
40. Make up and connect Section#1 and Section#2 BHA at Torque-Thru Deployment Connector / CARSAC High-Torque Connector.
41. Pump through CT String, and pressure test against DKCV 1,500 psi to test the connection at MHA and Torque-Thru Deployment Connector / CARSAC High-Torque Connector.

42. Box-down PCE stack-up, perform pressure test against the upper pipe/slip ram.
43. Fill and pressure test the treating line with IW/TSW (subject to IW availability) to 500 psi and hold for 5 minutes. Inspect the lines for leaks and observe for any pressure drop.
44. Increase pressure to 3,000 psi and hold for 15 minutes. Inspect the lines for leaks and observe for any pressure drop. On successfully pressure test, bleed off the pressure.
45. Break-off at the QTS.
46. Slowly open DKCV, ensure both valves at DKCV are opened before RIH. If it is closed, unable to pump through CT.
47. Connect back at QTS and pressure test at QTS.
48. Unlock the manual lock of the CT deployment BOP and open both pipe/slip rams.
49. Flag CT String at surface and pick-up BHA until it tags the stripper, this will be the distance as reference for reverse deployment later after complete the job. Once tag Stripper, flag CT string against and measure the distance between two flag depth. Record in the Daily report.

## OPERATIONAL PROCEDURE

### CT RUN#1: Casing cleanout until 1,545m / 5,069ft

Conduct safety meeting with all personnel on location detailing the program, pressure limitations, personnel responsibilities, emergency well control drill, and safety precautions.

1. Function tests the MultiJet Nozzle to determine the surface operating pumping parameter. Record the data in the table below, do not exceed 5,000psi.

| Flow rates (bpm) | Pressure (psi) | Remark |
|---|---|---|
| … (as minimum as possible) | | |
| 0.3 | | |
| 0.5 | | |
| 0.7 | | |
| 1.0 | | |
| 1.1 | | |
| 1.3 | | |
| … (as maximum as possible, below 5,000 psi) | | |

2. Zero both depth counters (Orion and Mechanical) at reference point.

   Note: Current fluid use for the operation is IW (if use IW is used, there is no need for it to be treated), in the event injection module is down, and IW is not available, switch to using TSW. Mix TSW as per below recipe (if required)

| TSW | | | | 100 | BBL | Description |
|---|---|---|---|---|---|---|
| Seq. | Product | Concentration | | Volume | | |
| 1 | Sea Water | 992 | gptg | 4,166 | gal | Base Fluid |
| 2 | ACM H2S Clear 200 | 2 | gptg | 8 | gal | $CO_2$ & $H_2S$ Corrosion Inhibitor |
| 3 | ACM BACT 200 | 2 | gptg | 8 | gal | Micro Biocide Control |
| 4 | ACM OXYFREE 100 | 2 | gptg | 8 | gal | Oxygen Scavenger |

**Mixing Instruction:**

1. Prepare sea water in the mixing tank.
2. Add ACM H2S Clear 200 into the tank and circulate the mixture.
3. Add ACM BACT 200 & ACM OXYFREE 100 into the tank and circulate the mixture until homogenous.

Note: The above recipe is for 100bbls of TSW. Please prepare another batch of TSW once needed.

| D801 Cleanout Gel | | | | 50 | BBL | Description |
|---|---|---|---|---|---|---|
| Seq. | Product | Concentration | | Volume | | |
| 1 | IW / Sea Water | 992 | gptg | 2,083 | gal | Base Fluid |
| 2 | D801 Gel | 40.5 | pptg | 85 | lbs | Gelling Agent |

**Mixing Instruction:**

1. Prepare IW / sea water in the mixing tank.
2. Add D801 Gel into the tank and circulate the mixture until homogenous.

Note: The above recipe is for 50 bbls of gel. Please prepare another batch if needed. Prepare only when require.

| Drag reducer solution | | | | 100 | BBL | Description |
|---|---|---|---|---|---|---|
| Seq. | Product | Concentration | | Volume | | |
| 1 | Sea Water | 970 | gptg | 4,074 | gal | Base Fluid |
| 2 | Im Lube | 30 | gptg | 126 | gal | Friction reducer |

**Mixing Instruction:**

a) Prepare Sea Water into the mixing tank.
b) Add IM Lube 10 and mix till homogenous

Note: The above recipe is for 100 bbls of drag reducer solution. Please prepare another batch if needed. Prepare only when require.

3. Start RIH BHA while pumping IW at idle rate until at EOT depth **1,514 m / 4,967 ft (or slickline latest HUD if any), target cleanout inside casing section until depth 1,545m / 5,069 ft.**

   3.1. Refer to CT Tubing Force simulation (Orpheus modelling) at Appendix **III**.

   3.2. Conduct pull test for every 300m (1,000ft) interval, use CT Fatigue graph as reference. Ensure the CT Fatigue graph is available at location before RIH. Record RIH, Hanging and POOH weight in treatment report.

   3.3. Pump drag reducer solution, 2 bbls as lubricant every 1,000 ft interval

   3.4. Maximum CT RIH speed is **30-50 ft/min/ 9-10m/min.**

   3.5. Slow down CT speed to **10 ft/min/ 10m/min**, 50 ft / 15m before and after passing through completion accessories.

   3.6. Observe and record return (if any and in what form)

   3.7. Do not exceed operating safety limits **5,000 psi (Circulating pressure).**

   3.8. If the well condition differs from original job design, contact appropriate personnel in charge before proceeding.

   3.9. At all time, while RIH, the injector torque control shall be set at the minimum pressure required to move the CT at specified speed.

4. Once BHA reaches 1,504 m (10m above EOT or 10m above latest slickline HUD (if any)), stop CT and conduct pull test (minimum of 10m/30ft) and record the pulling weight both static and dynamic. (If encounter early HUD, Pick-up BHA and record the weight parameter).

| Depth | RIH weight, lbf | Static weight, lbf | Pick up weight, lbf |
|---|---|---|---|
| | | | |

5. Continue RIH to tag top of HUD (do not set down more than 200 lbf if experience hard tag (downhole force)). RIH until 5 meters below EOT. In the event no HUD is encountered, POOH CT to EOT and flag the CT string.

6. Attempt to establish circulation while varying pump rates and choke sizes, this will be reference at which rate and choke, able to establish the circulation without nitrified condition. (if still no surface return, consider worst case scenario where there is no column of water inside production tubing, fill up at least 1.5 x CT string /Production tubing annulus volume before reattempting to establish return with varying rates + choke sizes)

7. After establishing surface returns without nitrifying, switch to pumping 1.1 bpm 300 scfm. After establishing surface returns, slowly increase liquid injection rate until maximum circulation pressure allowable (4,600 psi). This will be the nitrified rate reference for penetration into sand HUD with established surface return at surface.

Circulation Rate suggest by CIRCA: -

- 1.1 bpm with 300 scfm

***Notes:***

- ***For gas rate minimum at 300 scfm, increase gas rate if require maximum up to 4,600 psi circulation pressure.***
- ***On establishing constant surface return, divert the flow into surge tank for 15 – 30 minutes, record the volume inside the surge tank to calculate losses rate into reservoir. Repeat this step every time there is a change in choke size.***
- ***Continuously record return volume during cleanout operation. (Record inside improved FDR)***

7.1.1. In the event of lost return, kindly refer to the step below for reference:

7.1.1.1. Check surface flowback back pressure. Must be less than WHP

7.1.1.2. Wait till system stabilizes

7.1.1.3. Check gas lift injection

- Is it on?
- Injection pressure > Wellbore pressure?

7.1.1.4. Manipulate choke size

7.1.2. If still no return at surface, pick-up BHA to a shallower depth. Pick up in regulated interval while attempting to establish return. (Proposed to depth where returns were previously obtained).

7.1.3. If unable to establish return at surface, consult town. (Provide the details of THP, choke size and circulation pressure).

7.1.4. After return establish, RIH to perform cleanout.

7.1.5. At all times, monitor and record the return (a pattern if there is), THP and debris sample at surface. (Take note if there any THP drop during penetration).

**7.1.6. If no debris recover at surface while penetrating HUD with fluid return, stop penetration and circulate with Gel and CBU until debris recover at surface.**

**7.1.7. Pump 5 bbls gel to lift the suspected debris to surface.**

**7.1.8. CBU at least 2x Annulus volume at that depth.**

**7.1.9. After confirm there's no longer debris at that depth, proceed penetration.**

**7.1.10. In the event unable to penetrate due to hard solid, slowly increase jetting rate until maximum allowable during penetration (ensure the return always establish at surface). After complete 1 cycle penetration, follow rate suggest by CIRCA to lift up the debris.**

8. Every 5m bite, circulate with 5 bbls of gel, and pull test until EOT, 1514m. (Current fluid use is IW, in event injection module down, fluid will change to TSW).

| No. | Stage | Fluid | Liquid Rate | Total Liquid | N2 Rate (if require) | Nitrogen Consumption | CT Speed | Duration | Depth | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | BPM | Bbl | SCF/M | SCF/M | ft/min | Minute | m | |
| 1 | CT at EOT | TSW | 1.1 | 0 | 300 | 36000 | 0 | 120 | 1514 | Establish return on surface (CT at EOT) |
| 2 | Penetrating HUD/Fill | TSW | 1.1 | 18.7 | 300 | 5100 | 1 | 17 | 5 | Monitor return & CT weight on surface |
| 3 | Circulate | Gel | 1.1 | 5 | 300 | 1500 | 0 | 5 | 1519 | Provide suspension to the fill and lift to surface |
| 4 | Pull test | TSW | 1.1 | 18.7 | 300 | 5100 | 1 | 17 | 1514 | Pull test to EOT |
| 5 | RIH to HUD and Penetrate HUD/Fill | TSW | 1.1 | 36.3 | 300 | 9900 | 1 | 33 | 1524 | Monitor return & CT weight on surface |
| 6 | Circulate | Gel | 1.1 | 5 | 300 | 1500 | 0 | 5 | 1524 | Provide suspension to the fill and lift to surface |
| 7 | Pull test | TSW | 1.1 | 36.3 | 300 | 9900 | 1 | 33 | 1514 | Pull test to EOT |
| 8 | RIH to HUD and Penetrate HUD/Fill | TSW | 1.1 | 55 | 300 | 15000 | 1 | 50 | 1529 | Monitor return & CT weight on surface |
| 9 | Circulate | Gel | 1.1 | 5 | 300 | 1500 | 0 | 5 | 1529 | Provide suspension to the fill and lift to surface |
| 10 | Pull test | TSW | 1.1 | 55 | 300 | 15000 | 1 | 50 | 1514 | Pull test to EOT |
| 11 | RIH to HUD and Penetrate HUD/Fill | TSW | 1.1 | 72.6 | 300 | 19800 | 1 | 66 | 1534 | Monitor return & CT weight on surface |
| 12 | Circulate | Gel | 1.1 | 5 | 300 | 1500 | 0 | 5 | 1534 | Provide suspension to the fill and lift to surface |
| 13 | Pull test | TSW | 1.1 | 72.6 | 300 | 19800 | 1 | 66 | 1514 | Pull test to EOT |
| 14 | RIH to HUD and Penetrate HUD/Fill | TSW | 1.1 | 91.3 | 300 | 24900 | 1 | 83 | 1539 | Monitor return & CT weight on surface |
| 15 | Circulate | Gel | 1.1 | 5 | 300 | 1500 | 0 | 5 | 1539 | Provide suspension to the fill and lift to surface |
| 16 | Pull test | TSW | 1.1 | 91.3 | 300 | 24900 | 1 | 83 | 1514 | Pull test to EOT |
| 17 | RIH to HUD and Penetrate HUD/Fill | TSW | 1.1 | 112.2 | 300 | 30600 | 1 | 102 | 1545 | Monitor return & CT weight on surface |
| 18 | Circulate | Gel | 1.1 | 30 | 300 | 8400 | 0 | 28 | 1545 | Provide suspension to the fill and lift to surface |
| 19 | Perform Bottom up circulation as per CIRCA | TSW | 1.1 | 198 | 300 | 54000 | 0 | 180 | 1545 | Monitor return & CT weight on surface |
| | | | | | Wiper trip up to EOT | | | | | |
| 20 | Wiper trip as per CIRCA | TSW | 1.1 | 23.1 | 300 | 6300 | 5 | 21 | 1514 | Monitor return & CT weight on surface |
| 21 | Additional Bottom up | TSW | 1.1 | 132 | 300 | 36000 | 0 | 120 | 1514 | CBU for 2 hour |
| 22 | POOH to surface | TSW | 1 | 939 | 0 | 0 | 0 | 939 | 0 | CT at surface |

9. If CT encountered hard obstruction, proceed to pick up CT 10m above the obstruction and circulate at least 2x bottom up until clear return is observe on surface before proceed with the following steps.

   9.1. RIH and slack off CT not exceeding 200 lbf (downhole force) on top of the obstruction and attempt to jet on the obstruction. If no success mixes 10 bbls of 15% HCl acid and Neutralization Fluid as per the following recipe:

| 15% HCl (Main Treatment) | 10 | BBL | Description |
|---|---|---|---|

| Seq. | Product | Concentration | | Volume | | |
|---|---|---|---|---|---|---|
| 1 | IW | 419 | gptg | 176 | gals | Base Fluid |
| 2 | ACM CORR 400 | 4 | gptg | 2 | gals | Acid Corrosion Inhibitor |
| 3 | MESB NE 200 | 4 | gptg | 2 | gals | Non-Emulsifier |
| 4 | ACM Surf 210 | 3 | gptg | 1 | gals | Surfactant |
| 5 | Ammonium Chloride | 417 | pptg | 175 | lbs | Clay Stabilizer |
| 6 | ACM Iron 300 | 25 | pptg | 11 | lbs | Iron Sequestering |
| 7 | ACM Iron 200 | 15 | gptg | 6 | gals | Iron Control |
| 8 | 33% HCl | 419 | gptg | 176 | gals | Raw Acid |
| 9 | MESB MS 300 | 100 | gptg | 42 | gals | Mutual Solvent |

**Mixing Instruction:**
1. Fill up tank with IW.
2. Add additives as per above sequence.
3. Agitate until mixture is homogenous.

| Neutralization Fluid (Soda Ash) | | | | 10 | BBL | Description |
|---|---|---|---|---|---|---|
| Seq | Product | Concentration | | Volume | | |
| 1 | IW | 976 | gptg | 9.8 | bbl | Base Fluid |
| 2 | Soda Ash | 500 | gptg | 210 | lbs | Neutralization Fluid |

**Mixing Instruction:**
1. Prepare IW into mixing tank
2. Mix soda ash into tank and agitate until the mixture is homogenous.

