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IBDP VW1 Recompletion

September 19, 2017

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VW1 Recompletion

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- Timing & Resources
- Cost
- Current Status
- Remaining issues

VW1 Recompletion – Timing & Resources

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- Concept Approval – Dec. 15, 2016
- Well Field Work – Apr. 30, 2017 through Jun. 15, 2017
  - Wireline – Fishing, Logging and Perforating
  - Completion Rig – Cementing, Drilling and Tubing Run-in
  - Specialist Consultants – Engineering, Wellhead, Tools
- Data Acquisition – Baker and WellWatcher* permanent monitoring systems
- Baseline Logging and Sampling – September 2017
- Finalize Baker installation – 4Q 2017

VW1 Recompletion – Concept Approval

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- Options evaluated
  - Commenced in 2015
  - Cost and effectiveness compared
    - IntelliZone* family of multizonal management systems
    - Westbay Systems
    - New wells
    - Baker Intelligent Completion
- Presented to partners and DOE – 4Q 2016
- Baker installation approved by ISGS

VW1 Recompletion – Well Field Work

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- Westbay final sampling and fishing
- Westbay packer deflation (28 packers)
- Removal of Westbay
- Cement Westbay perforations and drill out plugs
- Prepare well for Baker installation
  - Mechanical Integrity Test (MIT) Log
  - Perforate and swab
- Install Baker Intelligent Completion
- MIT completion after Reactive Element Packers swelled

