



**DIMENSION BID**  
WELL INTERVENTION | PERFORATION SERVICES

**PETRONAS  
CARIGALI**



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## BREAKOUT JOB

### END OF WELL REPORT ANGSI B-02L

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Well: B-02L  
Field: Angsi B  
Operation Region: PMA  
Country: Malaysia  
Prepared by: Zalani B Ibrahim  
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## 1. Executive Summary

This post-job report on Well Angsi B-02L has been prepared by Dimension Bid (M) Sdn Bhd at the request of Petronas Carigali Sdn Bhd. The work scope Angsi B-02L job is to perform sand clean out until EOT, total depth 2130 m MDDF using 2 1/8 Multi Jet Nozzle and to perform drift run to 2129.2 m. The treatment was started on 15<sup>th</sup> April 2021 and its consist of five runs. First run is to perform sand clean out inside tubing until insert valve. After POOH, continue with second run to perform another sand clean out after Slickline fail to retrieve insert valve. Job continue with third run to perform sand cleanout inside tubing until EOT. For the fourth run, perform Drift run until No-go nipple. During this run, CT face few HUD and need to proceed with contingency plan – soaking 15% HCL solution to dissolve the suspected scale. Run 5 is additional Job, Acid soaking request by client after suspect that Calcite issue that could potentially plug off the annulus area between perforation tunnel I-68 and the production tubing. Completed on 1<sup>st</sup> May 2021, including monitor the return fluid pH level.



### 1.1 Job Objective

The objectives of this job are:

1. To perform sand cleanout in long string from last held up depth reported at 135m MDDF until EOT at 2130 m MDDF to enable production from I-68 (SSD#3) flow into the long string.

### 1.2 Job Summary

No	Job Scope	Details
1	Dimension Bid	Spot and rig up coil tubing equipment
2	Dimension Bid	CT Run #1 Sand clean out inside tubing until SCSSV ( INSERT VALVE)
3	Dimension Bid	CT Run #2 Additional Sand clean out inside tubing until SCSSV ( INSERT VALVE) after Slickline fail to retrieve insert Valve

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4	Dimension Bid	CT Run #3 Sand cleanout inside tubing until EOT
5	Dimension Bid	CT Run #4 Drift run until No-GO Nipple
6	Dimension Bid	CT Run #5 Acid Soaking

### 1.3 Well Data

Input Parameter	Parameter Value
Field	Angsi Bravo
Max. Deviation (degrees)	47.9 degree @ 1,005m MDDF / 896m TVDDF
Min. Restriction (inch)	<b>2.69" (XN Nipple) @ 2,129.2m MDDF</b>
Type of Fluid & Density	9.5 ppg Inhibited Brine (based on data in Well Diagram)
Top of Fluid	TBA
Current Well Status	idle
Reservoir Pressure	2,428 psia (I-68 Reservoir based on SGS 2018 Data)
Reservoir Temperature	245 deg.F
Fracture Gradient	0.70 psi/ft (assumed)
H2S Content	<b>N/A</b>
CO2 Content	<b>N/A</b>
Mercury, HG	<b>N/A</b>



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## 1.4 Equipment Layout



## 2. Job Execution

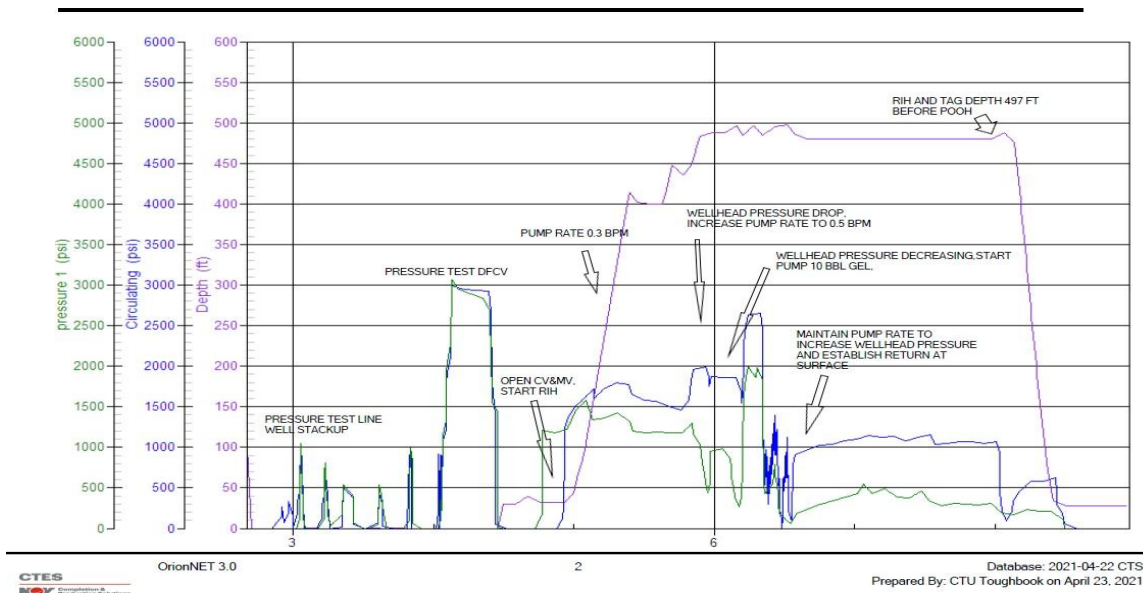
### 2.1 CT Run #1 Sand clean out inside tubing until top of insert valve

Configuration BHA from upper to below for Run#1:



- 2-1/8-inch Coiled Tubing Connector (External Dimple Type)
- 2-1/8-inch Motor Head Assembly
- 2-1/8-inch 5 + 3 Straight Bar
- 2-inch Hi-Jet Nozzle

Summary for the run as per below:

1. CT RIH to perform cleanout until top of insert valve.
2. Pull test at depth 455 ft MDDF.
3. Stop CT at 497 ft-MDDF (hard tag). Continue pump idle rate 0.35 bpm until return establish at surface, return water+sand, switch to pump 10 bbls gels.
4. After got clear return proceed to POOH (0.35 bpm idle rate)
5. POOH to surface.
6. Below is the graph for this run;



Graph 1 B02L Run 1

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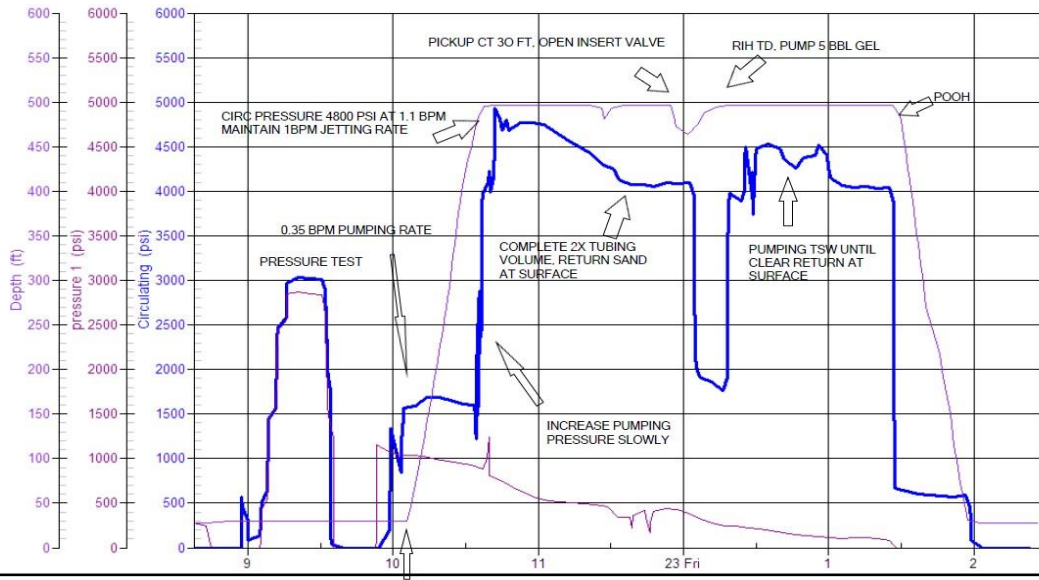
## 2.2 CT Run #2 Sand clean out inside tubing until top of insert valve

Configuration BHA from upper to below for Run#2:

- 2-1/8-inch Coiled Tubing Connector (External Dimple Type)
- 2-1/8-inch Motor Head Assembly
- 2-1/8-inch 5 + 3 Straight Bar
- 2-1/8-inch MultiJet Nozzle

Summary for the run as per below:

1. Slickline run 2.7" Gauge ring and HUD @137 m /449.7 ft, proceed run LIB and get impression of sand. Run 3" GS w/o dog to HUD @ 137 m, pin not shear. Run 2.25" hydrostatic Pump bailer and recover 400 ml sand.
2. CT enter to RIH for 2<sup>nd</sup> time to clean out until top of insert valve.
3. CT RIH with idle rate 0.35 bpm, after establish return and reach TD, proceed with increase the pump rate to 1 BPM. (Circulating pressure almost 5K psi when increase the flowrate to 1.1 BPM)
4. After complete pump 2x tubing volume and recover sand at surface, continue to POOH 30 ft before open insert valve.
5. RIH to TD and pump 5 bbl gel, continue pump TSW until clear return at surface.
6. CT start POOH after got clear return at surface.