9.2. Proceed to jet 5 bbls of 15% HCl on top of the obstruction (HUD) while attempt to pass through the obstruction.

9.3. If no success during jetting HCl acid, proceed to spot another 5 bbls of 15% HCl on top of obstruction (HUD) and soak the acid for 2 hours (pick-up at least 300m above). After completed soaking, proceed to RIH to pass through the obstruction while pumping high-rate nitrified IW. If unable to penetrate consult town for further instruction.

9.4. In the event of encounter waxy return at surface, spot 3 drums of Waxclen and soak for 3 hours (pickup to safe depth, based on CIRCA simulation, solid distribution after penetration without circulation, the solid will distribute until depth 1,500m, pick-up until depth 1,400m)

9.5. During circulation, if acid return observes on surface return line, inject soda ash using Graco Pump on the surface return line to neutralize the acid.

***Notes: if able to pass through for few feet, and re-encounter hard tag again, repeat step Jetting/Soaking with 15% HCl until TD.***

10. Once at target depth, flag CT string on surface.
11. Remaining stationary and proceed to pump 30 bbls of gel followed with CBU for 3 hours (as per CIRCA analysis).
12. Once complete CBU, start to wiper trip up to EOT at 5 ft/min.
13. Perform CBU at EOT for another 2 hours. Stop pump nitrogen after complete CBU.
14. POOH to surface.

## REVERSE DEPLOYMENT PROCEDURE

15. Once BHA at surface, proceed for reverse deployment using the same approach during deployment rig-up.
    15.1. Once BHA tag stripper, RIH back xx ft (calculated previously during BHA tag before RIH), to position the deployment bar across the deployment BOP.
    15.2. Close the LOWER Pipe/Slip ram of the deployment BOP. Manually lock it.
    15.3. Observe if there any remaining pressure above the pipe/slip ram of CT deployment BOP. (for 5 minutes)
    15.4. Perform pressure test through the flow tee above the Main deck, 3,000 psi for 15 minutes.
16. Bleed the remaining pressure (if any) inside the riser through flowback line.
17. Once confirmed no pressure build up thru the deployment BOP, Activate and close UPPER section of pipe/slip ram of the CT deployment BOP. Perform pressure test (3,000 psi) through the kill port between the deployment BOP for 15 minutes. On successfully pressure test, bleed off the pressure.
18. Break the PCE at QTS and jack-up the JF.
19. Flush the DKCV until clean water observe at bleed off point at DKCV. (In event got trace of hydrocarbon at bleed off point, continue to flush until clean trace of water observe at bleed off point.
20. Close LOWER DKCV, perform pressure test 3,000 psi for 15 minutes. Upon successfully pressure test, bleed off the pressure through the bleed off point at DKCV.
21. Close the UPPER DKCV, perform pressure test 3,000 psi for 15 minutes. Upon successfully pressure test, bleed off the pressure through the bleed off point at DKCV.
22. Secure the 2nd section BHA with C-Plate and disconnect at Torque-Thru Deployment Connector / CARSAC High-Torque Connector connection.
23. Skid the JF aside along with the PCE above the QTS section.
24. Rig-up back slickline lubricator 12 (section) with slickline PCE on top of the QTS connect through slickline crossover.
25. Once rig-up, RIH slickline wire and connect at Torque-Thru Deployment Connector / CARSAC High-Torque Connector connection.
26. Box down Slickline crossover and perform pressure test for the stack-up.
27. Open Pipe/Slip rams of the deployment BOP.
28. POOH slickline wire until tag slickline stuffing box.
29. Secure the well by close the crown and master valve.
30. Break the QTS connection, and disconnect the 2nd section BHA.

## APPENDIX I – BHA SCHEMATIC

### BHA#1: 1-11/16 MultiJet Nozzle

# DIMENSION BID

**BHA DIAGRAM #1 - 1.69" MULTIJET NOZZLE**

| | |
|---|---|
| Client | Petronas Carigali |
| Field | Dulang Bravo |
| Job Type | |
| Job No. | Run#1 |

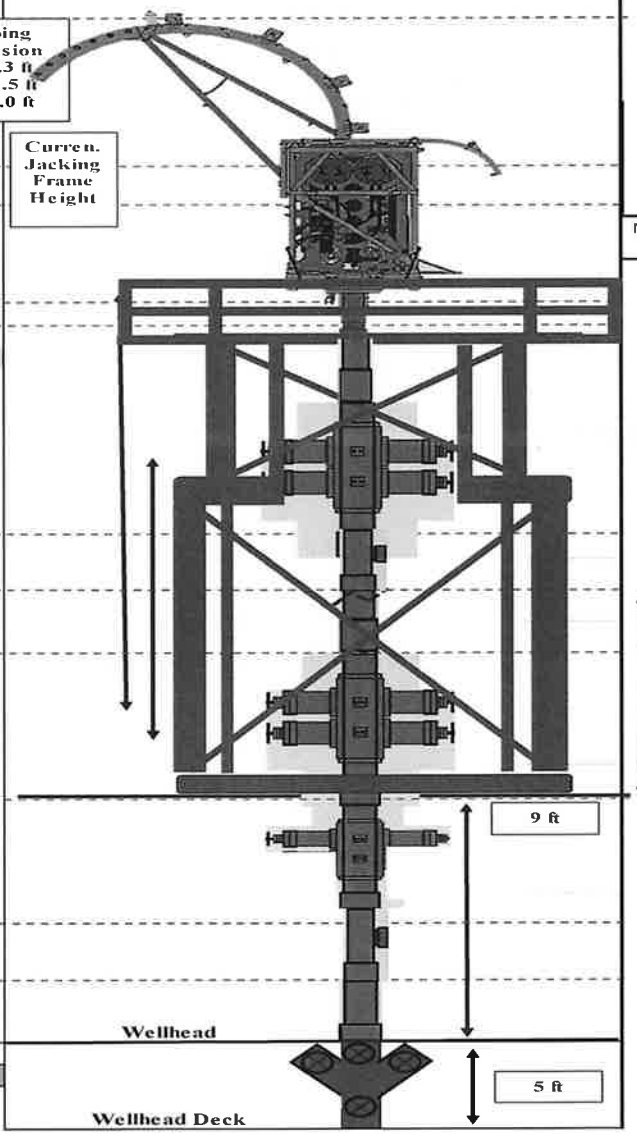
| | |
|---|---|
| Well | B7S |
| Min Restriction | |
| BHP | |
| BHT | |

| BHA DRAWING | DESCRIPTION | CONNECTION | | ID | OD | TOOL LENGTH | CUMULATIVE LENGTH | WEIGHT |
|---|---|---|---|---|---|---|---|---|
| | | UPHOLE | DOWNHOLE | INCH | INCH | FT | FT | KG |
|  | Dimple Connector | 1.5" CT | 1.0" AMMT PIN | | 1.690 | 0.3 | 0.3 | 2.0 |
| | MHA<br>Disconnect drop ball 5/8"<br>Circulating drop ball 1/2"<br>Burst Disc 5000 psi | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 2.3 | 2.6 | 6.5 |
| | Torque-Thru Deployment Connector / CARSAC High-Torque Connectors | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 1.6 | 4.18 | 1.0 |
| | Dual Kelly Cock Valve | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 1.6 | 5.76 | 2.0 |
| | 6 ft Deployment Bar | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.500 | 6.0 | 11.76 | 20.0 |
| | 92 ft Straight Bar | 1.0" AMMT BOX | 1.0" AMMT PIN | | 1.690 | 92.0 | 103.76 | 266.8 |
| | MultiJet | 1.0" AMMT BOX | | | 1.690 | 1.0 | 104.8 | 1.0 |
| | | | | | | | | **Total 299.30** |

| | |
|---|---|
| BHA LENGTH | 104.76 |
| MAXIMUM OD | 1.69 |
| MINIMUM ID | |

## APPENDIX II – CT STACK UP

| DIMENSION BID | | Well Name | Dulang B-7S | DIMENSION BID |
|---|---|---|---|---|
| Component Description | Component Length | Job Type | SCO | |
| | | Client | PCSB | |
| ft | ft | Revision | 0 | |
| PCE STACK-UP | | | | |
| ft | ft | | | |
| Gooseneck | | | | |
| Injector Head | | | | |
| Side Door Stripper | 2 | | | |
| Riser | 2 | | | |
| Blow Out Preventer (B.O.P) | 6 | | | |
| Pump In Tee | 2 | | | |
| Quick Test Sub | 2 | | | |
| Deployment BOP | 6 | | | |
| Blind Shear BOP | 4 | | | |
| Flow Cross | 2 | | | |
| Wellhead Crossover | 3 | | | |
| TOTAL | 29 | | | |




Max Jack-up 16ft + 6 Ft Extension frame

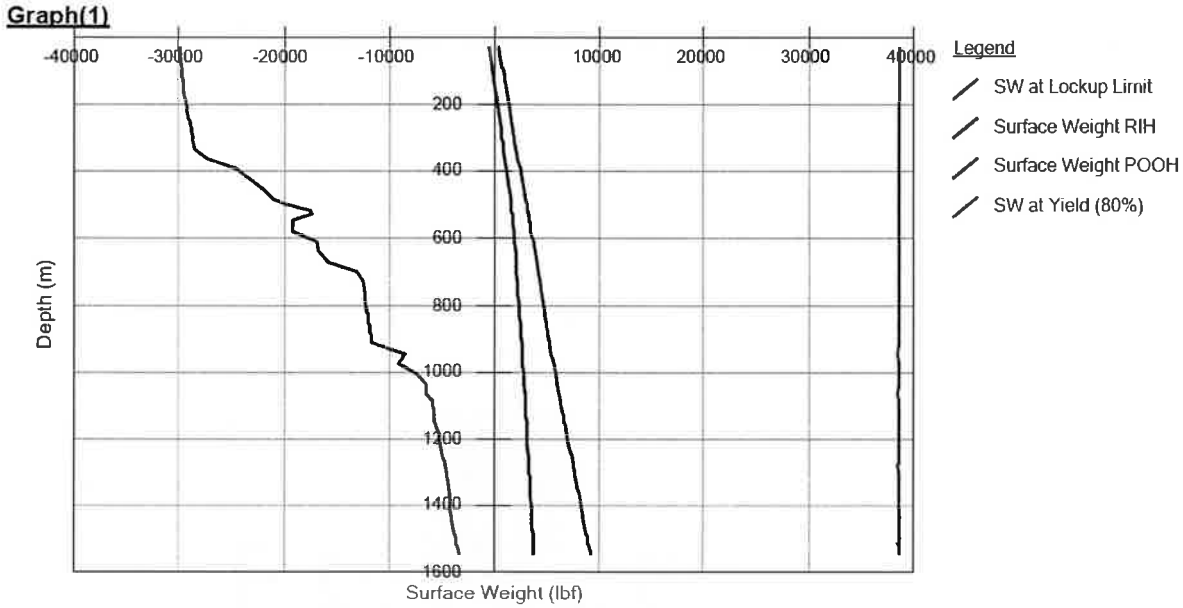
Condition
14 ft Jack-up + 6 ft Extension