VW1 Recompletion – Well Field Work

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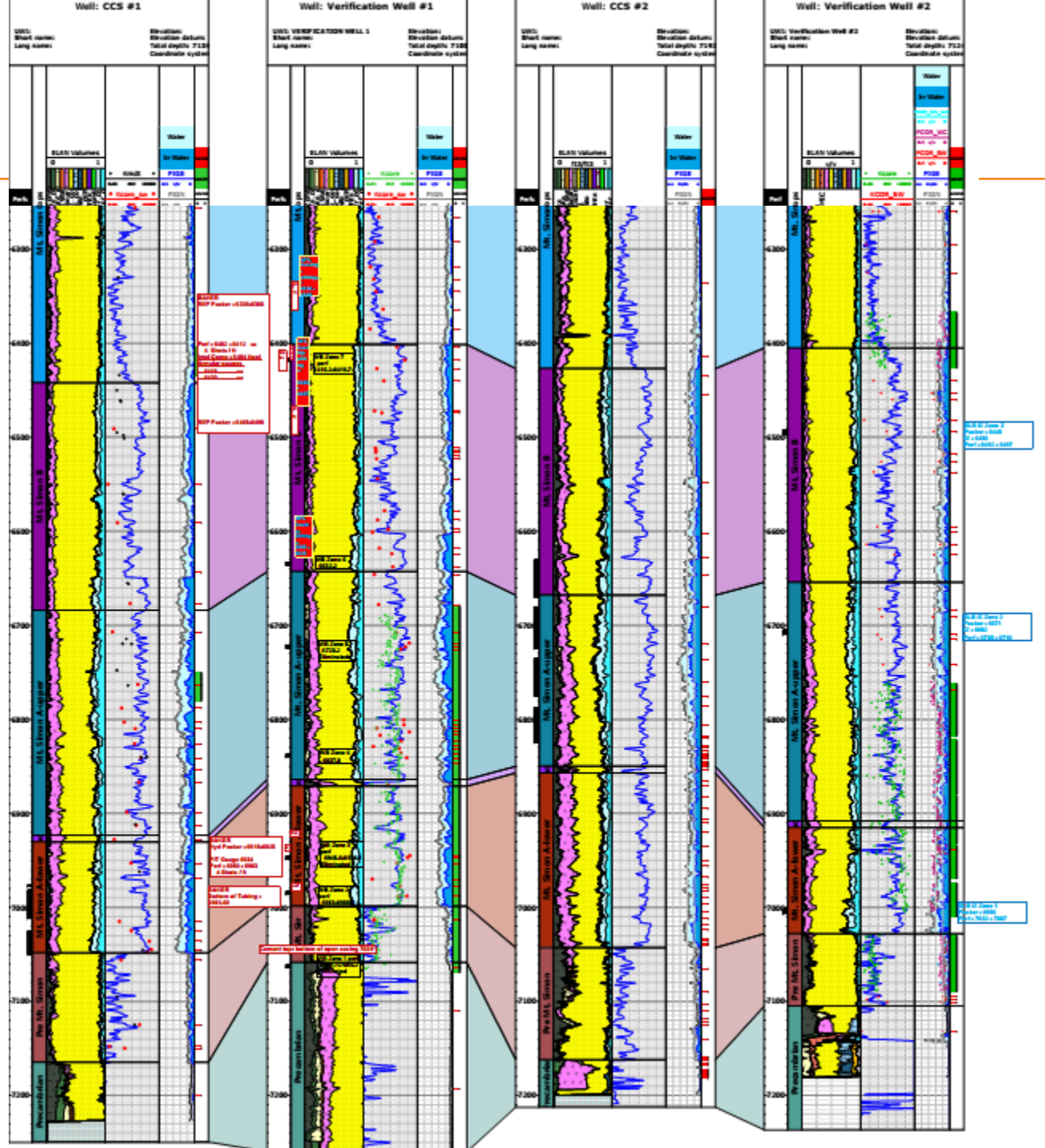
	VW1 Recompletion 2017	FINAL SUMMARY
	Date	Description of activity
0	Previous Activity	Westbay Travel; Baker 1st Bill; Louden; chrome casing
1	Sunday, April 30, 2017	WB Equipment Maintenance and Prep; Shoed in Probes
2	Monday, May 01, 2017	Set up and retrieve MOSDAX transducer string
3	Tuesday, May 02, 2017	Set up and do sampling - 2 sample trips
4	Wednesday, May 03, 2017	More sampling – 2 more sample trips
5	Thursday, May 04, 2017	More sampling – Unsuccessful
6	Friday, May 05, 2017	Began fishing for lost probe (Dec 2012) - unsuccessful
7	Saturday, May 06, 2017	Continued fishing for lost probe - successful; pullrd plug from bottom
8	Sunday, May 07, 2017	Began packer deflation attempts with Westbay tool
9	Monday, May 08, 2017	Continued Westbay packer deflation attempts; logged well with SLB slickline
10	Tuesday, May 09, 2017	Perforated one packer (P1) with SLB slickline; telemetry problems
11	Wednesday, May 10, 2017	Continued slickline perforation operation (P2.21.22.9)
12	Thursday, May 11, 2017	Continued slickline perforation operation (P12,14,15,16,17,19,20,13,10,11)
13	Friday, May 12, 2017	Continued slickline perforation operation ; Rig arrives; CWOP
14	Saturday, May 13, 2017	Continued slickline perforation operation (P3,4)
15	Sunday, May 14, 2017	Finished slickline perforation operation (P5,6,7,8,18,23,24,25,26,27,28)
16	Monday, May 15, 2017	Prep'd well to pull westbay; first attempt unsuccessful; circulated well fluid
17	Tuesday, May 16, 2017	Pulled tubing to top of Westbay tubing
18	Wednesday, May 17, 2017	Finished pulling Westbay tubing
19	Thursday, May 18, 2017	Cemented across WB Zones 1,2,3,4
20	Friday, May 19, 2017	Cemented across Z 5,6,7 then 8,9 then 10,11
21	Saturday, May 20, 2017	Pick up 4 ¾ bit and drilled through plugs to 4740'
22	Sunday, May 21, 2017	Drilled through plugs to 5570
23	Monday, May 22, 2017	Drilled through plugs to 6425; replaced bit
24	Tuesday, May 23, 2017	Drilled through plugs to 6647
25	Wednesday, May 24, 2017	Drilled through plugs to 7040 (new TD)
26	Thursday, May 25, 2017	Bit & Scraper run in Well; Logged PMIT and USIT
27	Friday, May 26, 2017	MEMORIAL DAY WEEKEND
28	Saturday, May 27, 2017	MEMORIAL DAY WEEKEND
29	Sunday, May 28, 2017	MEMORIAL DAY WEEKEND
30	Monday, May 29, 2017	MEMORIAL DAY WEEKEND;
31	Tuesday, May 30, 2017	MEMORIAL DAY WEEKEND;
32	Wednesday, May 31, 2017	Replace wellhead; test cemented zones
33	Thursday, June 01, 2017	Perforate Z-1 (6980 - 6983) & Z-2 (6402 - 6412)
34	Friday, June 02, 2017	Swabbed until native chemistry achieved; overbalanced the well to kill
35	Saturday, June 03, 2017	Circulated to clean sand flow from lower perf
36	Sunday, June 04, 2017	Perforate Z-3 (4964 - 4980); Swabbed until native chemistry achieved
37	Monday, June 05, 2017	Baker arrives and prep's equipment; Tubing set on racks; prep for installation
38	Tuesday, June 06, 2017	Final prep for running Baker; Casing Crew, Baker, rig, B&B, Target on site
39	Wednesday, June 07, 2017	Run Baker IC to first lowest (#1)REP; began splicing lower Gauge and sleeve; tubing bill
40	Thursday, June 08, 2017	Run Baker IC; Finished splice on first sleeve; Run Baker IC to #3 REP; Baker 2nd bill
41	Friday, June 09, 2017	Run Baker IC to top gauges and all chrome tubing
42	Saturday, June 10, 2017	Finish Baker IC. Logged well
43	Sunday, June 11, 2017	Land tubing and pull control lines through well head. Install upper well ahead. Monitor pressures at zones and confirm hydraulic isolation; rig down
44	Monday, June 12, 2017	Rig demobe; Baker swellable packers expand; monitor gauges; site final wrap up
45	Tuesday, June 13, 2017	Baker swellable packers expand; monitor gauges; site final wrap up
46	Wednesday, June 14, 2017	Baker swellable packers expand; monitor gauges; site final wrap up
47	Thursday, June 15, 2017	Baker swellable packers expand ; MIT VW1
	Future	final Beckman bills
	Wednesday, August 02, 2017	Baker and ADM gauges to WellWatcher Connect
	Future	Purchase and install permanent Baker Sliding Sleeve control unit
	Future	Other
	Future	PNX Baseline
	Future	Sampling Baker Zones 2 & 3