CTES  
OrionNET 3.0

OrionNET 3.0

OPEN CV & MV START RIH 2

Database: 2021-04-22 CTS  
Prepared By: CTU Toughbook on April 23, 2021

Graph 2 B02L RUN 2

 <b>DIMENSION BID</b> <small>WELL INTERVENTION   PERFORATION SERVICES</small>	DIMENSION BID COILED TUBING SERVICES		
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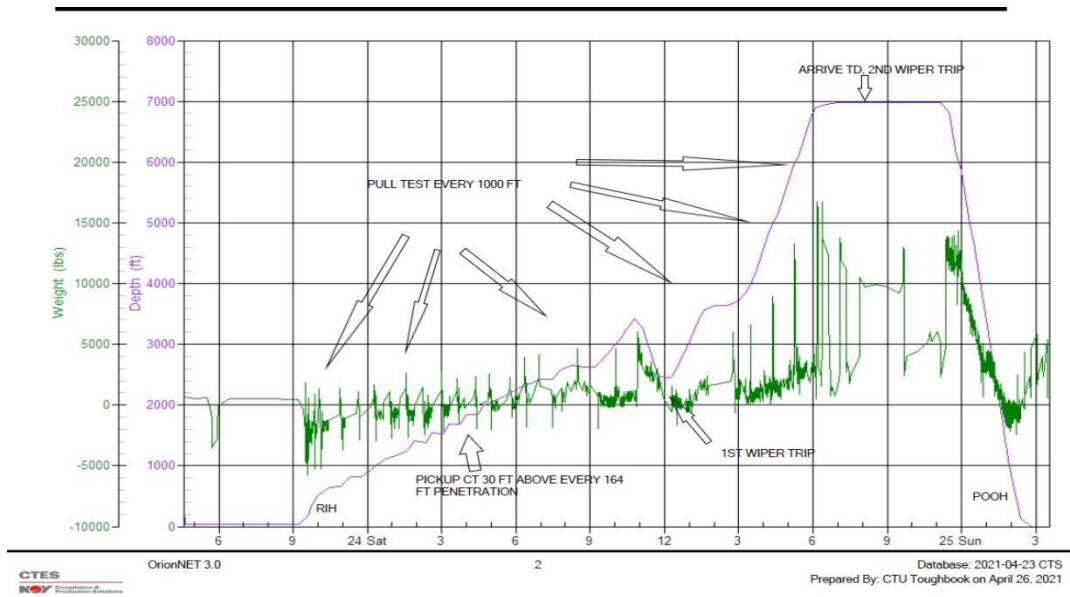
### 2.3 CT Run #3 Sand cleanout inside tubing until EOT

Configuration BHA from upper to below for Run#3:

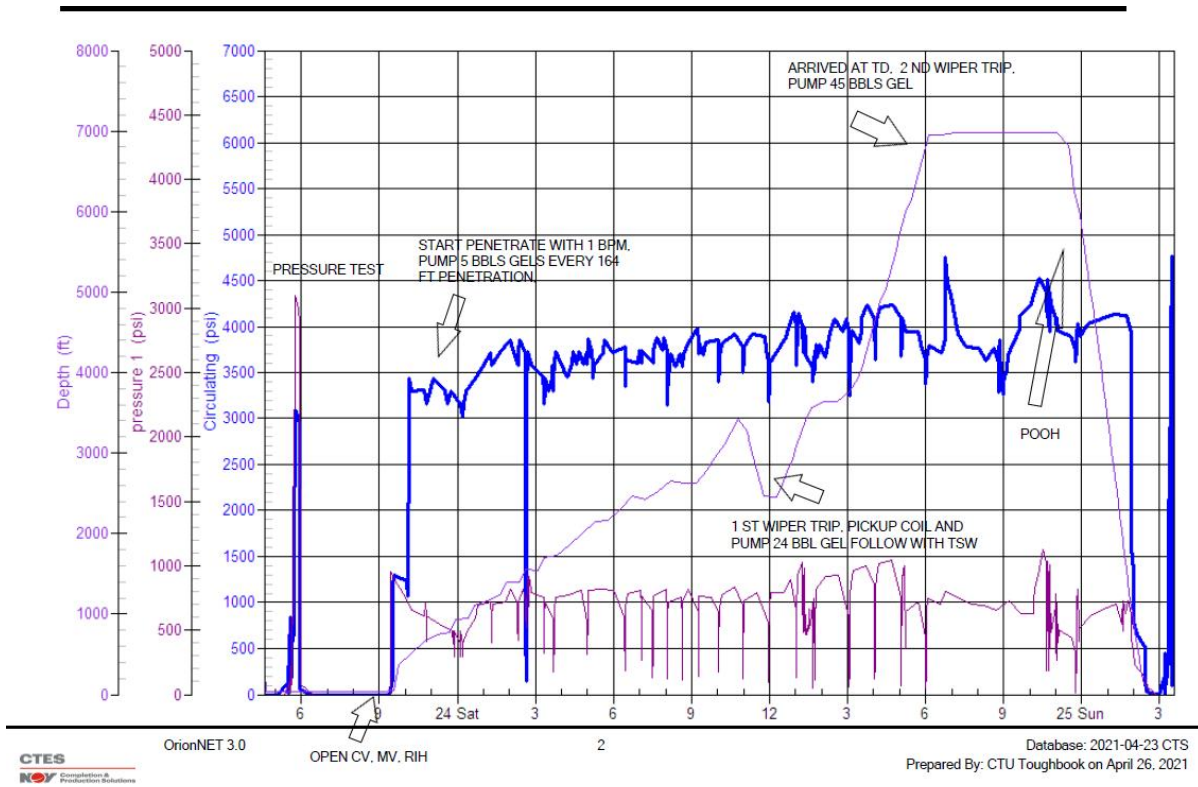
- 2-1/8-inch Coiled Tubing Connector (External Dimple Type)
- 2-1/8-inch Motor Head Assembly
- 2-1/8-inch 5 + 3 Straight Bar
- 2-1/8-inch MultiJet Nozzle

Summary for the run as per below:



1. After Slickline successfully retrieve Insert Valve, continue with CT job to clean production tubing until EOT, this run support with Injection gas at GL valve to establish return at surface.
2. Start with pump idle rate 0.3 BPM, pull test 30 ft before last HUD (510 ft), RIH with higher penetration rate (1BPM) to penetrate, no HUD while penetrate to TD
3. For the first 3495 ft (before first wiper trip) Circulate with 5 bbl D801 after each penetration of 50m/164ft.
4. Pull test were conducted as per standard practice, every 1000 ft.
5. After CT reach depth 3495 ft, pick up coil to depth 2447 ft before start first wiper trip, 24 bbl gel.
6. Once complete circulation CT proceed to RIH to penetrate the fill.
7. No HUD while continue penetrate to target depth, no gel pump during this stage.
8. After CT reach TD @ 6983 ft, tag twice at depth 6983 (suspected EOT), CT start 2<sup>nd</sup> wiper Trip, switch to pump 45 bbl Gels follow with TSW. After finish CBU and observe clear return at surface, flag coil before proceed POOH.
9. Sand obtained from this run can refer in appendix section.
10. Below is the graph for this run;



Graph 3 B02L RUN 3.1



Graph 4 B02L RUN 3.2

 <b>DIMENSION BID</b> <small>WELL INTERVENTION   PERFORATION SERVICES</small>	DIMENSION BID COILED TUBING SERVICES		
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## 2.4 CT Run #4 Drift run using 2.75 FC