Required
8 ft height scaffolding

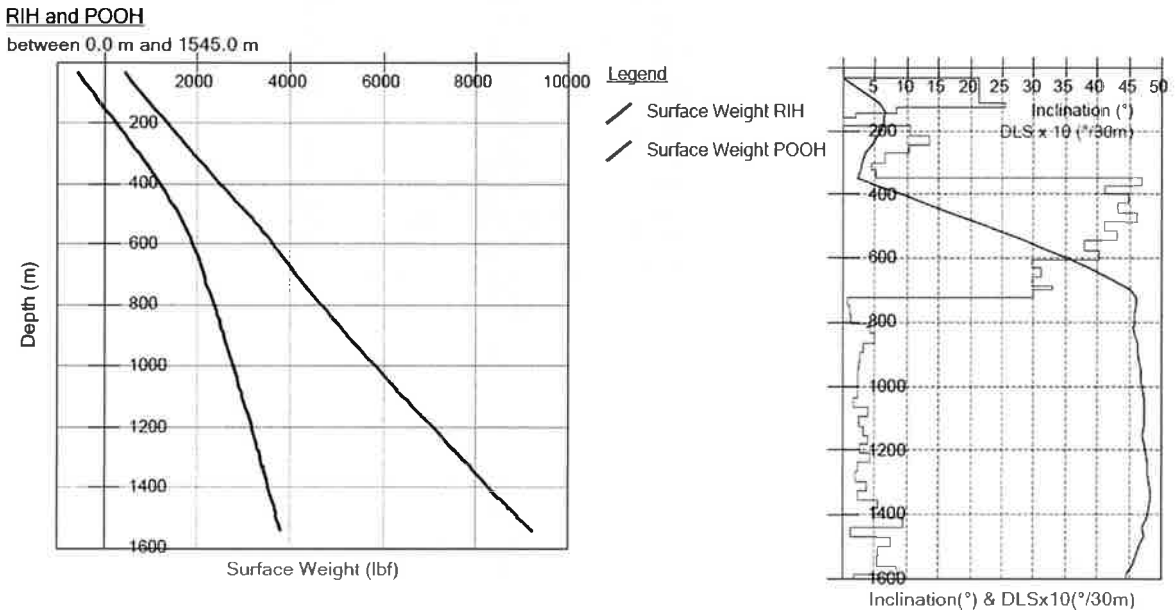
Main deck floor

## APPENDIX III – ORPHEUS SIMULATIONS

### TUBING FORCE ANALYSIS (IDLE RATE)

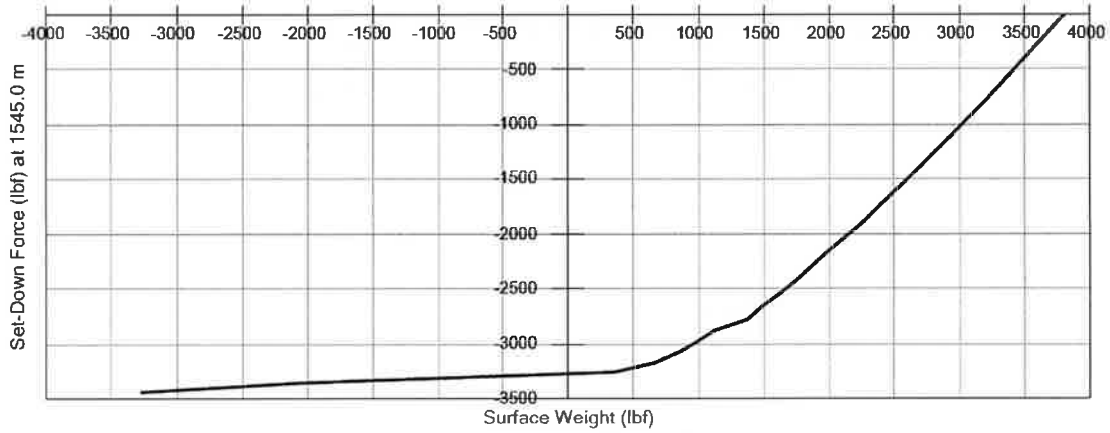



## RIH & POOH WEIGHT



## MAXIMUM STRING SET DOWN LIMIT

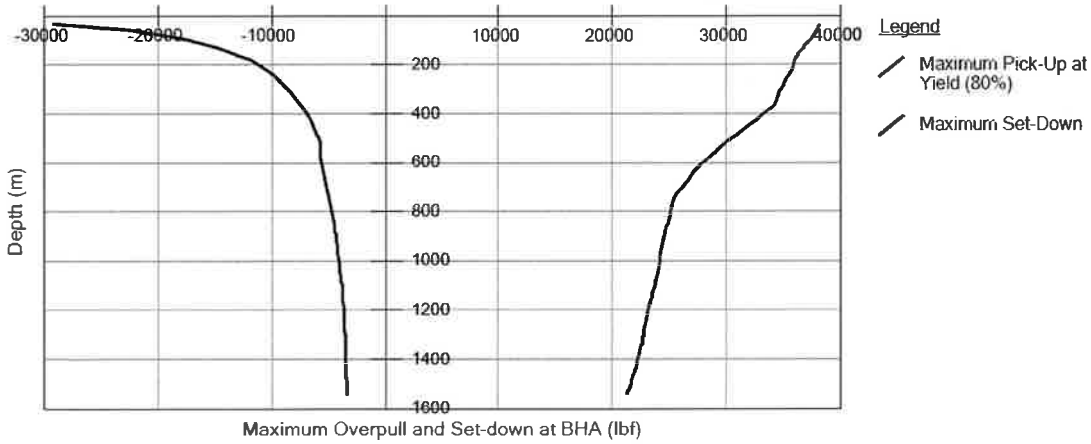
MD3 ■ The available set-down force at 1545.0 m is -3443 lbf at the end of the string.
The weight indicator reading will be -3273 lbf on surface.




## MAXIMUM STRING PICK UP LIMIT

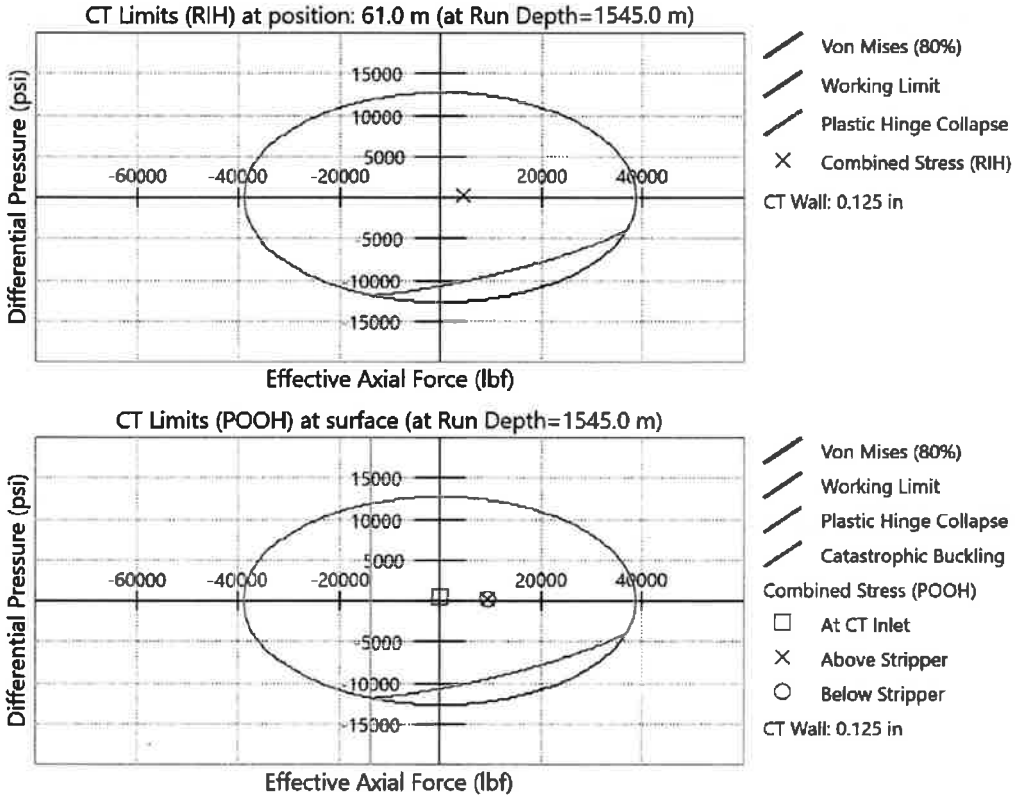
Calculations at 1545.0 m

MD1 ■ The available pick-up at 1545.0 m based on 80% of yield strength is 21255 lbf.
The weight indicator reading will then be 38564 lbf.



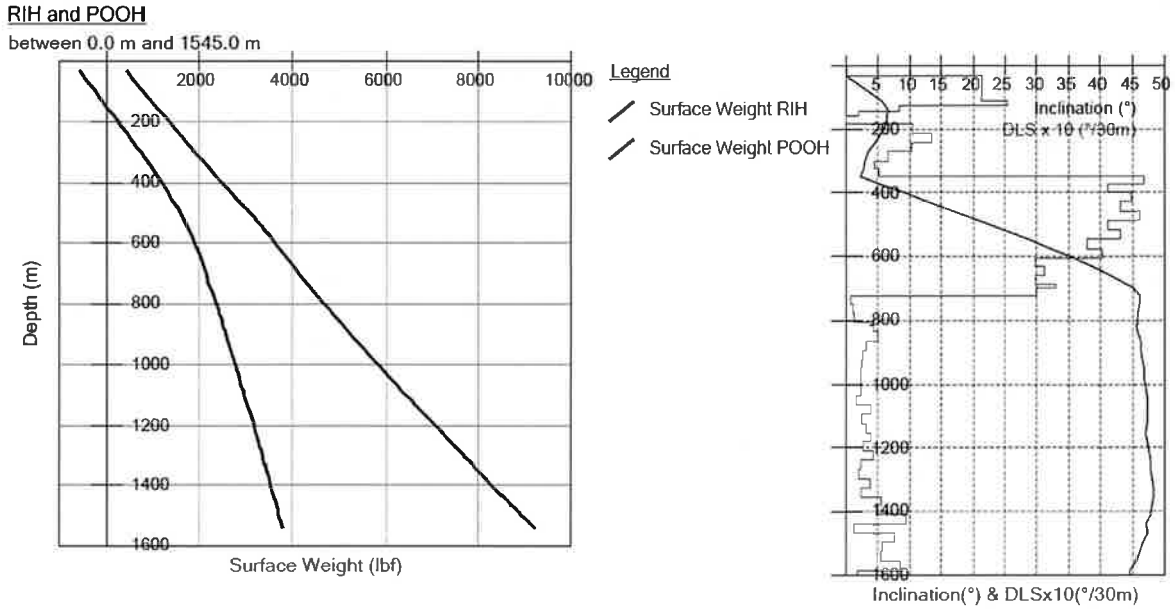
## STRING LIMIT

CT Limits

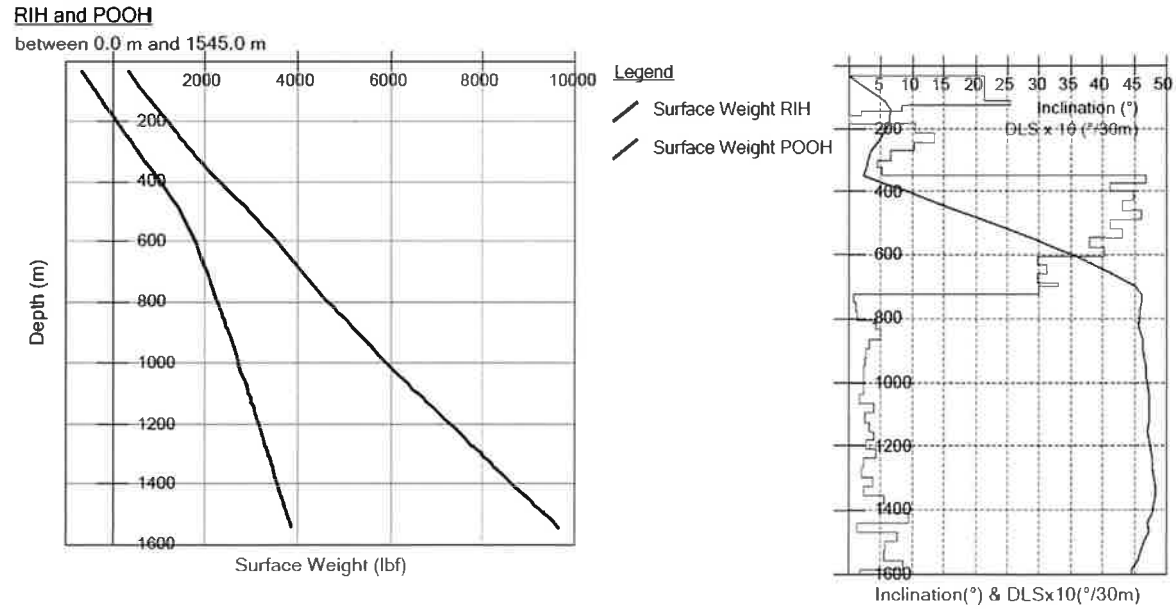


## SENSITIVY ANALYSIS TFA

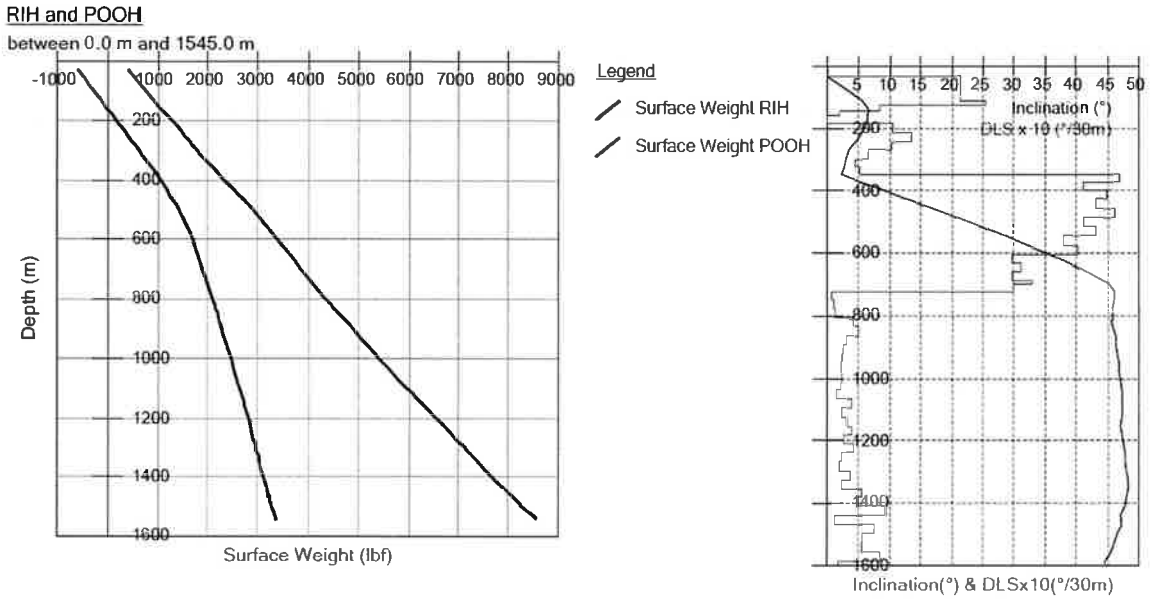
### Idle Rate (0.3 bpm)