VW1 Recompletion
All Wells ELAN



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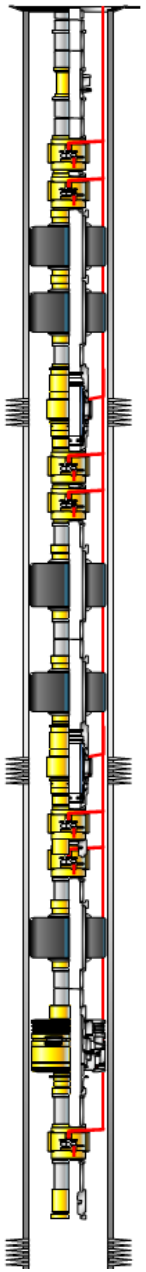
VW1 Recompletion
Baker Intelligent Completion

Operator:	Loudon Tech Services
Field, Block, Lease, Well:	Wild Cat N/A-Pending, ADM, Verification Well #1
Customer Representative	Jim Kirksey, 304-545-2370, Jkirksey1@loudontechsvcs.com
Baker Hughes Field Rep:	Justin Boone
BHI District Info:	Broussard Supercenter
Casing/Tubing:	Casing 5.5" 17# Tubing 2-7/8" 6.5# 13cr 110 Vam Top Tubing 2-7/8" 6.4# L-80 EUE 8rd