Configuration BHA from upper to below for Run#4:

- 2-1/8-inch Coiled Tubing Connector (External Dimple Type)
- 2-1/8-inch Motor Head Assembly
- 2-1/8-inch 5 + 3 Straight Bar
- 2.75-inch Flute Centralizer
- 2-1/8-inch MultiJet Nozzle

Summary for the run as per below:

1. After complete perform sand cleanout until EOT (RUN3), CT enter the well with 2.75" FC make up in BHA to perform drift run until EOT.
2. During this run gas lift reduced from 8% to 4% to reduce wellhead pressure.
3. Start with idle rate 0.4 bpm until first HUD at depth 467 ft, start increase to 1 bpm to penetrate the HUD (circulation pressure around 4300 psi).
4. CT encounter few HUD at depth 467, 501, 604, 673, 686, 711, 811 and 815 ft.
5. For HUD at depth 467 till 711, CT able to penetrate after pickup 30ft, Re-Run while penetrate with 1bpm.
6. At HUD 811 ft after CT fail to penetrate for 3<sup>rd</sup> time with high jetting rate, 10 bbl 15% acid system were mixed inside batch mixer tank.
7. After jetting 5 bbl 15% acid, able to pass through HUD at 811 ft, but encounter second HUD at depth 815 ft. Start pump remaining 5 bbl acid and soaked it for 2 Hours, while CT POOH at safe depth (200 ft).
8. 5 bbl soda ash were pumped inside the tubing to neutralize the acid, continue RIH to TD (able to pass through last HUD).
9. Pull test were conducted as per standard practice, every 1000 ft.
10. CT station 10 metre above XN Nipple, perform pull test and record it.
11. CT experienced hard tag (3times) at depth 6997 ft, continue circulate 90 bbl TIW, after complete CBU, CT start POOH to surface.
12. Below is the graph for this run;

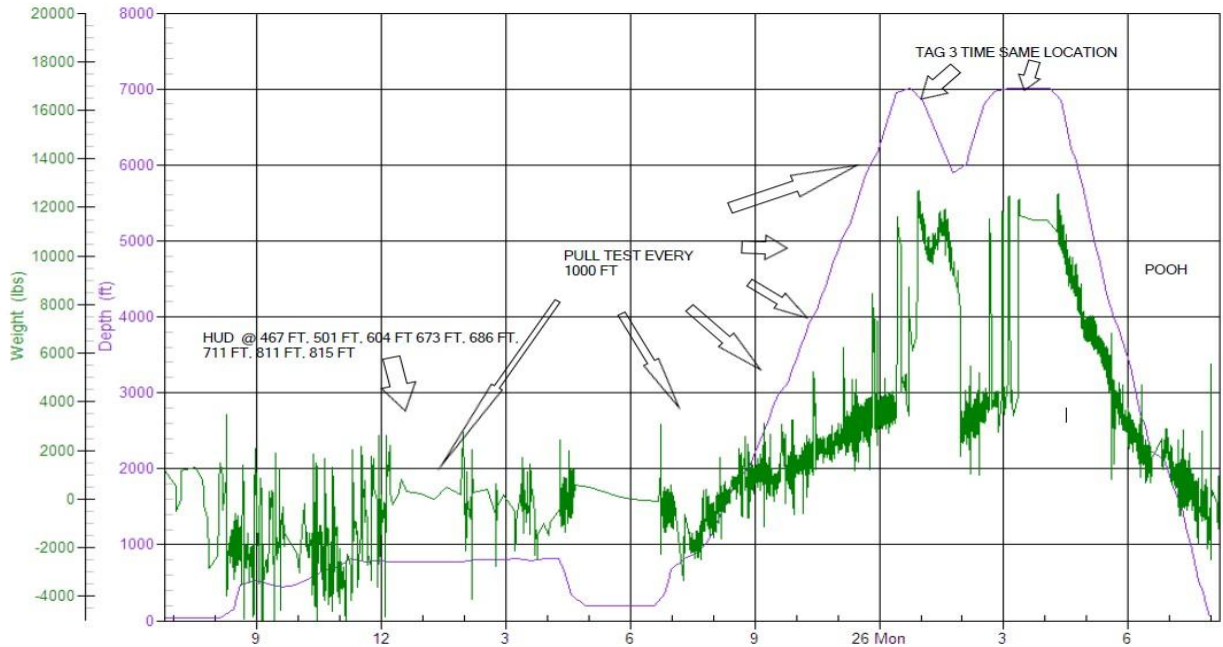


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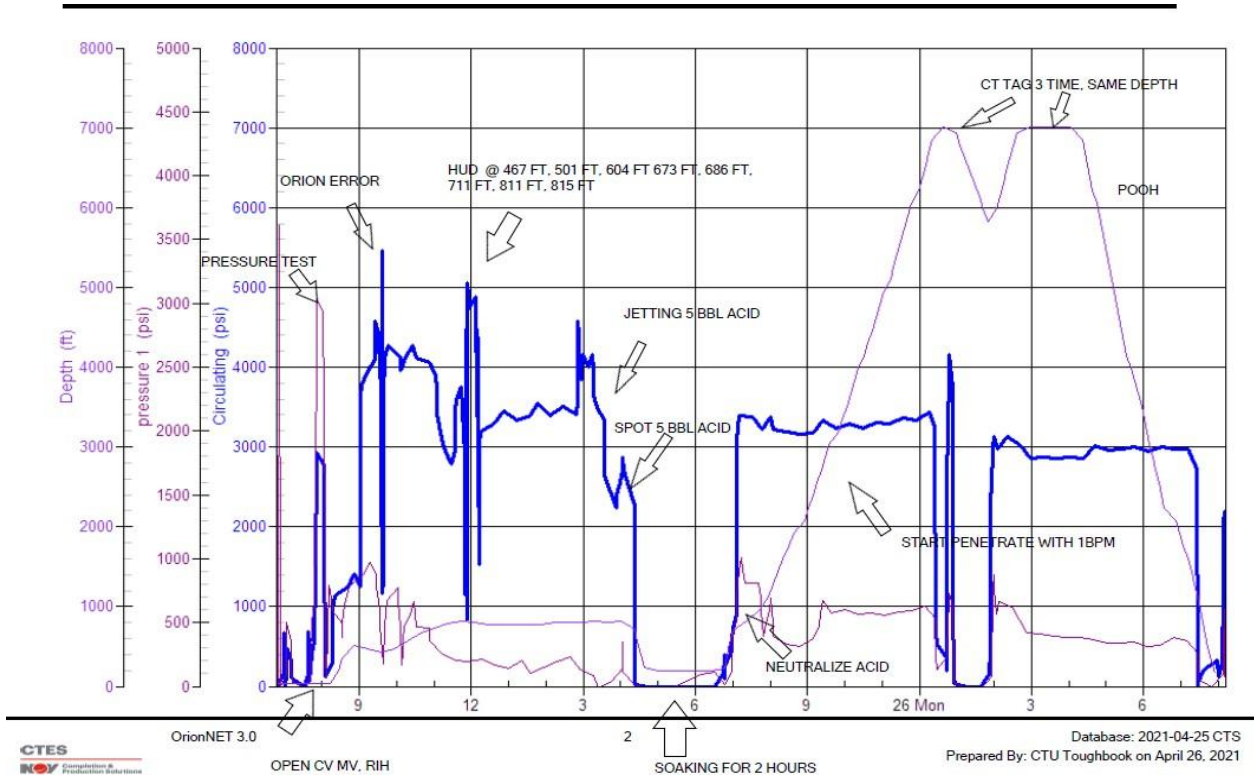
2

Database: 2021-04-25 CTS

Prepared By: CTU Toughbook on April 26, 2021

RIH

Graph 5 B02L RUN 4.1



Graph 6 B02L RUN 4.2

## 2.5 CT Run #5 Acid Soaking

Configuration BHA from upper to below for Run#5:

- 2-1/8-inch Coiled Tubing Connector (External Dimple Type)
- 2-1/8-inch Motor Head Assembly
- 2-1/8-inch 5 + 3 Straight Bar
- 2-1/8-inch 45 deg DownJet Nozzle