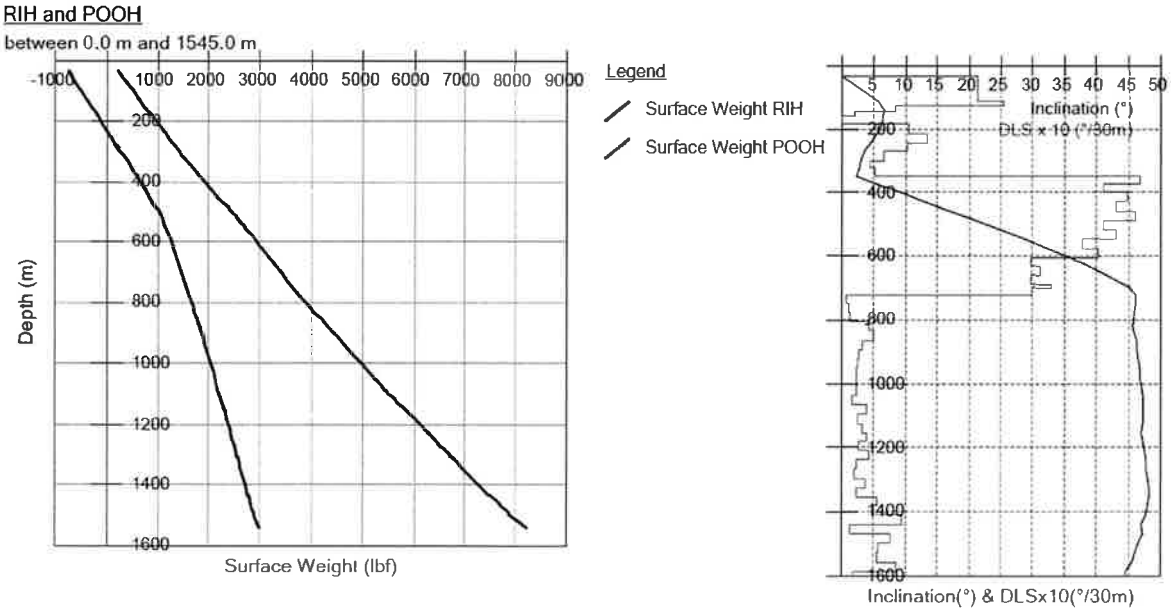

### 0.3 bpm 300 scfm



### 1.1 bpm 0 scfm




### 1.1 bpm 300 scfm



## APPENDIX IV – EMERGENCY PROCEDURE

### EMERGENCY BOP OPERATIONS

In the event of an emergency arising and the well having to be secured, the following steps should be taken:

1. Stop CT movement, close the Slip and Pipe rams and slack off string weight to ensure slips are holding. If time permits, review all options with the client representative. (Ensure that rams with guides are activated first to avoid damaging the CT).

   **Note: The decision to proceed past the above step should normally be made after consultation with the client representative unless there is an immediate and serious danger to personnel and/or equipment and the client representative is not immediately available to be involved in the decision.**

2. Stop pumping.
3. Close the upper Shear Seal rams to cut the CT.
4. Set up to circulate well to kill fluid through the CT remaining in the well.
5. Make arrangements necessary to fish the CT from the BOP.

   **Note: When actuating any ram in the BOP system, the corresponding manual lock should be closed behind it to prevent accidental release in the event of total loss of hydraulic power. The force required to close the rams manually against pressure cannot be supplied by turning in the locks. Use of a pipe wrench, cheater bars or snipes will damage the internal workings of the ram actuators. Some form of hydraulic power is required to operate the actuators. This pressure can be supplied via a hand pump or a hydraulic pump from any other piece of equipment on location, including a fluid pumper.**

**Actuating the BOP System Hydraulic Controls**

1. Remove locks on control panel
2. Move the control lever to the desired position.
3. Push the BOP activate button supplying pressure to the circuit.
4. Observe the pressure drop in the hydraulic circuit and subsequent pressuring back up to system pressure as ram opens or closes completely.
5. Observe the ram indicator pins to verify the operation of the ram.
6. Close in the manual locks if required. (Flag system to indicate position of rams.)

The connections below the CT BOP must be all flanged. Should one of these connections start leaking, the following steps should be taken in consultation with the client representative:

1. Call local alert and ensure all personnel are removed from the wellhead area.
2. Notify the client representative of the problem and determine the best method to make the area safe.
3. If the leak is minor, it may be possible to continue to pull the CT to surface. Assess the scenario and consider all the risks associated then proceed to pull the CT to surface. Once at surface, close available valves below the leak point.
4. If the leak is more severe, initiate a well kill through the well kill line and continue to pull the CT to surface.
5. If the leak is catastrophic, run the CT to HUD; pick up sufficient so that after the CT is cut at surface by CT BOP shear; the top of the CT falls below the X-mass Tree. Once the end of the CT is off bottom, proceed to cut the cut the CT with the shear RAM then close the available valves below the leak point. A well kill operation can be started through the kill line if requested by the client representative.

## LEAK IN CT AT SURFACE

In the event of a leak in the CT occurring at surface, the following steps should be taken:

1. Call local alert and ensure all personnel are removed from the operational area. In particular make sure all personnel remain clear of the area between the IH and the CT reel.
2. If the leak is small or a pinhole leak, POOH and position the leak on the lower part of the CT reel as soon as possible. Be careful when area of leak is bent onto the reel as failure may occur. Make arrangements to have a water hose present to wash away any fluid from the reel which may be hazardous. Make arrangements to start pumping water through the CT reel. Depressurize reel as much as conditions allow without exceeding collapse limitations of CT.
3. Notify client representative of problem and determine best method to make area safe. If leak is minor and water can be displaced to leak, continue to POOH and change reel.
4. If leak is considered to be too serious to displace to water and POOH, or serious and uncontrolled leakage of hydrocarbon or hazardous materials prevents this, (i.e. check valves not holding, lost BHA, parted CT) set the CT slips and pipe rams. Activate the upper Shear Seal rams on either the triple or quad BOP and manually lock in place.
5. Depressurize the CT reel and flush through the reel. If hydrocarbons are present in the reel, displace the reel with water and empty the contents to specified safe disposal area.

## LEAK IN CT BELOW SURFACE

If a leak occurs in the CT below the Stuffing Box during down hole operations (usually indicated by a drop in pump pressure or loss of string weight), suspend CT operations and alert the client representative.

**Note: If indications are that the BHA has been lost in hole then revert to section 0.**

1. Once the client representative has been alerted, clear all personnel from the immediate area of the CT around the IH and between the IH and the CT reel.
2. Displace the CT to water and commence to POOH at not more than 20 ft per minute (5 meters/min). Ensure at all times that all personnel are clear of the immediate area as the possibility exists to pull the CT out of the Stuffing Box. Continue pumping water at a slow rate through the CT.
3. When the leak in the CT appears above the Stuffing Box, stop the injector and hold the leaking section of CT between the chains and the Stuffing Box.
4. Inspect leak. If leak is minor continue to POOH.
5. If leak is major, or CT is actually severed or well bore fluids are escaping through the CT, continue as per Section 09.2.

**LEAK IN SURFACE PRESSURE CONTROL EQUIPMENT**

Stuffing Box

1. **Stop** CT movement and close both sets of pipe rams to seal CT annulus. Set manual lock.
2. On semi-submersible operations this will be a set of pipe rams and pipe/slip rams.
3. Notify Client representative.
4. Ensure the injector is in neutral and that the brake is engaged.
5. Bleed off pressure above pipe rams
6. Set reel brake. On Semi-Submersible jobs the CT should be clamped at the level wind and CT run out of hole until enough slack between the injector and reel is obtained to cope with the heave from the rig, prior to setting reel brake.
7. Bleed off closing pressure on Stuffing Box. Open side doors and apply pressure to retract piston. Replace packer elements and then re-apply pressure to Stuffing Box. Close side doors.

   **Note: 3" side door Stuffing Boxes first bleed off closing pressure. Remove hoses from pack and retract piston and connect to open and close on side door. Open door and replace packer element. Close door, bleed off pressure and connect to pack and retract piston.**
8. Slowly open both equalizing valve on pipe rams and check that stripper is holding pressure.
9. If stripper is holding pressure, undo manual locks and open pipe rams or pipe slip rams. When using pipe/slip rams the depth that they were set on the CT must be recorded. Release reel brake and continue operations.

Surface Leaks Other Than Stuffing Box

1. If leak is minor and a relatively short length of CT is in the hole and the Shear Seal safety head is **below the leak:**
2. Call local alert and notify the client representative.
3. Clear all non-essential personnel away from the area
4. Continue POOH and monitor situation closely
5. Hook up kill line to BOP and pump water slowly down annulus.

**Note: Avoid collapse situation**

1. Close swab valve and Shear Seal once CT is in riser and repair leak
2. Perform reinstatement test on surface equipment after leak has been repaired
3. If CT is in the well to a considerable depth and leak is considered serious:
4. Call local alert and notify Client representative.
5. Ensure all non-essential personnel are removed from the area.
6. Ensure that CT is sufficiently off bottom so that when the Shear Seal safety head is activated the pipe will drop below the Xmas tree manual master valve. If the CT is stuck down hole, pull to 80% of operating limit before activating Shear Seal BOP, thus allowing the CT to drop below the Xmas tree manual master valve. If the CT is attached to a fish, packer etc pull to 80% of operating limit (if possible) or maximum weight possible before activating Shear Seal BOP, thus allowing the CT to drop below the Xmas tree manual master valve. **If at all possible**, the decision to cut the CT and activate the system will be taken by the Client representative in charge of the operation. This may not always be possible. If the situation is extremely dangerous and requires a fast decision, the Supervisor in charge will take this decision.

7. Close the Shear Seal rams in the safety head to cut the pipe and allow it to drop. (If the safety head has separate shear and blind rams, close the shear rams to cut the pipe, pull up the CT and close the blind rams).
8. Close the swab valve on the Xmas tree.
9. Close the master valve on the Xmas tree
10. Repair leak and pressure test riser.
11. Plan for fishing operations.

Rotating Joint Leak

Eliminate the potential for reel movement by securing the reel with turnbuckles and set reel brake. On Semi-Submersible jobs the CT should be clamped at the level wind and CT run out of hole until enough slack between the injector and reel is obtained to cope with the heave from the rig. Close the reel isolation valve inside the reel and repair or replace the rotating joint as required. Re-test and resume operations.

**CT RUNS AWAY INTO WELL**

If the inside chain tension system on the IH should fail for any reason, and CT is pulled into the well under its own weight with no control, the procedure should be as per the following:

1. Call a local alert.
2. Attempt to speed the injector up to match the speed of the descending CT.
3. Increase inside chain tension to increase friction on CT.
4. Increase stripper pressure to exert more friction on CT.
5. If these actions fail to make any difference, reduce injector hydraulic pressure to zero.
6. In the event that there is insufficient CT on the reel to reach bottom close CT slips. This action may damage or break the CT. This is the preferred option to using the pipe rams as these will become damaged and a primary well control system will be lost.
7. If the CT is not too far off bottom it may be practical to let it fall to bottom then investigate the causes and repair. This can only be done if there is sufficient CT on the reel to reach bottom.

**Note: CT may helix when hitting bottom making it difficult to pull into tail pipe.**

8. Once CT has been controlled, examine IH for damage including chains and POOH.
9. The CT run away may be caused by the injector becoming overloaded with the weight of the CT and fluid in the CT. This situation should not occur if proper pre job planning is done. Correct selection of IH or ensuring CT is full of Nitrogen would prevent this situation from occurring.
10. If a runaway situation occurs, reduce the injector hydraulic pressure to zero. This may cause the safety brake in the motors to actuate and counter balance valves to close, stopping the injector.
11. Under certain circumstances if the runaway CT is at a speed above the critical speed, the back pressure created by the circulating hydraulic fluid may prevent the injector motor brakes from actuating. If this situation occurs, select the pull mode for the injector and increase system hydraulic pressure until the CT comes to a standstill.

**CT IS PULLED OUT OF STUFFING BOX**

This situation is most likely to occur when the CT is being pulled into the riser section. If the BHA is lost including the End Connector there will be no external upset to prevent the CT from passing through the Stuffing Box. If this situation occurs, stop injector before CT passes through the chains and shut in Shear Seal rams on upper BOP's.

If it is thought that the BHA may be lost while down hole, stop the CT at 300ft from surface. Slowly close in the swab valve counting the number of turns. If the CT is still deemed to be across the wellhead, POOH the CT no more than the distance between the top of the wellhead and the top of the CT BOP's. Repeat this step until the swab valve can be fully shut. Once the swab valve is shut, bleed off the pressure in riser.

**CT COLLAPSED AT SURFACE**

Collapsed CT at surface will be obvious by escape of well bore fluids from the Stuffing Box, as the strippers will no longer seal round the deformed pipe. In addition to this the collapsed pipe will not allow the IH to grip the CT due to its change in shape. Usually collapsed CT will not pull through the bottom brass bushings on the Stuffing Box.

1. If POOH, immediately run CT back in well a sufficient distance to make sure round pipe is in contact with the Stuffing Box.
2. Call alert and notify client representative.
3. Ensure that all non-essential personnel are cleared from the immediate area.
4. Immediately reduce well head pressure by all safe means possible; either flow well through choke at a higher rate or stop annular fluid injection if reverse circulating.
5. Increase CT internal pressure by circulating.
6. Once pressure conditions inside and outside the CT have been optimized, a decision can be taken on how to proceed. If it is not possible to position un-collapsed pipe across the stripper rubbers, i.e., well contents are escaping from stripper rubbers:
7. Call alert and notify client representative.
8. Close pipe rams in an effort to reduce flow of fluid/gas around CT.

**Note: If it is not possible to control the well, the slips will have to be set, and the CT cut using the Shear Seal rams.**

9. Arrange for clamps to be fitted to CT above IH.
10. Remove all non-essential personnel from immediate area
11. Under authority from client representative, kill well.
12. Release pressure from Stuffing Box and remove bushings.
13. Open pipe rams.
14. Attempt to pull CT from the well using the IH.
15. Cut CT at the gooseneck and use the rig or a crane to pull the CT through the injector. Re-clamp the CT above the IH and cut off in thirty-foot sections (or as appropriate to the crane or rig)
16. Continue pulling and cutting CT until the CT pulled to surface can be pulled by the IH.
17. Once CT in good condition (i.e. not collapsed) is at surface, set CT slips and pipe rams and make up roll-on connector to CT on reel.
18. Continue POOH.