Schematic	No	Description	Serial No	ID	OD	Length	Depth
		Orignal Elevation				5	
	1	**B&B Tubing Hanger w/2-7/8" 8rd top and**		2.441	10.600	0.75	5
		Bottom thread Type W/2.5" Type "H" BPV					5.75
		2 7/8" 6.5# P-110 EU8rd Pup Jt		2.441	2.875	18.15	5.75
		2 7/8" 6.5# EU8rd L-80 Tubing (37jts)		2.441	2.875	1212.42	23.9
		X-over 2-7/8 8rd pin X 2-7/8 VamTop bx		2.441	3.663	0.71	1236.32
		Welded Lug Injection Mandrel		2.441	3.920	4.01	1237.03
		X-over 2-7/8 VT pin X 2-7/8 8rd bx		2.441	3.250	0.73	1241.04
		2 7/8" 6.5# EU8rd L-80 Tubing (96jts)		2.441	2.875	3145.36	1241.77
		X-over 2-7/8 VamTop pin X 2-7/8 Eu 8rd bx		2.441	3.670	0.65	4387.13
		2 7/8" 6.4# 13cr110 VamTop Tubing (12jts)		2.441	2.875	378.07	4387.78
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	8.3	4765.85
	2	**J-2 CLPG Guage carrier (Tubing)**	8928856040	2.441	4.700	0.71	4774.15
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	5.49	4774.86
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	8.07	4780.35
	3	**J-2 CLPG Guage carrier (annular)**	8928856040	2.441	4.700	0.71	4788.42
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	5.69	4789.13
		2 7/8" 6.4# 13cr110 VamTop Tubing (1 jts)		2.441	2.875	30.6	4794.82
	4	**Baker Reactive Packer 2 7/8" Vam top 13cr 80-**		2.441	4.520	30	4825.42
		W 4- Control Line by-pass slots					4855.42
	5	**Baker Reactive Packer 2 7/8" Vam top 13cr 80-**		2.441	4.520	30	4855.42
		W 4- Control Line by-pass slots					4885.42
		2 7/8" 6.4# 13cr110 VamTop Tubing (1 jts)		2.441	2.875	31.61	4885.42
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	6.69	4917.03
	6	**Baker HCM w 2.313 BX profile -**	8928856040	2.313	2.313	5.45	4923.72
		2 7/8 6.4# Vam Top 13cr80					4929.17
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	1.93	4929.17
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	4.04	4931.1
	7	**J-2 CLPG Guage carrier (annular)**	8928856040	2.441	4.700	0.71	4935.14
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	5.71	4935.85
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	4.31	4941.56
	8	**J-2 CLPG Guage carrier (annular)**	8928856040	2.441	4.700	0.71	4945.87
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	5.7	4946.58
		2 7/8" 6.4# 13cr110 VamTop Tubing (3 jts)		2.441	2.875	94.86	4952.28
	9	**Baker Reactive Packer 2 7/8" Vam top 13cr 80-**		2.441	4.520	30	5047.14
		W 3- Control Line by-pass slots					5077.14
		2 7/8" 6.4# 13cr110 VamTop Tubing (40 jts)		2.441	2.875	1259.22	5077.14
	10	**Baker Reactive Packer 2 7/8" Vam top 13cr 80-**		2.441	4.520	30	6336.36
		W 3- Control Line by-pass slots					6366.36
		2 7/8" 6.4# 13cr110 VamTop Tubing (1 jts)		2.441	2.875	31.36	6366.36
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	6.71	6397.72
	11	**Baker HCM w 2.313 BX profile -**	105986689	2.313	2.313	5.45	6404.43
		2 7/8 6.4# Vam Top 13cr80					6409.88
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	2.3	6409.88
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	5.96	6412.18
	12	**J-2 CLPG Guage carrier (annular)**	8928856040	2.441	4.700	0.71	6418.14
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	5.44	6418.85
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	6.09	6424.29
	13	**J-2 CLPG Guage carrier (annular)**	8928856040	2.441	4.700	0.71	6430.38
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	5.51	6431.09
		2 7/8" 6.4# 13cr110 VamTop Tubing (1 jts)		2.441	2.875	31.6	6436.6
	14	**Baker Reactive Packer 2 7/8" Vam top 13cr 80-**		2.441	4.520	30	6468.2
		W 1- Control Line by-pass slot					6498.2
		2 7/8" 6.4# 13cr110 VamTop Tubing (13 jts)		2.441	2.875	409.07	6498.2
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	6.04	6907.27
		X-over 2-7/8 VamTop pin X 2-3/8 Eu 8rd bx		1.995	3.250	0.85	6913.31
		2 3/8" 4.7# 13cr80 EU 8rd Pup Jt		1.995	2.875	4.13	6914.16
	15	**450-237 HS packer 13cr80 w/TEC feed thru**	106018599-01	1.730	4.500	7.54	6918.29
		90-80-90HD Nitrile P.E 2 3/8 Eu 8rd BxP					6925.83
		2 3/8" 4.7# 13cr80 EU 8rd Pup Jt		1.995	2.875	3.71	6925.83
		X-over 2-3/8 Eu 8rd bx x 2-7/8 VamTop pin		2.441	2.875	0.79	6929.54
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	4.3	6930.33
	16	**J-2 CLPG Guage carrier (annular)**	8928856040	2.441	4.700	0.71	6934.63
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	4.68	6935.34
		2 7/8" 6.4# 13cr110 VamTop Tubing (1 jts)		2.441	2.875	31.63	6940.02
		2 7/8" 6.4# 13cr80 VamTop Pup Jt		2.441	2.875	8.32	6971.65
	17	**1.71 "R" Nipple w/2 7/8" 6.4# 13cr 80 Vam Top**	8950068010	1.710	3.250	1.22	6979.97
		WLEG w/ 2 7/8" 6.4# 13cr80 VamTop	4508950068	2.441	3.250	0.5	6981.19
		End of assembly					**6981.69**

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VW1 Recompletion – Baker Intelligent Completion

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Gauge Mandrels

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Bottom Gauge and
Hydraulic Packer Assembly