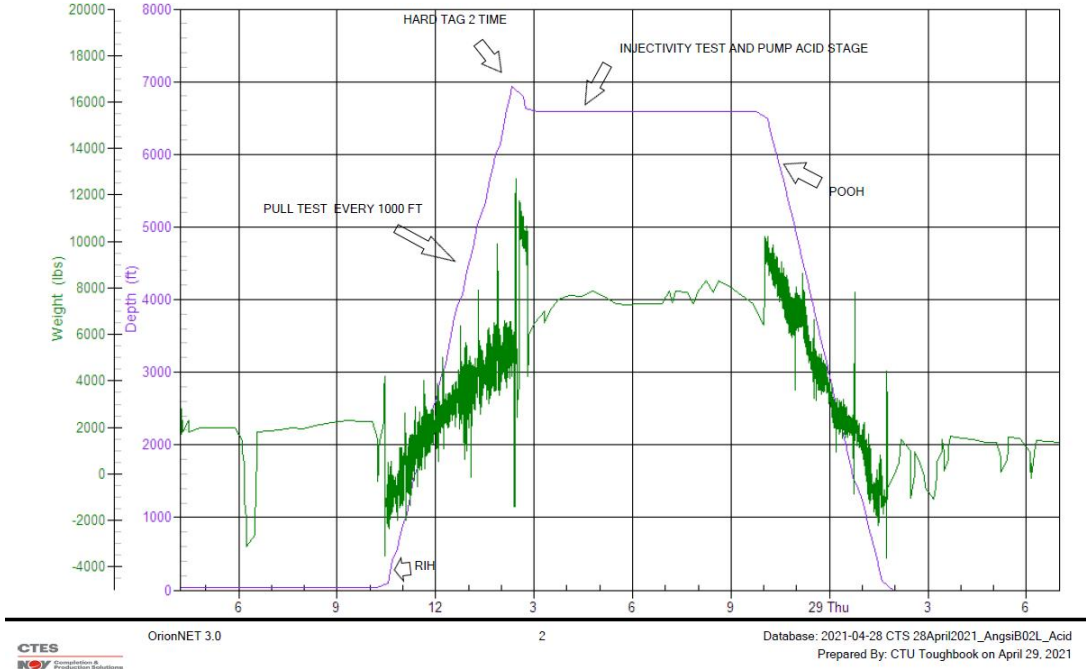
Summary for the run as per below:

1. Due to the calcite issue that potentially plug off the annulus area between perforation tunnel I-68 and the production tubing, 15% acid soaking were proposed.
2. First of all, 250 bbl of Fresh water were bunker from Boat, 200 bll for TFW and another 50 bbl for Acid mixing.
3. CT RIH to 6985-MDDF (EOT), after tag 2 time same depth, pickup CT to depth 6595 ft (SSD#3).
4. Gas return at surface, no solid water return, continue to fill up well until 140 bbl (1.5 x Completion volume).
5. After fill up, Injectivity test were performed, results as per table below;

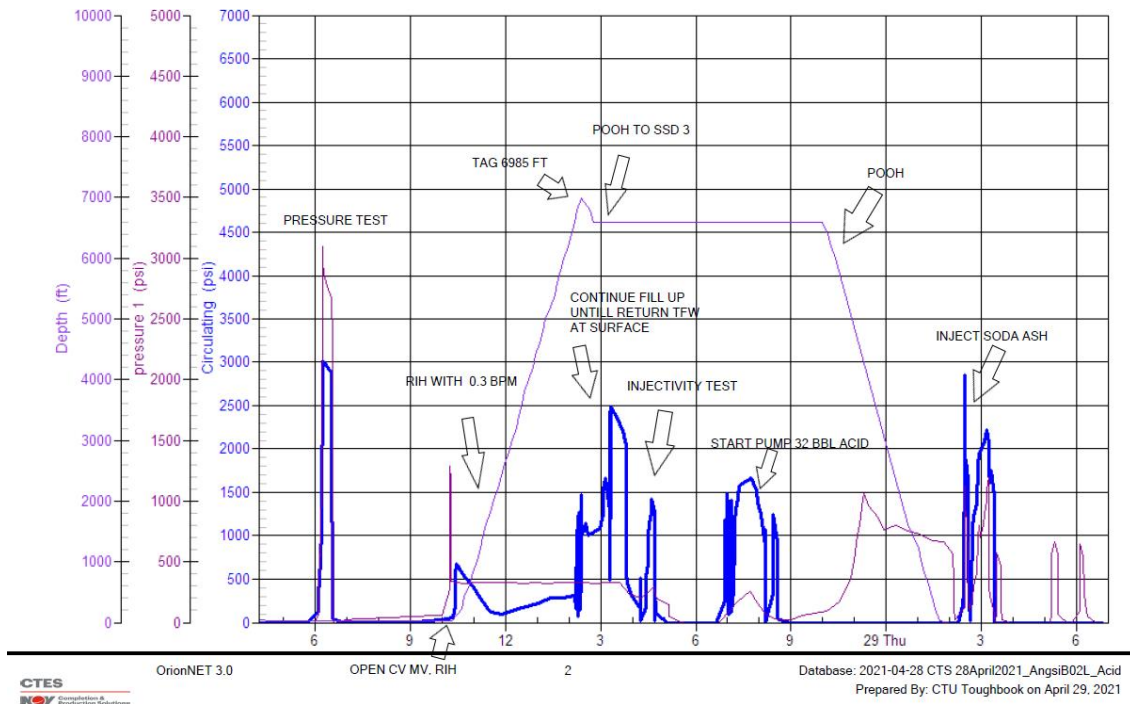
Rate, BPM	THP	PCP	Circulating
0.3	148	900	120
0.5	150	900	160
0.7	215	900	1100
0.8	275	900	1500

6. Start pump 32 bbl acid with return and wing valve line closed, soaking for 1 hour.
7. Production started flow the well and CT POOH to surface, continue monitor at sampling point.
8. Soda ash injected to the well when got pH reading less than 7.

9. After the temperature for the return sample start increase and stable around 60 deg C, with pH average around 7-8, stop monitor the well and handover the well to Geowell to set Insert Valve back.
10. Refer Flowback monitoring checklist in reference section.
11. Below is the graph for this run;

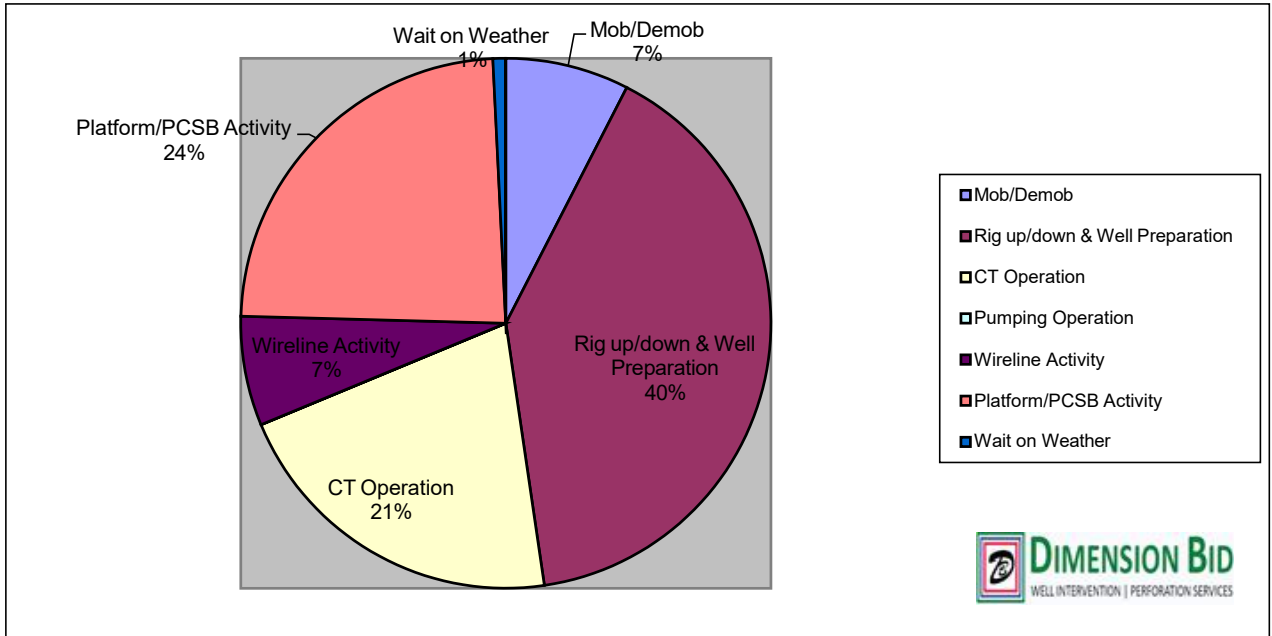


GRAPH 7B02L RUN 5.1





GRAPH 8 B02L RUN 5.2

### 3. Utilization Rate



Activity	Hours	Day
Mob/Demob	29	1:12
Rig up/down & Well Preparation	154:20	6:25
CT Operation	81:00	3:22
Pumping Operation	0	0
Wireline Activity	25:40	1:04
Wait on Weather	3:00	0:07
Platform/PCSB Activity	91:30	3:48
Downtime-DB	0	0
Downtime-Non DB	0	0
<b>Total</b>	<b>384:30</b>	<b>16:01</b>