If the leak is too serious and cannot be controlled and well fluids are escaping, continue as per Section 9.2.

**CT BREAKS AT SURFACE**

If CT breaks at surface into two separate sections:

1. Stop the injector and set the slips.
2. Stop pumping operations.
3. Call alert and notify client representative. Ensure all non-essential personnel are cleared from the area and that the area is secure.
4. Secure CT reel.
5. If the reel capacity is insufficient to hold all of the CT remaining in the well due to uneven spooling resulting from the CT failure, it may be necessary to obtain another reel with sufficient capacity to hold the CT remaining in the well.
6. After consulting with client representative, remove damaged section of CT and insert in line roll-on connector and continue to POOH.
7. If this course of action is considered inappropriate or dangerous due to well conditions or condition of CT still in the well, continue as per Section 0.

**BUCKLED TUBING**

Should the CT hit an obstruction down hole while RIH with the thrust pressure set too high or running speed too fast, the CT will buckle in a 'Z' shape (plastically hinged).

CT being run inside CT and through small ID BOP's/lubricators will normally buckle between the Stuffing Box and the chains.

CT being run through casing or open hole will normally break below the BOP, usually somewhere around the largest ID.

- The CT will generally buckle several times.
- This type of failure is a little more difficult to detect.

If the CT is being run into casing and a large amount of weight is lost suddenly, there is a very good possibility that the CT is buckled somewhere down hole. Indications of this could be:

- An increase in pump pressure as fluid or gas is now being pushed through an additional restriction created by a hinge.
- A decrease in pump pressure as the CT may have broken removing a restriction such as a BHA.
- A loss of string weight due to the CT breaking and falling off.
- An increase in string weight while pulling out of the hole as the buckled portion of CT creates additional drag or needs to be straightened to get through a restricted ID.

In the event CT buckling is suspected, the CT movement should be stopped and the pump pressure kept within operating limits allowing the situation to be analyzed and determine the correct action to be taken for existing conditions.

**If there is an increase in pump pressure or an increase in string weight**:

1. Stop the pumps and pick up slowly.
2. POOH slowly (10 to 20 feet per minute) watching the weight indicator carefully.
3. If the CT is buckled close to surface, the buckled CT will pull into the bottom of the Stuffing Box and stop.
4. Close and lock the slip and pipe rams.
5. If the ram indicators show that the rams are not completely closed, there may be more than one piece of CT inside the BOP. In this event, open the rams and try to put undamaged CT across the pipe and slip rams.
6. Make arrangements to kill the well and retrieve the remaining CT from the well.

7. If the buckled CT is down hole and cannot be pulled free, consult the client representative as he may want the CT left at TD prior to being hung off in the slip and CT rams.
8. Arrangements should be made to run CT cutter on wireline to retrieve the CT above stuck point.

**If there is a decrease in pump pressure or a loss of string weight**:

1. It must be assumed that the CT has parted somewhere down hole.
2. Calculate from the remaining string weight approximately how much CT is left in the well.
3. Stop the pumps and POOH slowly.
4. Should the CT come out of the Stuffing Box, the blind rams should also be closed in.

**If the CT is buckled above the Stuffing Box, the following steps should be taken:**

1. Stop the injector as quickly as possible.
2. Close the slip and pipe rams and manually lock them.
3. If the down hole check valves are holding, bleed the pressure in the CT down to zero and monitor for 15 minutes for pressure build up.
4. Consider at this stage whether to kill the well.
5. Use a hacksaw to start the cut until you are sure there is no trapped pressure in the CT.
6. Cut the CT
7. Remove as much of the buckled CT as possible leaving any undamaged CT showing above the Stuffing Box intact so that it may be rejoined later.
8. Bleed the pressure from above the CT rams and undo the connection below the injector.
9. Slowly raise the injector until it is clear of the damaged CT.
10. Cut away any damaged CT, dress the CT and install an inline connector.
11. Run some fresh CT down through the injector until it is just out of the Stuffing Box.
12. Lower the injector until immediately over the pipe sticking out of the BOP.
13. Attach the pipe to the inline connection attached to the pipe sticking up out of BOP.
14. Pump off the inside chain tension and rotate the chains slowly in the OOH direction, while lowering the injector until the connection below the injector can be fastened.
15. Pump up the inside chain tension and pull weight equal to the weight of the CT suspended below the slips plus 2,000 lbf for friction or CERBERUS prediction, whichever is greatest.
16. Equalize the pressure across the CT rams.
17. Unlock the pipe and slip rams.
18. Open the slip and pipe rams and POOH.
19. If the down hole check valves do not hold then the CT will have to be cut.

**CT STUCK IN HOLE PROCEDURES**

There are various scenarios by which CT can be deemed as a stuck in hole situation. The following procedures are to be used as generic guidelines prior to the compilation of a signed off chemical cutting program applicable to the current situation.

In the event of being stuck in hole, several factors would have to be taken into consideration, the first of which would be whether the CT is stuck in hole on a platform, or a semi-submersible, as the procedures to be followed may vary greatly between the two options.

Other factors to be considered are:

- Type of well, i.e., flowing oil or gas well, water injector etc.
- The type of BHA being used, i.e., perforating guns, milling assembly, plug etc.
- The type of operation being carried out when the CT became stuck.

In all of the above cases, the CT would be defined as being "stuck" when the pipe cannot be retrieved from the well bore without the pipe exceeding its 80% minimum yield rating, or without exceeding 80% stress of the weak link release rating. The lower of these two factors should always be used when attempting large pulls.

Regardless of the specifics involved, the following procedures should be adopted:

1. Inform the client representative of the situation.
2. Inform the Onshore Engineer.
3. From the information available, and taking into account the well conditions, try to determine the reason for the pipe/BHA being stuck.
4. Attempt to pull free by applying a steady pull to a maximum of 80% of the CT yield. If in doubt as to what this figure is, consult Engineering Department before proceeding.
5. When applying the maximum pull, hold the maximum value for a minimum of 10 minutes and observe the trend (if any) on the weight indicator and chart. Measure the amount of pipe extension that is required when this pull is applied. The figure can be used to determine where the CT is stuck. As a rule of thumb, the depth that the pipe is held at will be the extension of the CT (in feet) when pulled to 80% of yield divided by 0.002. This can be determined using CERBERUS.

The following are options that may be appropriate depending on the particular circumstances:

1. If possible, flow the well, or increase well flow in an effort to remove debris in the well bore that may be holding the CT/BHA. Maintain maximum circulation through the CT at the same time. This is particularly relevant if well cleanout or drilling operations have been performed.
2. Circulate acid across the BHA in an attempt to remove any acid soluble material that may be holding the CT.
3. Pump fluid down the backside of the CT to the formation in an attempt to dislodge debris from around the BHA. Potential CT collapse must be considered if engineering this scenario.
4. Displace CT contents to a lighter fluid (base oil) or gas (Nitrogen) to increase buoyancy and allow greater end force to be applied at BHA.
5. Underbalance the well in the case of differentially stuck CT.
6. Cool the well if the CT is helically stuck in corkscrewed Production Tubing.
7. Pump down the CT / completion annulus to try and move the source of hold-up.
8. Displace slugs of Nitrogen with water to create a surge effect at the BHA.
9. Pump friction reducer, IM Lube in seawater at 2-3% by volume, down the CT and into the well. Ideally, one well volume will be pumped.
10. After consultation with the client representative and the on-call Engineer, activate the emergency disconnect mechanism in the BHA to allow the CT to be released. The release mechanism should only be implemented after all avenues have been explored.
11. When attempting maximum pull, do not work the CT violently across the gooseneck by frequent intervals.
12. The number of cycles across the gooseneck must be logged, and if in doubt of the CT fatigue condition, the Engineer must be consulted and the cycles entered into the CERBERUS FATIQUE program, to determine the number of cycles left available.

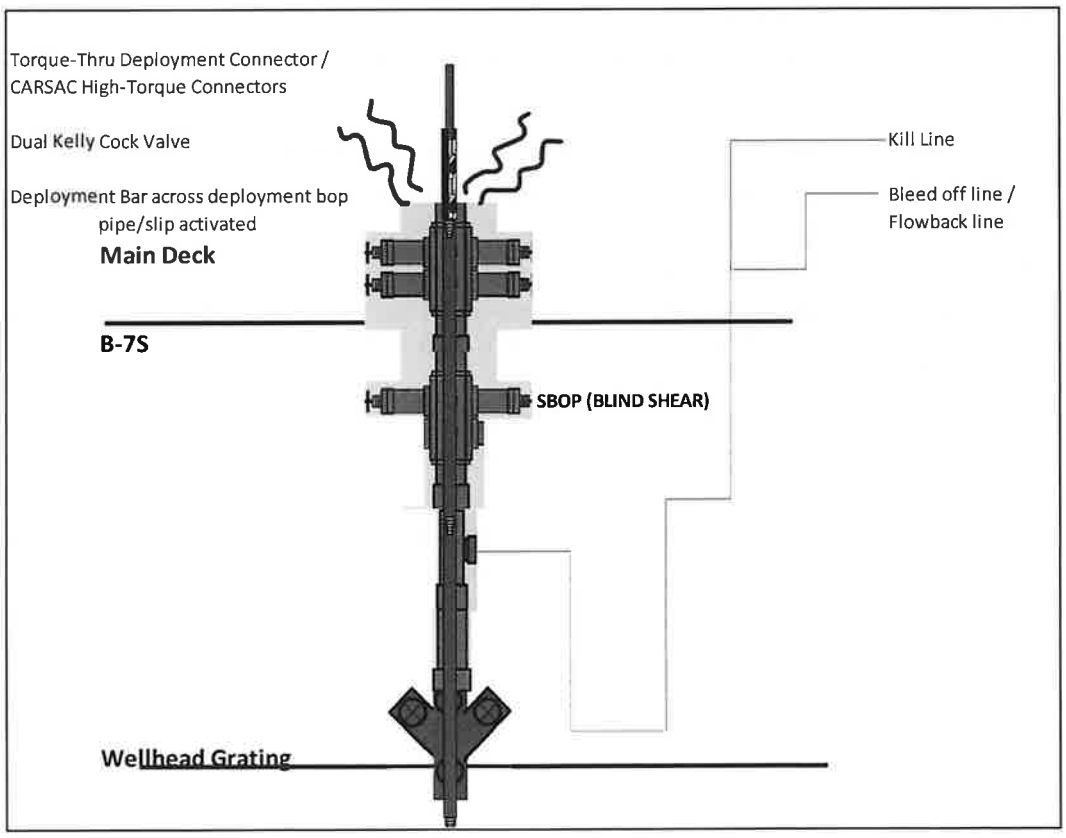
After consultation with the client representative, kill the well and commence preparations for External/Internal cutting operations.

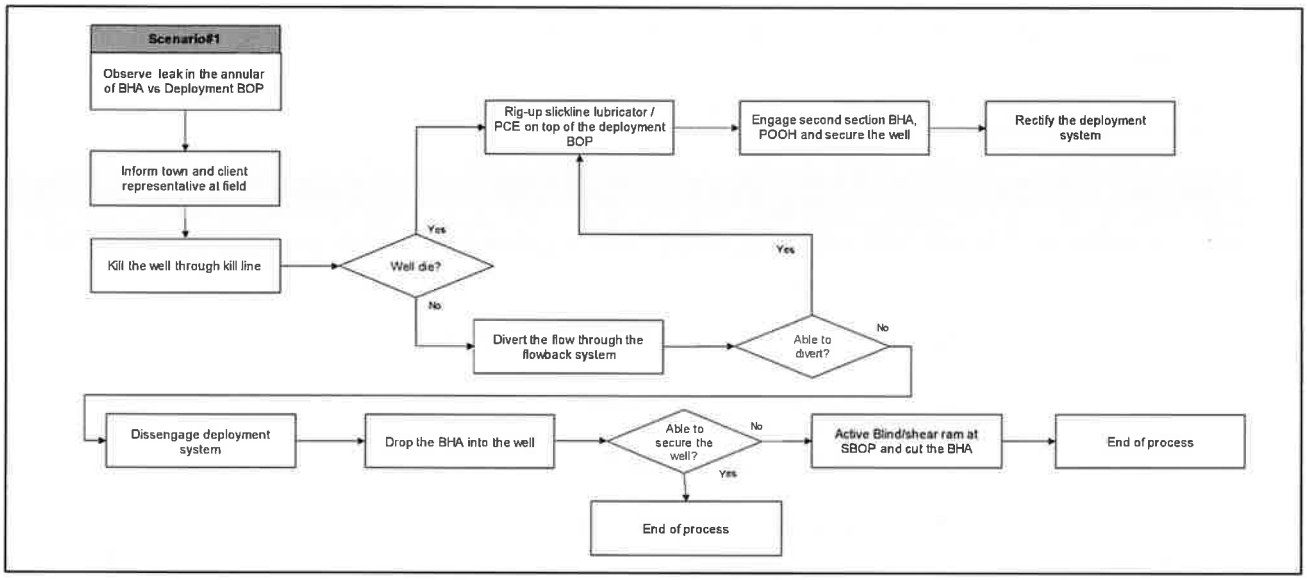
## CT Deployment System Emergency Respond Plan

Scenario 1: - Leak at annular section when CT BHA is across the deployment BOP after slickline deploy the 2nd Section BHA

Section #2 BHA fully deployed across deployment BOP. Pipe/Slip ram engaged and holding. C-Clamp and Dog Clamp in position.