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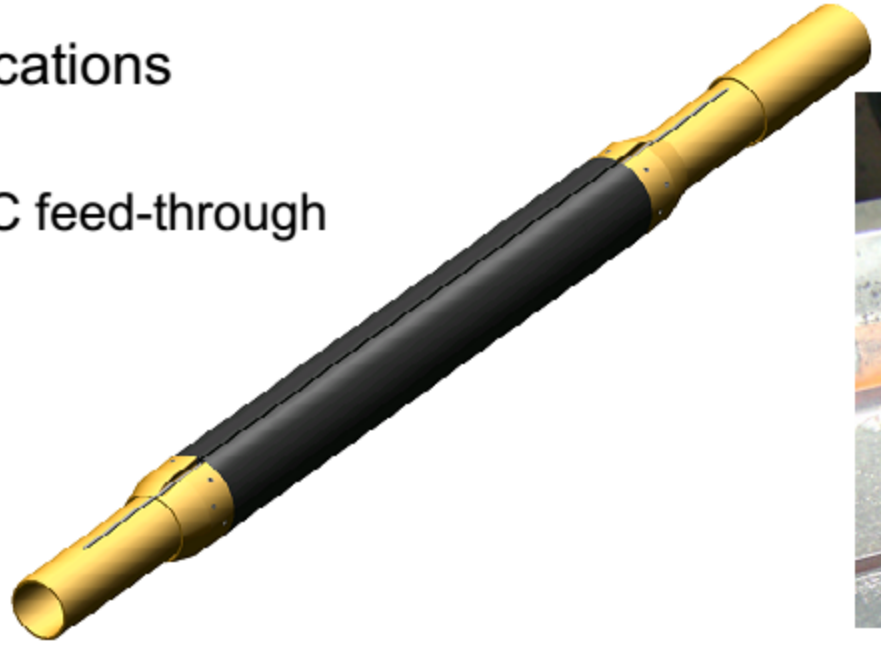
Reactive Element Packer (REPacker)

- Job-specific applications
  - Control line / TEC feed-through
    - Slot through



Thermal Cutter

VW1 Recompletion – Baker Intelligent Completion

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Reactive Element
Packer Prep

VW1 Recompletion
Baker Intelligent Completion

HCM-Plus Hydraulic Sliding Sleeve

Baker Hughes intelligent well systems flow control valves

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The Baker Hughes InForce HCM™-Plus downhole valve provides remote and reliable isolation of a specific interval. It reduces costs and minimizes production downtime by allowing production or injection from the wellbore to be altered without intervention from the surface. This product is compatible with oil- or water-base control fluids.

The hydraulically balanced piston yields high shifting forces to overcome scale and debris, and it requires two control lines per HCM-Plus valve. A third port is included on the valve as part of the closed line circuit. This port reduces the number of lines required to operate a mulitizone system.

Hydraulic pressure applied from the surface shifts the HCM-Plus valve to the open or close position. If a hydraulic operation cannot be performed, the HCM-Plus valve has an integral shifting profile for mechanical operation.

The Baker Hughes testable control line jam nut fittings are some of the most widely used hydraulic connectors available in the market.

Applications

- Multiple zone production or injection wells requiring remote operations to isolate a specific zone when choking is not required

Benefits

- Intervention not required to open or close the valve
- Cost-effective, remote valve operation
- Reliable, simple design with proven technology and built-in flexibility

Features

- Balanced piston design to open and close the valve at deep setting depths
- Simple surface procedures for valve actuation
- Non-elastomeric sealing technology isolated during flowing operations for high-performance sealing from tubing to annulus
- Testable control line jam nut fittings
- Control line bypass allows multiple valves, sensors, or chemical injection valves to be run as part of an intelligent well system
- Internal profiles allow placement of flow control devices
- Integral profile for secondary mechanical shifting
- Water- or oil-base control line fluid compatible

VW1 Recompletion – Baker Intelligent Completion

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Sliding Sleeve Assembly

VW1 Recompletion – Cost

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- Initial estimate $1.89 Million
- Sensitivities
  - High risk - $2.5 Million
  - Low risk - $1.75 Million
- Current Estimate - $2.3 Million
  - Baseline Pulsed Neutron eXtreme (PNX) Log
  - Additional logging for WestBay packer locations
  - New chrome and steel tubing for entire string
  - New negotiated overhead rates

VW1 Recompletion – Current Status

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- Baseline sampling and PNX logging completed
- Data acquisition connected to WellWatcher
- VW1 is actively collecting data as planned

VW1 Recompletion – Remaining Issues

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- Final funding forthcoming
- Baker hydraulic sliding sleeve control unit to be installed
- Scheduled sampling and logging for compliance and research

Baker Hydraulic Control Unit

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More to come