 <b>DIMENSION BID</b> <small>WELL INTERVENTION   PERFORATION SERVICES</small>	DIMENSION BID COILED TUBING SERVICES		
	ANGSI B-02L	EOWR	

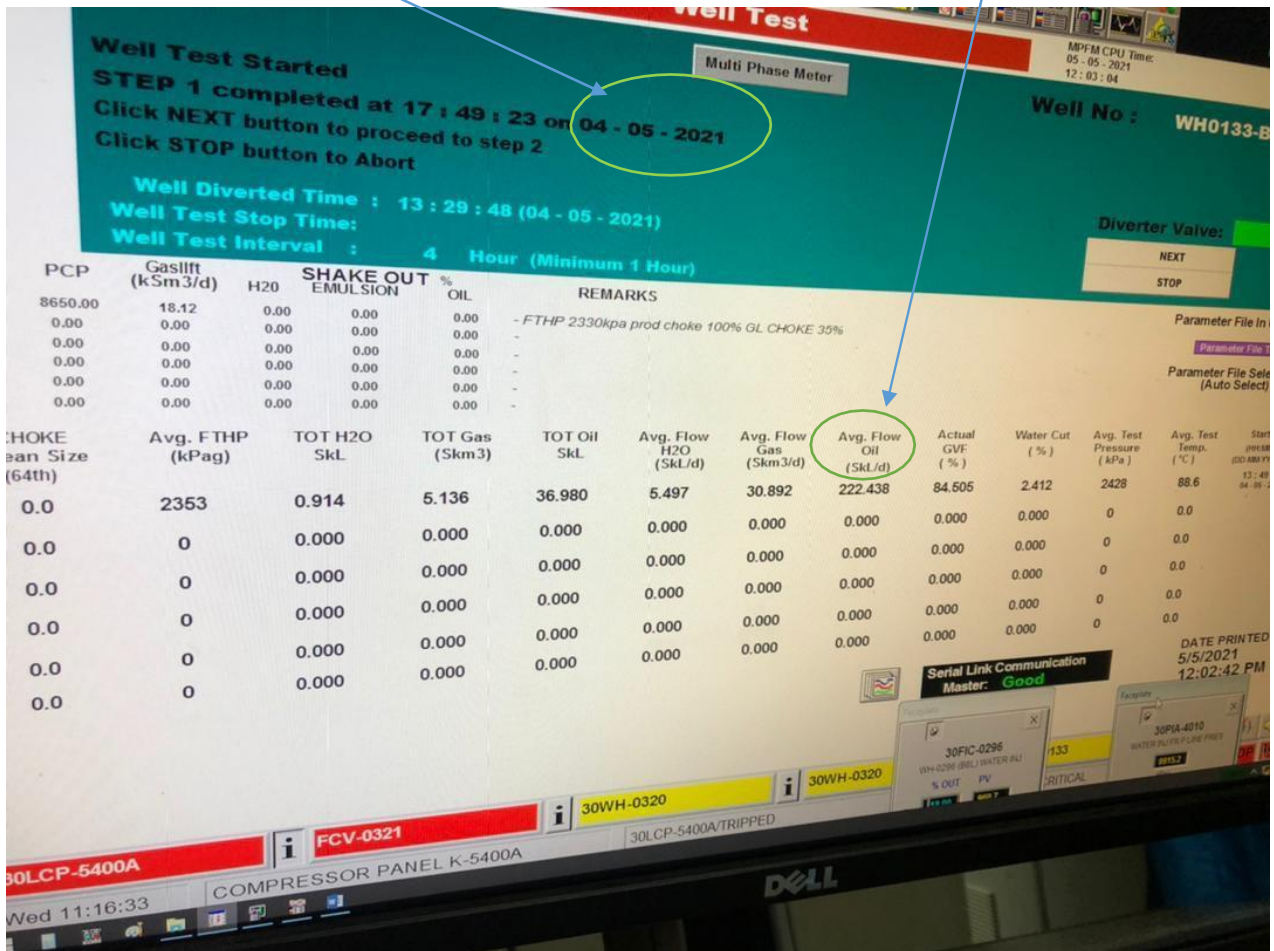
#### 4. Lessons Learned & Way forward

- 1) Contingency plan must be ready to execute during failed operation in order to reduce production lost time.
- 2) Reserve fresh water in a tank must be provided in case of emergency or failed operation. Otherwise, it will take long time to re-bunker from vessel.
- 3) Prepare 3" HP Hoses to bunker fresh water from Ship, as per discuss with Captain of Setia Qaseh, 2" Hoses is not suitable to be used due to low pressure rating and the connection for the spring hose sometimes open during bunker process.

## 5. Conclusion

The job was finally successful despite of challenges faced. Lessons learnt from the operation will be highlighted for future operation. Result from well test obtained for B02L show slightly increase in volume of oil.

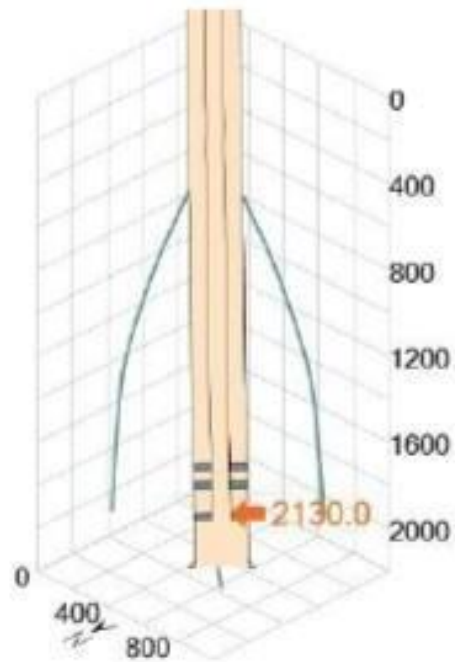
DATE	AVG FLOW WATER (skl/day)	AVG FLOW OIL (skl/day)
4/4/2021 (Last well test result before DB CT enter)	1.22	188
4/5/2021	5.497	222.438





## 6.2 Appendix B: Cerberus Analysis

### 6.2.1 Well Trajectory

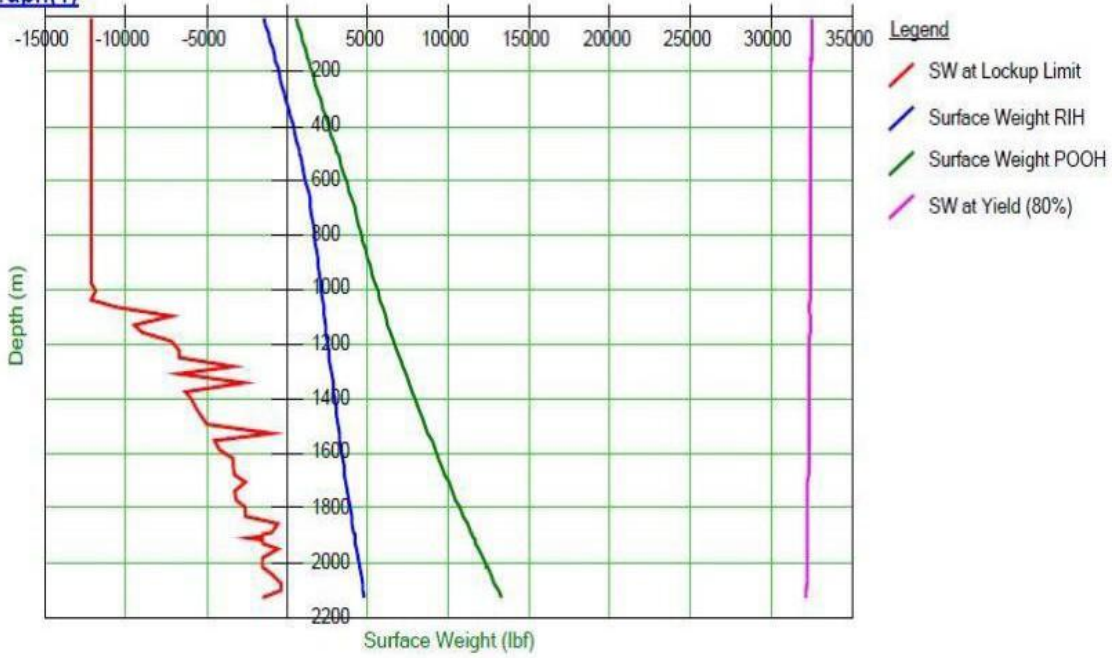


**Well name:** Angsi B-02L TFA  
**Total depth:** 2363.1 m  
**Max Inclination:** 47.9° at 1005.6 m  
**Max DLS:** 5.745 °/100ft at 185.0 m  
**Min ID:** 2.690 in at 2129.3 m  
**WHP:** 150 psi