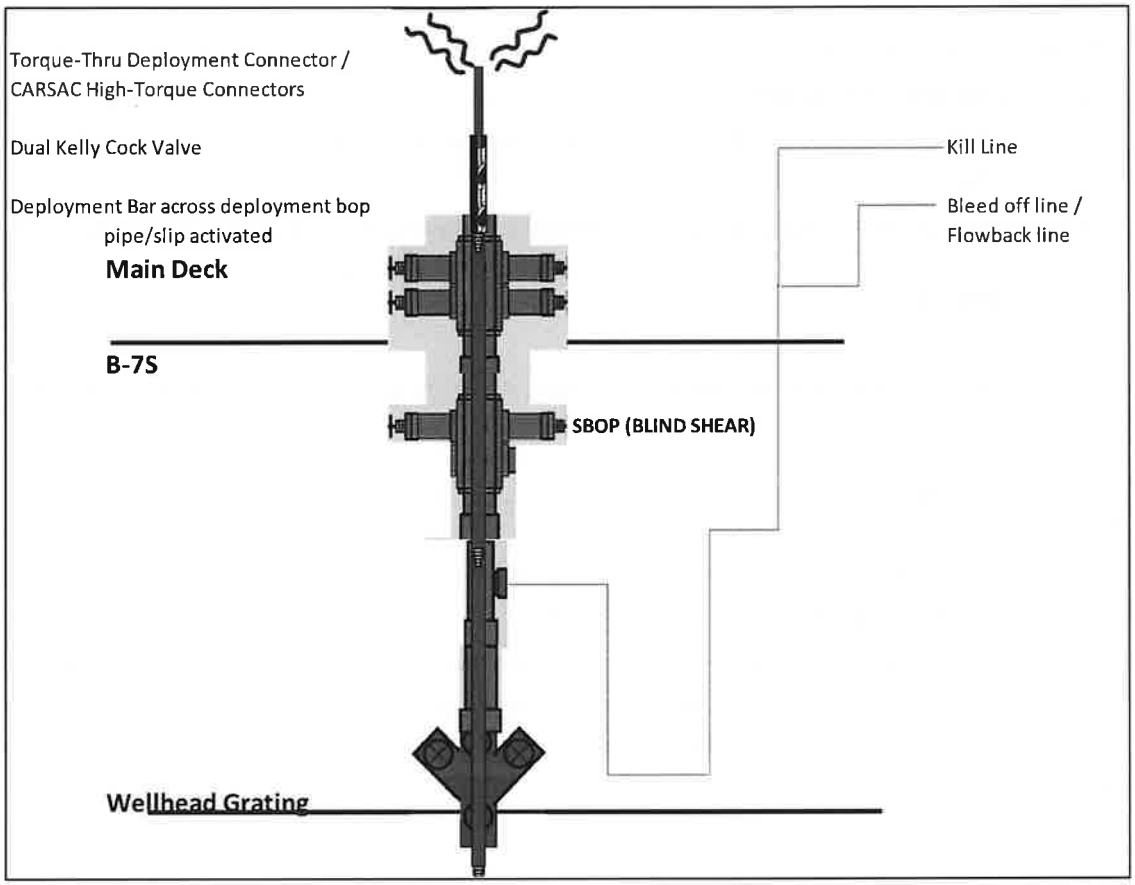
| Section | Items | | Description | BHA OD, Inch | Length, ft | Deploy by |
|---|---|---|---|---|---|---|
| 1 | 1 | DB | Dimple End Connector | 1.687 | 2.6 | CT |
| | 2 | DB | CT MHA | 1.687 | | |
| 2 | 3 | DB | Torque-Thru Deployment Connector / CARSAC High-Torque Connectors | 1.687 | 102. 2 | Slickline |
| | 4 | DB | Dual-ball Kelly cock valve | 1.687 | | |
| | 5 | DB | Deployment bar | 1.5 | | |
| | 6 | DB | Straight bar | 1.687 | | |
| | 7 | DB | MultiJet Nozzle | 1.687 | | |

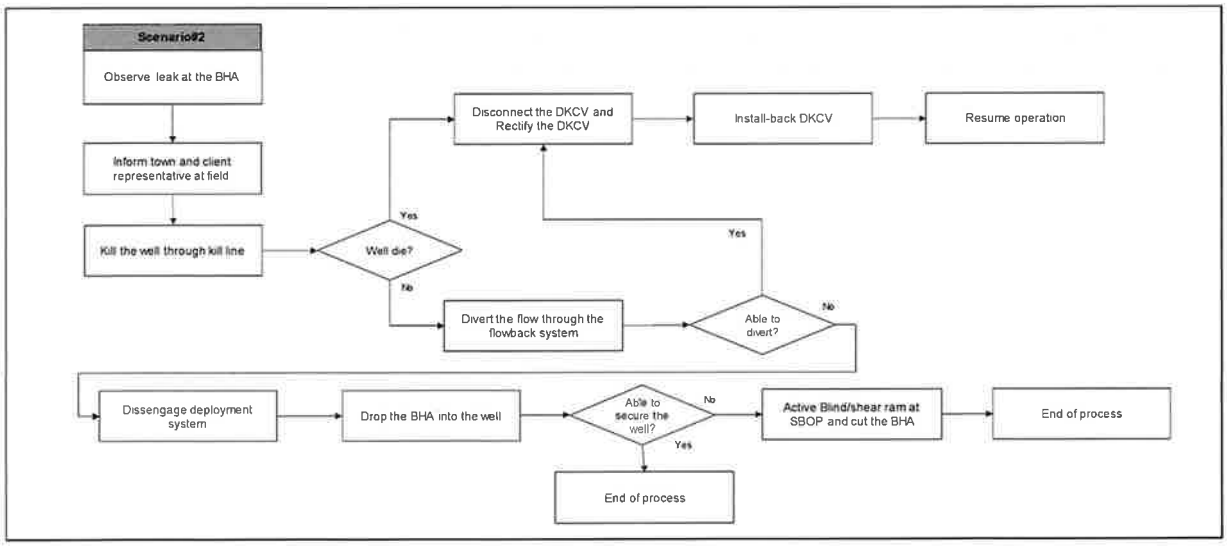





1. Observed fluid (liquid and/or gaseous) release from annular of CT BHA vs deployment BOP.
2. Slowly start pumping kill fluid thru the pumping tee below the Safety Head (Blind/Shear BOP). Attempt to fill up the well completion tubing to reduce and/or stop the ingress of wellbore fluid. Simultaneously alert nearby personnel and inform town.
3. Attempt to kill the well through the kill line via flow tee.
4. If able to successfully kill the well,
   - 4.1. Rig-up slickline lubricator / PCE on top of the Deployment BOP.
   - 4.2. Pressure test PCE stack.
   - 4.3. On successful pressure test, RIH slickline and make up slickline BHA to 2nd section CT BHA,
   - 4.4. POOH BHA to surface (above deployment BOP) and close the well Xmas tree crown valve and master valve
   - 4.5. Identify and rectify the annular leak.
5. If the well cannot be killed with available fluid system, divert the flow of return from the flow tee at top of wellhead grating to flowback facility. Continue to next step if redirecting of the flow is successful and annular leakage ceases.: -
6. Mix heavier circulation fluid and reattempt step #2 & #3.
   - 6.1. If the well cannot be killed and the flow cannot be diverted, then move forward to the steps below: Withdraw Deployment BOP Pipe/Slip Ram.
   - 6.2. Permit the BHA to gravitate and descend into the wellbore past the Xmas tree of the well.
7. Shut the master valve followed by the crown valve to ensure the well is secure. If the BHA is unable to be dropped beyond the Xmas tree, activate Blind/Shear ram on the Safety Head and shear the BHA in the PCE stack across the Safety Head.

Scenario 2: - Leak inside CT BHA after slickline have successfully deployed Section #2 CT BHA. Addressing leak bypassing the DKCV

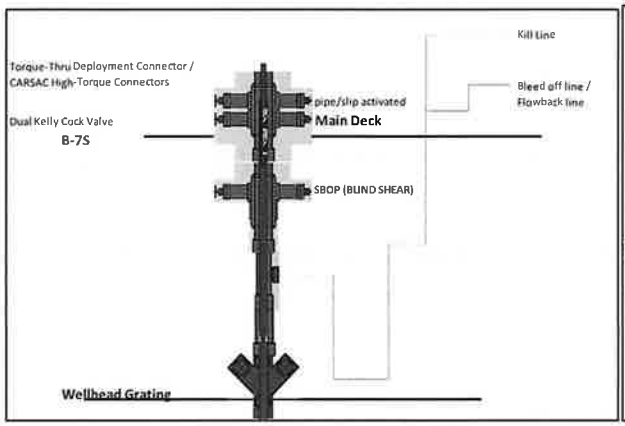


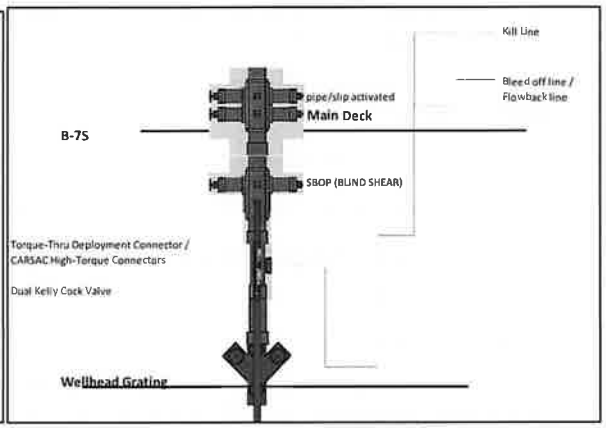

8. Observed fluid (liquid and/or gaseous) release from CT BHA.

9. Slowly start pumping kill fluid thru the pumping tee below the Safety Head (Blind/Shear BOP). Attempt to fill up the well completion tubing to reduce and/or stop the ingress of wellbore fluid. Simultaneously alert nearby personnel and inform town.
10. Attempt to kill the well through the kill line via flow tee
11. If able to successfully kill the well,
    - 11.1. Rig-up slickline lubricator / PCE on top of the Deployment BOP.
    - 11.2. Pressure test PCE stack.
    - 11.3. On successful pressure test, RIH slickline and make up slickline BHA to 2nd section CT BHA,
    - 11.4. POOH BHA to surface (above deployment BOP) and close the well Xmas tree crown valve and master valve
    - 11.5. Identify and rectify the annular leak.
12. If the well cannot be killed with available fluid system, divert the flow of return from the flow tee at top of wellhead grating to flowback facility. Continue to next step if redirecting of the flow is successful and annular leakage ceases.: -
13. Mix heavier circulation fluid and reattempt step #9 & #10. If well killing is successful, proceed to step #15 else to step #14
14. If the well cannot be killed and the flow cannot be diverted, then move forward to the steps below:
    - 14.1. Withdraw Deployment BOP Pipe/Slip Ram.
    - 14.2. Permit the BHA to gravitate and descend into the wellbore past the Xmas tree of the well.
    - 14.3. Shut the master valve followed by the crown valve to ensure the well is secure
15. Once well is secured proceed with steps below:
    - 15.1. Disconnect the DKCV
    - 15.2. Rectify the DKCV
    - 15.3. Install DKCV
    - 15.4. Resume operation
16. If the BHA is unable to be dropped beyond the Xmas tree, activate Blind/Shear ram on the Safety Head and shear the BHA in the PCE stack across the Safety Head.

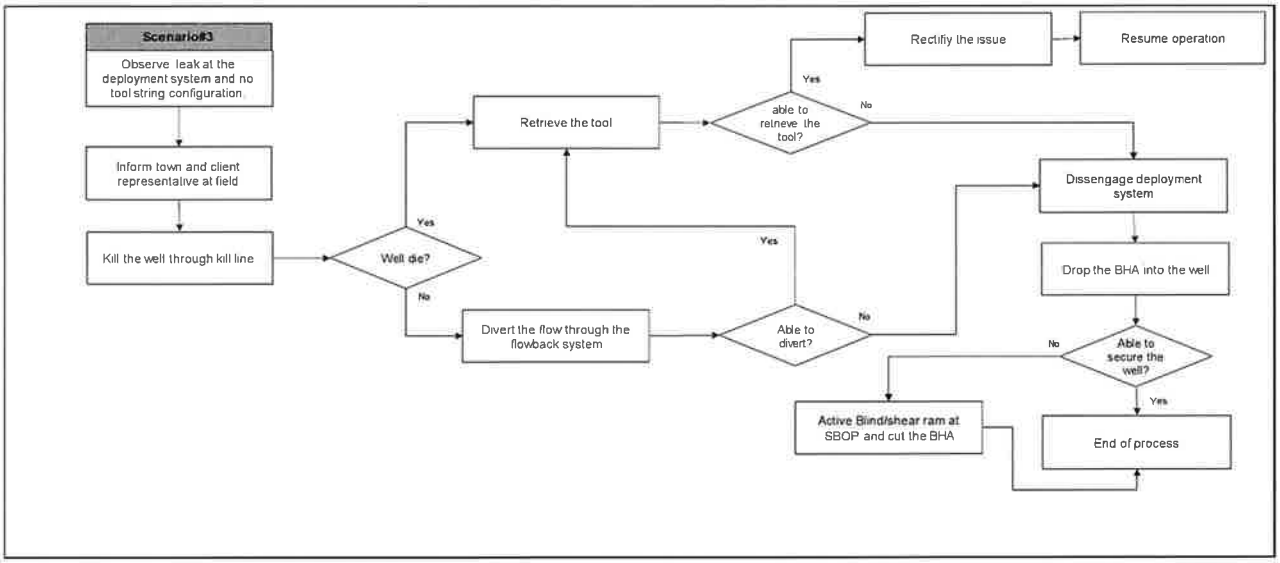
Scenario 3: - BHA slip after slickline deploy the 2nd Section BHA