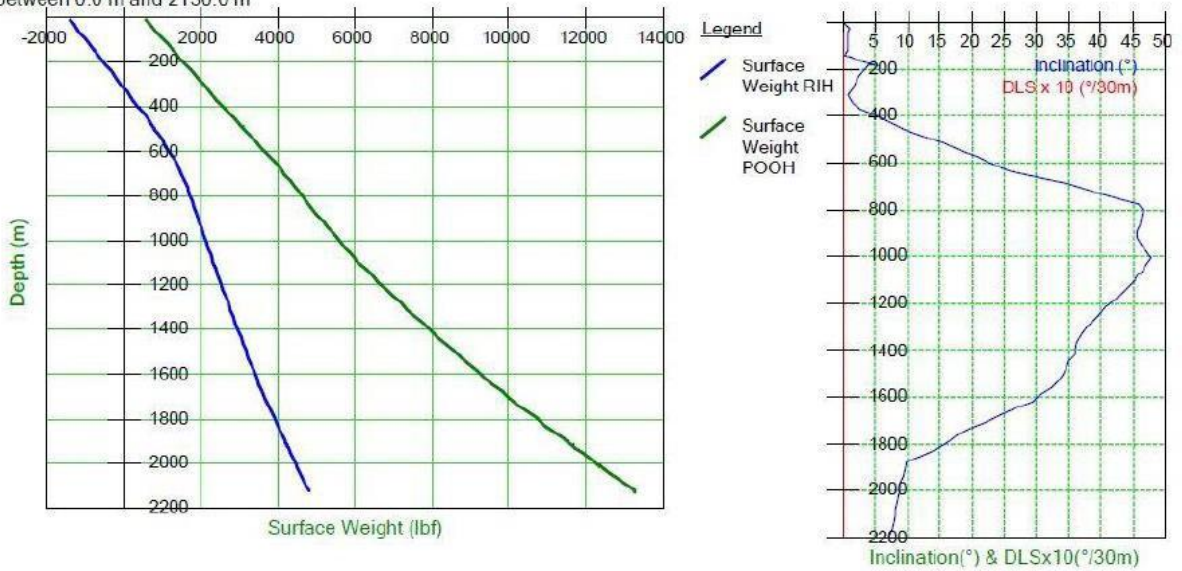


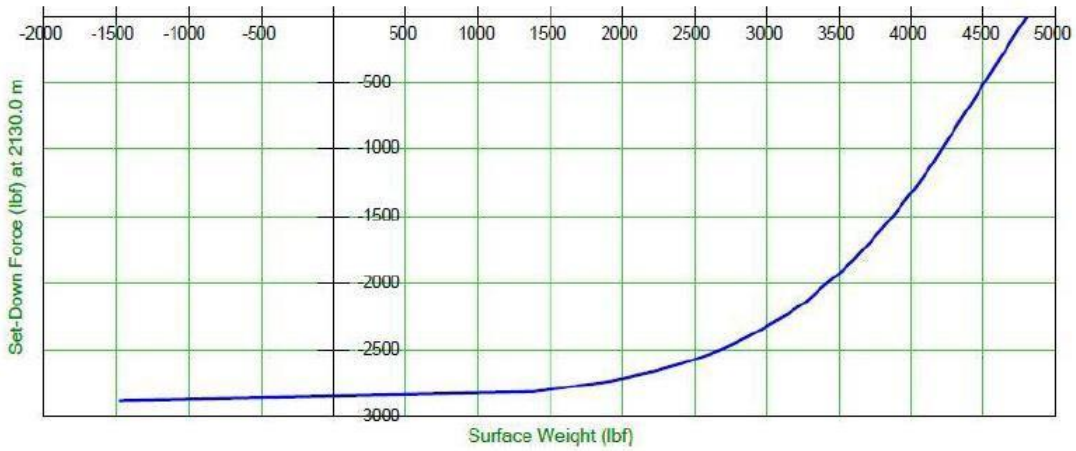
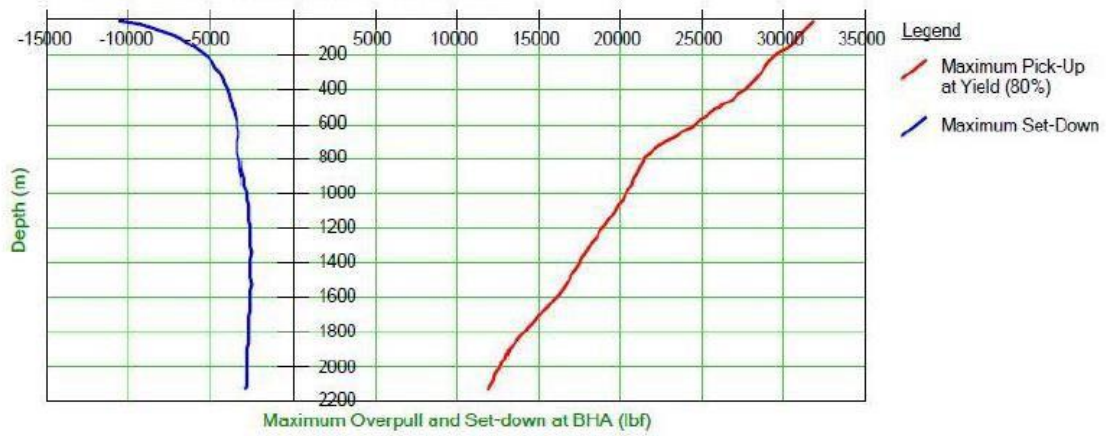
### 6.2.2 Orpheus Simulation (Tubing Forces)

Graph(1)



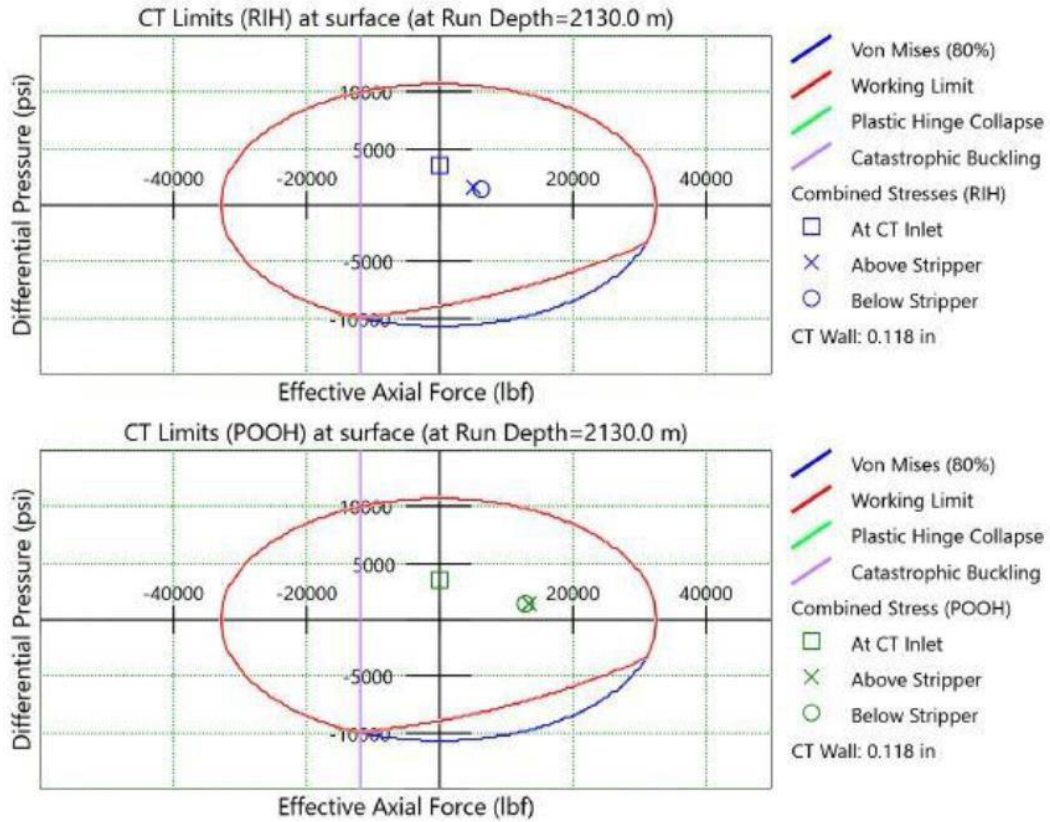
RIH and POQH  
between 0.0 m and 2130.0 m







### 6.2.3 Hercules Simulation (CT Limit)

#### CT Limits





### 6.3 Appendix C: BHA Diagram



#### 6.3.1 2-1/8" MultiJet Nozzle

 <b>DIMENSION BID</b> <small>WELL INTERVENTION   PERFORATION SERVICES</small>							
BHA DIAGRAM #1- 2-1/8" MultiJET Nozzle BHA							
Client	Petronas Carigali	Well	B-02L				
Field	Angsi Bravo	Min Restriction	2.69"				
Job Type	CT Sand Cleanout	BHP	2428 psia				
Job No.		BHT	245 Deg F				
BHA DRAWING	DESCRIPTION	CONNECTION		ID INCH	OD INCH	TOOL LENGTH FT	CUMULATIVE LENGTH FT
		UPHOLE	DOWNHOLE				
	External Dimple	1.5" CT	1.5" AMMT PIN		2.125	0.6	0.6
	MHA Disconnect drop ball 3/4" Shear pressure 5,456 psi	1.5" AMMT BOX	1.5" AMMT PIN		2.125	2.5	3.1
	Circulating drop ball 10/16" Shear pressure 2,520 psi Burst Disc 5000 psi						
	5 ft Straight Bar	1.5" AMMT BOX	1.5" AMMT PIN		2.125	5.0	8.1
	3 ft Straight Bar	1.5" AMMT BOX	1.5" AMMT PIN		2.125	3.00	11.1
	MultiJET Nozzle	1.5" AMMT BOX			2.125	0.8	11.9

### 6.3.2 2-1/8" MultiJet Nozzle c/w 2.75" OD FC BHA

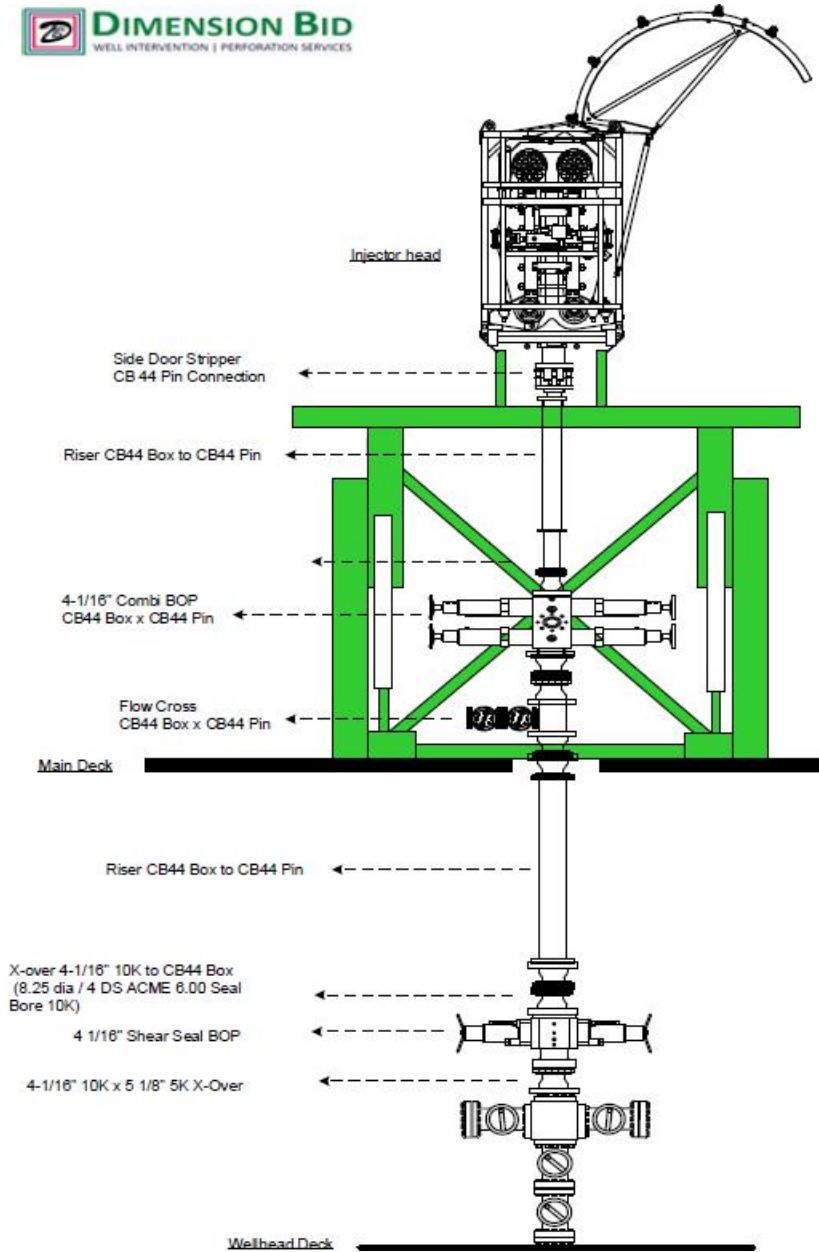
 <b style="font-size: 1.2em;">DIMENSION BID</b> <small>WELL INTERVENTION   PERFORATION SERVICES</small>							
BHA DIAGRAM #1- 2-1/8" MultiJET Nozzle c/w 2.75" OD FC BHA							
Client	Petronas Carigali	Well	B-02L				
Field	Angsi Bravo	Min Restriction	2.69"				
Job Type	CT Sand Cleanout	BHP	2428 psia				
Job No.		BHT	245 Deg F				
BHA DRAWING	DESCRIPTION	CONNECTION		ID	OD	TOOL LENGTH	CUMULATIVE LENGTH
		UPHOLE	DOWNHOLE				
	External Dimple	1.5" CT	1.5" AMMT PIN		2.125	0.6	0.6
	MHA Disconnect drop ball 3/4" Shear pressure 5,455 psi	1.5" AMMT BOX	1.5" AMMT PIN		2.125	2.5	3.1
	Circulating drop ball 10/16" Shear pressure 2,520 psi Burst Disc 5000 psi						
	5 ft Straight Bar	1.5" AMMT BOX	1.5" AMMT PIN		2.125	5.0	8.1
	3 ft Straight Bar	1.5" AMMT BOX	1.5" AMMT PIN		2.125	3.00	11.1
	2.75" ID Flute Centralizer	1.5" AMMT BOX	1.5" AMMT PIN		2.750	1.0	12.1
	MultiJET Nozzle	1.5" AMMT BOX			2.125	0.8	12.9

### 6.3.3 45 Deg Downjet Nozzle

 <b>DIMENSION BID</b> <small>WELL INTERVENTION   PERFORATION SERVICES</small>							
BHA DIAGRAM #1- 2-1/8" 45 Deg Downjet Nozzle BHA							
Client	Petronas Carigali	Well	B-02L				
Field	Angsi Bravo	Min Restriction	2.69"				
Job Type	CT Acid Soaking	BHP	2428 psia				
Job No.		BHT	245 Deg F				
BHA DRAWING	DESCRIPTION	CONNECTION		ID INCH	OD INCH	TOOL LENGTH FT	CUMULATIVE LENGTH FT
		UPHOLE	DOWNHOLE				
	External Dimple	1.5" CT	1.5" AMMT PIN		2.125	0.6	0.6
	MHA Disconnect drop ball 3/4" Shear pressure 5,456 psi	1.5" AMMT BOX	1.5" AMMT PIN		2.125	2.5	3.1
	Circulating drop ball 10/16" Shear pressure 2,520 psi Burst Disc 5000 psi						
	5 ft Straight Bar	1.5" AMMT BOX	1.5" AMMT PIN		2.125	5.0	8.1
	3 ft Straight Bar	1.5" AMMT BOX	1.5" AMMT PIN		2.125	3.00	11.1
	45 Deg Downjet Nozzle LOT 15-097-1-10652	1.5" AMMT BOX			2.125	0.8	11.9