Scenario#3.1



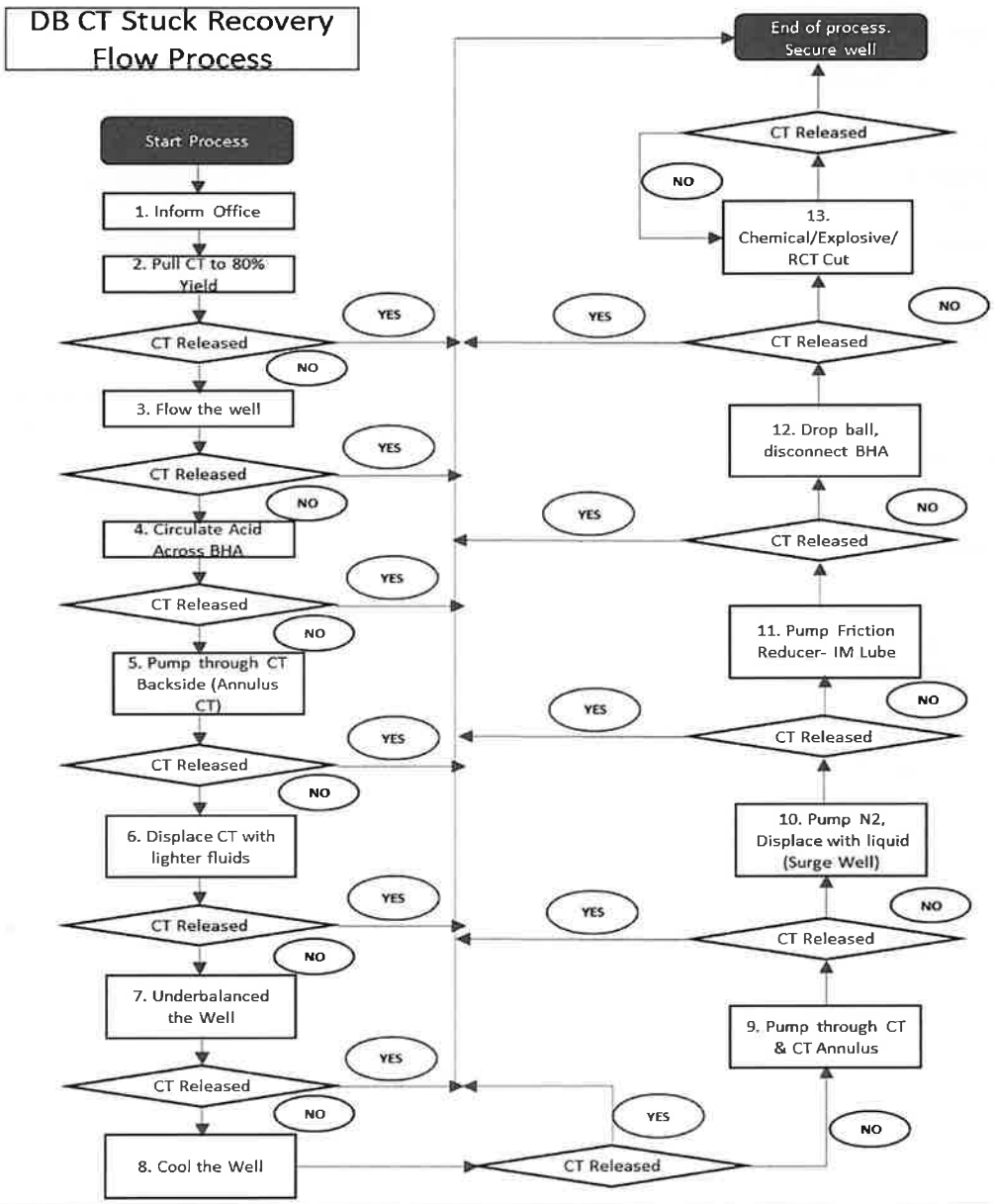

Scenario#3.2




17. Observed fluid (liquid and/or gaseous) release at deployment system. (No BHA observe at deployment system).
18. Slowly start pumping kill fluid thru the pumping tee below the Safety Head (Blind/Shear BOP). Attempt to fill up the well completion tubing to reduce and/or stop the ingress of wellbore fluid. Simultaneously alert nearby personnel and inform town.
19. Attempt to kill the well through the kill line via flow tee
20. If able to successfully kill the well,
    - 20.1. Retrieve the tool
    - 20.2. If unable to retrieve the tool, disengage the BHA from deployment system and secure the well by close the crown valve / master valve
    - 20.3. If unable to close the crown valve / master valve, active blind/shear ram at SBOP and secure the well

21. If the well cannot be killed with available fluid system, divert the flow of return from the flow tee at top of wellhead grating to flowback facility. Continue to next step if redirecting of the flow is successful and annular leakage ceases.
22. Mix heavier circulation fluid and reattempt step #19 & #20. If well killing is successful, proceed to step #24 else to step #23
23. If the well cannot be killed and the flow cannot be diverted, then move forward to the steps below:
    - 23.1. Withdraw Deployment BOP Pipe/Slip Ram.
    - 23.2. Permit the BHA to gravitate and descend into the wellbore past the Xmas tree of the well.
    - 23.3. Shut the master valve followed by the crown valve to ensure the well is secure
24. Secure the well.
25. If the BHA is unable to be dropped beyond the Xmas tree, activate Blind/Shear ram on the Safety Head and shear the BHA in the PCE stack across the Safety Head.

## STUCK CT COIL RECOVERY PROCESS




Precautionary Steps to avoid Stuck while Cleanout in Dual string Completion:

1) To monitor pressure trending all the times during operation and record for any abnormalities. If there is continue pressure increasing trend during cleanout, proceed to pick up coil to the previous pull test depth and perform flow rate test.
2) In the event of coil entangle on the Long string, proceed to pick up coil and simulate pumping lost prime scenario to create vibration and tip of coil wobble to release from entanglement.

## APPENDIX VI – CIRCA SIMULATION

***Flow Summary***

SUMMARY OF FLOW RESULTS

| | |
|---|---|
| **Produced Fluids** | |
| **Pressure known at:** | Perforations |
| **Production Mode:** | No Production |
| **Fluid Composition:** | Oil and Gas |
| | |
| Circulated Fluids | |
| Fluid Composition: | Nitrified Water |
| Liquid: | 1.10 bbl/min |
| Solids: | 0.00 bbl/min |
| Gas: | 300.0 scf/min |
| Circulation Point: | 1545.00 m |
| HHP Required : | 79.86 KW |

COMPLETION:

| | |
|---|---|
| Wellhead Pressure..... | 130.2 psi g |
| Hydrostatic pressure loss..... | 954.0 psi |
| Friction pressure loss..... | 514.1 psi |
| Kinetic pressure loss..... | -0.6 psi |
| Restriction pressure loss..... | 2.2 psi |
| Equivalent Circulation Density[ECD]... | 7.06 lb/gal (US) |
| | |
| Perforation Pressure..... | 1600.0 psi g |
| Hydrostatic pressure loss..... | 386.6 psi |
| Friction pressure loss..... | 0.1 psi |
| | |
| Bottom Hole Pressure..... | 1986.7 psi g |

FROM CIRCULATION POINT TO WELLHEAD:

| | |
|---|---|
| Liquid transit time..... | 9 min |
| Gas transit time..... | 8 min |
| Annular volume..... | 21.1 bbl |
| Volume below circulation point..... | 41.1 bbl |
| Total liquid volume..... | 53.1 bbl |

| | |
|---|---|
| Total gas volume | 9.1 bbl |
| (Surface equivalent) | 2475.1 scf |

WORKSTRING:

| | |
|---|---|
| Liquid: | 1584.0 bbl/day |
| Gas: | 0.43 MMscf/day |
| Pressure at reel rotating joint | 3958.9 psi g |
| Friction pressure loss on reel | 1940.7 psi |
| Pressure inside WS at Gooseneck | 2018.3 psi g |
| Hydrostatic pressure loss | -1104.6 psi |
| Friction pressure loss | 1012.9 psi |
| Equivalent Circulation Density[ECD] | 1.46 lb/gal (US) |
| BHA total pressure loss | 487.3 psi |
| BHA Hydrostatic loss | -18.5 psi |
| BHA Friction loss | 226.6 psi |
| BHA Kinetic loss | 6.8 psi |
| Nozzle | 272.3 psi |
| Circulation Point pressure | 1622.8 psi g |

FROM REEL ROTATING JOINT TO CIRCULATION POINT:

| | |
|---|---|
| Liquid transit time | 12 min |
| Gas transit time | 15 min |
| Displacement Volume | 11.1 bbl |
| Internal Volume | 18.6 bbl |
| Internal liquid volume | 13.2 bbl |
| Internal gas volume | 5.4 bbl |
| (Surface equivalent) | 4440.1 scf |
| Length of Workstring on reel | 2130.78 m |

***Ctran Summary***

SUMMARY OF HOLE CLEANING RESULTS

| | |
|---|---|
| **Initial Condition:** | |
| **% of fill interval occupied by solids before cleanout ...** | **100.0 %** |
| **Top of fill ...** | **1515.01 m** |
| **Deepest Circulation point ...** | **1545.00 m** |
| **Bottom of fill ...** | **1545.00 m** |
| **Initial Volume of Solids...** | **3.4 bbl** |
| **Initial Mass of Solids...** | **1740.4 lb** |
| **Solids type:** | **Mud Residue/Formation Fines** |
| **Fluid Description:** | **Nitrified Water** |
| Penetration Hole Cleaning Mode: | |
| Penetration rate... | 1.0 ft/min |
| Penetration time... | 1.64 hr |
| Solids volume in the well after penetration ... | 2.7 bbl |
| Solids mass in the well after penetration ... | 1398.9 lb |
| Circulation Hole Cleaning Mode: | |
| Hole circulation time ... | 3.28 hr |
| Solids volume in the well after circulation... | 0.5 bbl |
| Solids mass in the well after circulation... | 259.3 lb |
| Wiper Trip Hole Cleaning Mode: | |
| Wiper Trip Scheme: | User Specified rate, Tornado not |
| Wiper trip time ... | 0.21 hr |
| Solids volume in the well after wiper trip ... | 0.5 bbl |
| Solids mass in the well after wiper trip ... | 259.3 lb |
| Volume of Fluids Pumped During Penetration, Circulation & Wiper Trip: | |
| Gas volume ... | 92441.7 scf |
| Liquid Volume ... | 339.0 bbl |
| Penetration, Circulation & Wiper Trip time ... | 5.14 hr |

Circulation results at point of Maximum Solids Head:

**Flow State**

| Measured Depth[Flow] *m* | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocity ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 0.0 | 95.0 | 130.2 | 2018.3 | 0.0 | 1619 | 1163 | 0 |
| 4.0 | 95.4 | 135.5 | 2019.4 | 0.0 | 1635 | 1163 | 0 |
| 29.0 | 97.7 | 166.2 | 2026.2 | 0.0 | 1420 | 1164 | 0 |
| 54.0 | 100.1 | 195.0 | 2032.9 | 0.0 | 1277 | 1165 | 0 |
| 79.0 | 102.5 | 222.6 | 2039.7 | 0.0 | 1172 | 1166 | 0 |
| 104.0 | 104.8 | 249.4 | 2046.4 | 0.0 | 1091 | 1168 | 0 |
| 129.0 | 107.2 | 275.7 | 2053.1 | 0.0 | 1231 | 1169 | 0 |
| 132.0 | 107.4 | 279.2 | 2053.9 | 0.0 | 1019 | 1170 | 0 |
| 157.0 | 109.8 | 305.1 | 2060.5 | 0.0 | 967 | 1171 | 0 |
| 182.0 | 112.1 | 330.9 | 2067.1 | 0.0 | 923 | 1172 | 0 |
| 207.0 | 114.5 | 356.5 | 2073.7 | 0.0 | 885 | 1173 | 0 |
| 232.0 | 116.8 | 382.2 | 2080.3 | 0.0 | 852 | 1174 | 0 |
| 257.0 | 119.2 | 407.8 | 2086.9 | 0.0 | 824 | 1175 | 0 |
| 282.0 | 121.5 | 433.5 | 2093.6 | 0.0 | 956 | 1176 | 0 |
| 303.1 | 123.5 | 455.5 | 2099.2 | 0.0 | 778 | 1177 | 0 |
| 328.1 | 125.9 | 481.4 | 2105.8 | 0.0 | 758 | 1178 | 0 |
| 353.0 | 128.2 | 507.4 | 2112.4 | 0.0 | 739 | 1179 | 0 |
| 378.0 | 130.6 | 533.4 | 2119.0 | 0.0 | 722 | 1180 | 0 |
| 403.0 | 132.9 | 559.4 | 2125.3 | 0.0 | 706 | 1183 | 0 |
| 428.0 | 135.2 | 585.4 | 2131.5 | 0.0 | 692 | 1187 | 0 |
| 453.0 | 137.5 | 611.5 | 2137.3 | 0.0 | 681 | 1191 | 0 |
| 478.0 | 139.8 | 637.6 | 2142.6 | 0.0 | 670 | 1195 | 0 |
| 503.0 | 142.0 | 663.6 | 2147.5 | 0.0 | 660 | 1201 | 0 |