## 6.4 Appendix D: Well Stack Configuration



### 6.5 Appendix E: Sand from 2<sup>nd</sup> and 3<sup>rd</sup> Run



*Figure 9 SAND RECOVERED FROM 1ST AND 2ND RUN*



*Figure 10 SAND RECOVERED FROM 3RD RUN*

## 6.6 Appendix F: Flowback Monitoring Checklist

1	<b>Monitoring Checklist</b>									
2										
3	<b>Field/Platform/Well</b>			<b>: B02L</b>						
4	<b>Engineer</b>			<b>: Muhammad Hafiz Bin Saharuddin</b>						
5										
6	<b>No.</b>	<b>Date</b>	<b>Time</b>	<b>Choke Size</b>	<b>pH.</b>	<b>% Water Cut</b>	<b>Bbl Counter</b>	<b>FLT (DegC)</b>	<b>FTHP (PSI)</b>	<b>Remark</b>
7	1	28/4/2021	23:45	100%	-			31.8	400	Gas
8	2	29/4/2021	0:00	100%	-			34.1	400	Gas
9	3	29/4/2021	0:15	100%	-			37.4	400	Gas
10	4	29/4/2021	0:30	100%	-			37.3	400	Gas
11	5	29/4/2021	0:45	100%	-			40	400	Gas
12	6	29/4/2021	1:00	100%	-			42.1	400	Gas
13	7	29/4/2021	1:15	100%	-			43.8	400	Gas
14	9	29/4/2021	1:30	100%	-			44.4	400	Gas
15	10	29/4/2021	1:45	100%	-			44.5	400	Gas
16	11	29/4/2021	2:00	100%	5			44.2	400	Gas + Fluid
17	12	29/4/2021	2:15	100%	-				400	Gas
18	13	29/4/2021	2:30	100%	4			44.5	400	Gas + Fluid
19	14	29/4/2021	2:45	100%	-				400	Gas
20	15	29/4/2021	3:00	100%	4			44.2	400	Gas + Fluid
21	16	29/4/2021	3:15	100%	-				400	Gas
22	17	29/4/2021	3:30	100%	7			42	400	Gas + Fluid
23	18	29/4/2021	3:45	100%	5			37.2	400	Gas + Fluid
24	19	29/4/2021	4:00	100%	5			39.2	400	Gas + Fluid
25	20	29/4/2021	4:30	100%	-			40.1	400	Gas + Fluid
26	21	29/4/2021	5:00	100%	4			40.1	400	Gas + Fluid
27	22	29/4/2021	5:30	100%	10			35.8	400	Gas + Fluid
28	23	29/4/2021	6:00	100%	6			40	400	Gas + Fluid
29	24	29/4/2021	6:30	100%	9			39.4	400	Gas + Fluid
30	25	29/4/2021	7:30	100%	3			45	400	Gas + Fluid
31	26	29/4/2021	7:45	100%	6			45	400	Gas + Fluid
32	27	29/4/2021	8:00	100%	7			52	400	Gas + Fluid
33	28	29/4/2021	8:30	100%	7			48	390	Gas + Fluid
34	29	29/4/2021	9:00	100%	7			51	390	Gas + Fluid
35	30	29/4/2021	9:30	100%	8			55	390	Gas + Fluid
36	31	29/4/2021	10:00	100%	5			60	390	Gas + Fluid
37	32	29/4/2021	10:30	100%	5			62	390	Gas + Fluid



**DIMENSION BID**  
WELL INTERVENTION | PERFORATION SERVICES

DIMENSION BID  
COILED TUBING SERVICES

ANGSI B-02L

EOWR



38	33	29/4/2021	11:00	100%	5			61	390	Gas + Fluid
39	34	29/4/2021	11:30	100%	6			62	390	Gas + Fluid
40	35	29/4/2021	12:00	100%	6			58	390	Gas + Fluid
41	36	29/4/2021	12:30	100%	8			57	390	Gas + Fluid
42	37	29/4/2021	13:00	100%	8			56	390	Gas + Fluid
43	38	29/4/2021	13:30	100%	6			62	390	Gas + Fluid
44	39	29/4/2021	14:00	100%	6			64	390	Gas + Fluid
45	40	29/4/2021	14:30	100%	6			62	390	Gas + Fluid
46	41	29/4/2021	15:00	100%	6			62	390	Gas + Fluid
47	42	29/4/2021	15:30	100%	6			62	390	Gas + Fluid
48	43	29/4/2021	16:00	100%	6			60	400	Gas + Fluid
49	44	29/4/2021	16:30	100%						
50	45	29/4/2021	17:00	100%	7			62	400	Gas + Fluid
51	46	29/4/2021	17:30	100%						
52	47	29/4/2021	18:00	100%	7			63	400	Gas + Fluid
53	48	29/4/2021	20:00	100%	8			64.1	400	Gas + Fluid
54	49	29/4/2021	21:00	100%	7			63.2	400	Gas + Fluid
55	50	29/4/2021	22:00	100%	8			64.5	400	Gas + Fluid
56	51	29/4/2021	23:00	100%	9			64.4	400	Gas + Fluid
57	52	30/4/2021	0:00	100%	9			64.2	400	Gas + Fluid
58	53	30/4/2021	1:00	100%	9			64.4	400	Gas + Fluid
59	54	30/4/2021	2:00	100%	8			64.2	400	Gas + Fluid
60	55	30/4/2021	3:00	100%	9			64.3	400	Gas + Fluid
61	56	30/4/2021	4:00	100%	8			64.4	400	Gas + Fluid
62	57	30/4/2021	5:00	100%	9			64.4	400	Gas + Fluid
63	58	30/4/2021	6:00	100%	8			64.4	400	Gas + Fluid
64	59									
65	60									
66										

### 6.7 Appendix G: Return Sample with temperature Graph

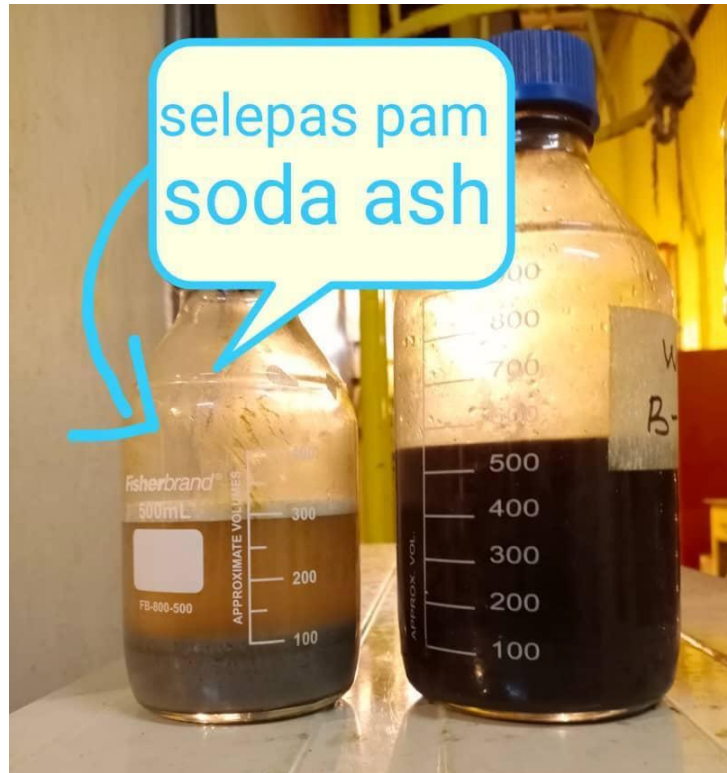


Figure 11 RETURN SAMPLE

RETURN SAMPLE  
TEMPERATURE, 40 DEG C

RETURN SAMPLE  
TEMPERATURE, 60 DEG C



GRAPH 12 GRAPH FOR RETURN SAMPLE TEMPERATURE