**Flow State (continued)**

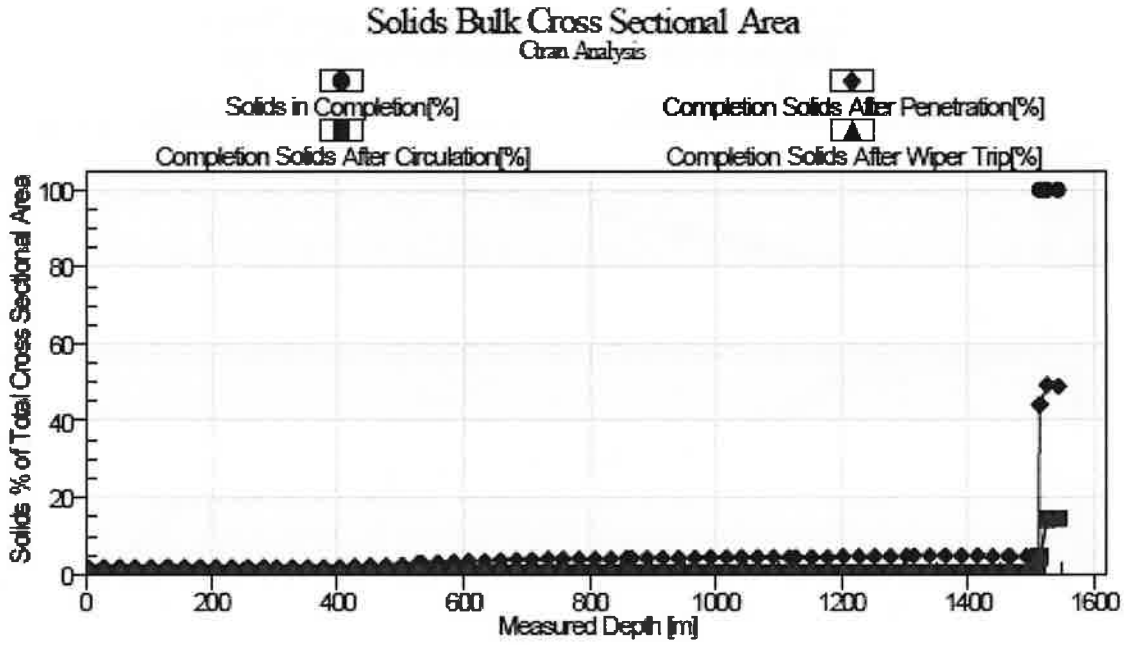
| Measured Depth[Flow] m | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocity ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 528.0 | 144.1 | 689.4 | 2151.8 | 0.0 | 781 | 1206 | 0 |
| 534.1 | 144.6 | 695.9 | 2152.7 | 0.0 | 650 | 1209 | 0 |
| 559.1 | 146.7 | 721.5 | 2156.2 | 0.0 | 642 | 1213 | 0 |
| 584.1 | 148.7 | 746.5 | 2159.0 | 0.0 | 636 | 1217 | 0 |
| 609.1 | 150.6 | 771.0 | 2161.1 | 0.0 | 630 | 1222 | 0 |
| 634.1 | 152.5 | 794.9 | 2162.6 | 0.0 | 625 | 1225 | 0 |
| 659.1 | 154.3 | 818.2 | 2163.4 | 0.0 | 621 | 1228 | 0 |
| 684.0 | 156.0 | 841.0 | 2163.5 | 0.0 | 617 | 1230 | 0 |
| 709.0 | 157.7 | 863.2 | 2163.1 | 0.0 | 613 | 1232 | 0 |
| 734.0 | 159.3 | 885.2 | 2162.3 | 0.0 | 609 | 1233 | 0 |
| 759.0 | 160.9 | 907.3 | 2161.4 | 0.0 | 604 | 1234 | 0 |
| 784.0 | 162.6 | 929.5 | 2160.5 | 0.0 | 599 | 1236 | 0 |
| 809.0 | 164.2 | 951.7 | 2159.7 | 0.0 | 594 | 1237 | 0 |
| 834.0 | 165.9 | 973.9 | 2158.8 | 0.0 | 590 | 1239 | 0 |
| 859.0 | 167.5 | 996.2 | 2157.8 | 0.0 | 702 | 1240 | 0 |
| 867.1 | 168.0 | 1003.5 | 2157.4 | 0.0 | 585 | 1240 | 0 |
| 892.1 | 169.7 | 1025.7 | 2156.3 | 0.0 | 581 | 1242 | 0 |
| 917.1 | 171.3 | 1048.0 | 2155.1 | 0.0 | 577 | 1243 | 0 |
| 942.0 | 172.9 | 1070.2 | 2153.8 | 0.0 | 574 | 1244 | 0 |
| 967.0 | 174.5 | 1092.5 | 2152.5 | 0.0 | 571 | 1246 | 0 |
| 992.0 | 176.1 | 1114.7 | 2151.1 | 0.0 | 567 | 1247 | 0 |
| 1017.0 | 177.7 | 1137.0 | 2149.6 | 0.0 | 565 | 1248 | 0 |
| 1042.0 | 179.3 | 1159.2 | 2148.0 | 0.0 | 562 | 1250 | 0 |

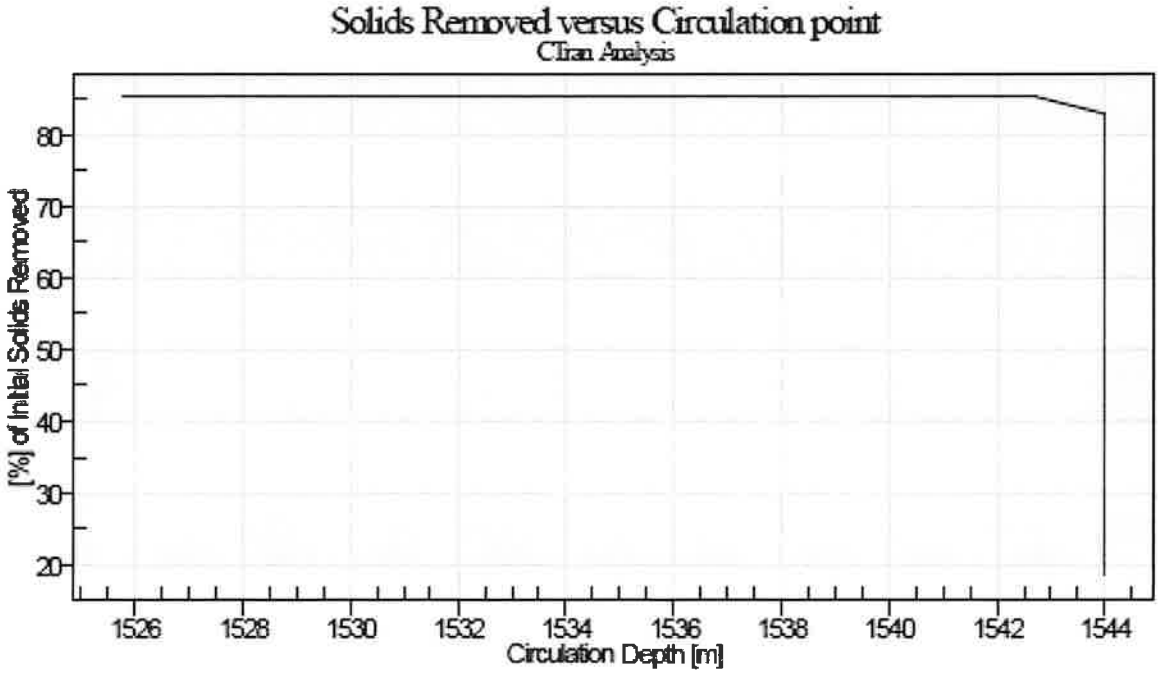
**Flow State (continued)**

| Measured Depth[Flow] m | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocitv ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 1067.0 | 180.9 | 1181.5 | 2146.4 | 0.0 | 559 | 1251 | 0 |
| 1092.0 | 182.5 | 1203.8 | 2144.7 | 0.0 | 556 | 1253 | 0 |
| 1117.0 | 184.1 | 1226.2 | 2143.1 | 0.0 | 663 | 1254 | 0 |
| 1128.0 | 184.8 | 1236.3 | 2142.3 | 0.0 | 552 | 1255 | 0 |
| 1153.0 | 186.5 | 1258.8 | 2140.6 | 0.0 | 549 | 1256 | 0 |
| 1178.0 | 188.1 | 1281.2 | 2138.8 | 0.0 | 547 | 1257 | 0 |
| 1203.0 | 189.6 | 1303.7 | 2137.0 | 0.0 | 544 | 1259 | 0 |
| 1228.0 | 191.2 | 1326.1 | 2135.0 | 0.0 | 542 | 1260 | 0 |
| 1253.0 | 192.8 | 1348.6 | 2133.0 | 0.0 | 540 | 1261 | 0 |
| 1278.0 | 194.4 | 1371.0 | 2130.9 | 0.0 | 538 | 1263 | 0 |
| 1303.0 | 196.0 | 1393.5 | 2128.8 | 0.0 | 643 | 1264 | 0 |
| 1315.0 | 196.7 | 1404.5 | 2127.7 | 0.0 | 536 | 1265 | 0 |
| 1340.0 | 198.3 | 1426.9 | 2125.5 | 0.0 | 534 | 1266 | 0 |
| 1365.0 | 199.9 | 1449.3 | 2123.1 | 0.0 | 532 | 1267 | 0 |
| 1390.0 | 201.5 | 1471.9 | 2120.8 | 0.0 | 530 | 1269 | 0 |
| 1415.0 | 203.0 | 1494.5 | 2118.5 | 0.0 | 527 | 1271 | 0 |
| 1440.0 | 204.6 | 1517.3 | 2116.3 | 0.0 | 524 | 1272 | 0 |
| 1465.0 | 206.2 | 1540.2 | 2114.2 | 0.0 | 626 | 1274 | 0 |
| 1468.0 | 206.4 | 1543.1 | 2113.9 | 0.0 | 522 | 1274 | 0 |
| 1493.0 | 208.0 | 1566.2 | 2111.8 | 0.0 | 622 | 1276 | 0 |
| 1513.0 | 209.3 | 1584.9 | 2110.1 | 0.0 | 682 | 1277 | 0 |
| 1514.0 | 209.4 | 1586.1 | 2110.1 | 0.0 | 515 | 1277 | 0 |
| 1514.2 | 209.4 | 1587.1 | 2110.0 | 0.0 | 83 | 1277 | 0 |

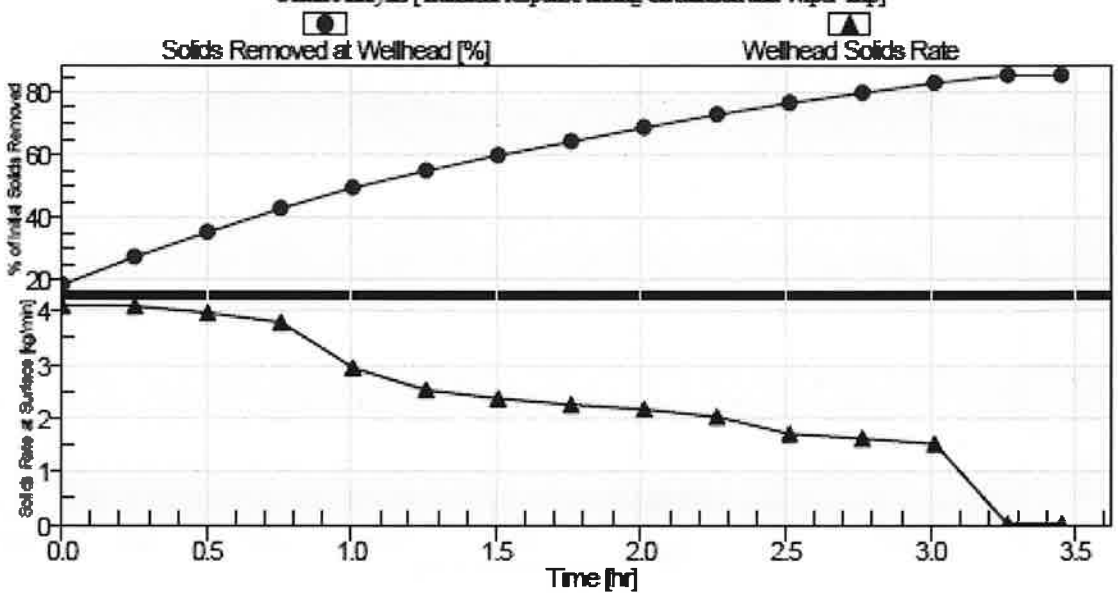
**Flow State (continued)**

| Measured Depth[Flow] m | Temperature | Completion Pressure | Workstring Pressure | Concentric Pressure | Completion Liquid Velocity ft/min | Workstring Liquid Velocity ft/min | Concentric Liquid Velocity ft/min |
|---|---|---|---|---|---|---|---|
| 1515.0 | 209.5 | 1588.0 | 2098.1 | 0.0 | 85 | 3157 | 0 |
| 1526.0 | 210.2 | 1600.0 | 2024.6 | 0.0 | 84 | 3179 | 0 |
| 1544.7 | 211.4 | 1622.4 | 1897.2 | 0.0 | 89 | 3222 | 0 |
| 1545.0 | 211.4 | 1622.8 | 1895.1 | 0.0 | 88 | 13353 | 0 |
| 1558.1 | 212.3 | 1635.3 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1583.1 | 214.0 | 1659.4 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1608.1 | 215.7 | 1683.6 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1633.1 | 217.3 | 1707.9 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1658.1 | 219.0 | 1732.3 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1683.1 | 220.7 | 1757.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1708.1 | 222.5 | 1781.9 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1733.0 | 224.2 | 1807.1 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1758.0 | 226.0 | 1832.6 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1783.0 | 227.8 | 1858.2 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1808.0 | 229.5 | 1883.8 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1833.0 | 231.3 | 1909.6 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1858.0 | 233.1 | 1935.4 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1883.0 | 234.9 | 1961.1 | 0.0 | 0.0 | 0 | 0 | 0 |
| 1908.0 | 236.7 | 1986.7 | 0.0 | 0.0 | 0 | 0 | 0 |


Solids Bulk Cross Sectional Area
CTran Analysis
Solids in Completion[%]
Completion Solids After Penetration[%]
Completion Solids After Circulation[%]
Completion Solids After Wiper Trip[%]
Solids % of Total Cross Sectional Area
100
80
60
40
20
0
0
200
400
600
800
1000
1200
1400
1600
Measured Depth [m]


Solids Removed versus Circulation point
CTran Analysis
[%] of Initial Solids Removed
80
70
60
50
40
30
20
1526
1528
1530
1532
1534
1536
1538
1540
1542
1544
Circulation Depth [m]

## Solids Removal after Penetration to Target Depth




## Tripping Speed to be used while Pulling Out of Hole