Bonnett's Energy Corp.

Benefits of Bottomhole Chokes

Date – 2021
Contact – Ron Potts - Operations Manager
Bonnett's Wireline

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Service Offerings






BONNETT'S ENERGY CORP.

Wireline Services	Production Services	Stimulation Services
BONNETTS Wireline	SILVERLINE Swabbing	BOREAL Pumping
REDNECKZ Wireline		
BOREAL E-line		
BONNETTS Well-Intel		

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Geographical Coverage






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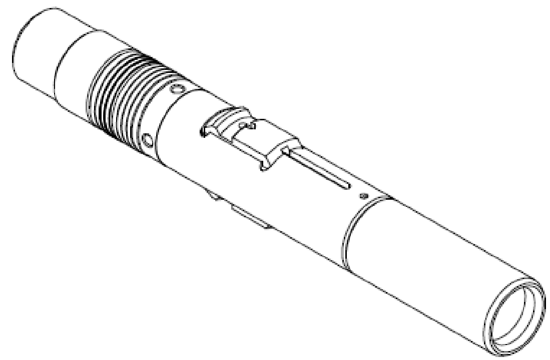
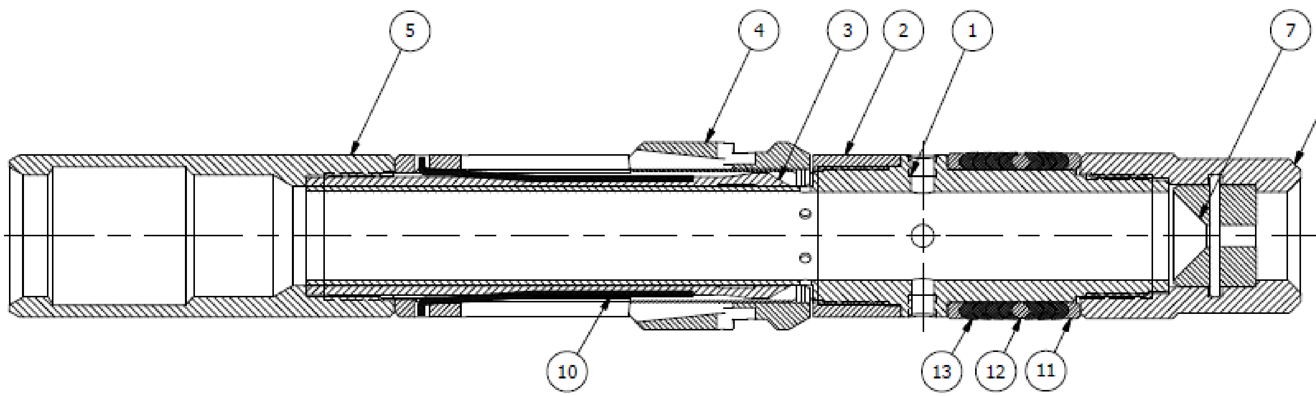
Downhole AX Choke

PARTS LIST				
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
1	1	08-02-X-200-06	Packing Mandrel	As REQ
2	1	08-02-X-200-03	Key Retainer	As REQ
3	1	08-02-X-200-02	Expander Sleeve	As REQ
4	2	08-02-X-200-04	Key	As REQ
5	1	08-02-X-200-01	Fishneck	As REQ
6	1	09-02-XC-200-01	Cap	As REQ
7	1	09-02-XC-200-02	Choke	As REQ
14	1	Parker (External) No. 2-216	O-Ring Face Seal Glands (External)	Rubber
10	2	08-02-X-200-05	Key Spring	As REQ
11	2	08-02-BUR-187-01	Female Back Up Ring	As REQ
12	1	08-02-BUR-187-02	Male Back Up Ring	As REQ
13	7	08-02-VP-187-01	'V' PACKING	As REQ





Choke Beans

Optional Choke Parts






Boronized Packing Mandrel

Diffuser Boronized

Recorder Hanger

Debris Screen

Choke Cap

Reasons to Run a Choke

- The need to manage flow rates
- Initial start up
    - Hydrate prevention
    - Reservoir drawdown (water drive etc.)
    - Gathering system capacity - third party restrictions
- Capital cost savings
- Reduced testing issues
- Liquid loading issues.






Initial Start-up






- Downhole chokes eliminate large pressure drops at surface
- Lower pressures reduces hydrate formation temperature
- Flowing temperature generally increases to further help with hydrate issues
- Eliminated pressure drop at surface reduces methanol requirements
- Packered wells are especially prone to tubing hydrates. They generally flow colder due to thermal conductivity of annular fluid which is augmented due to low velocities
- Chemical cost reductions have been significant in the Montney – Chokes in the tie back strings

Capital Cost Savings

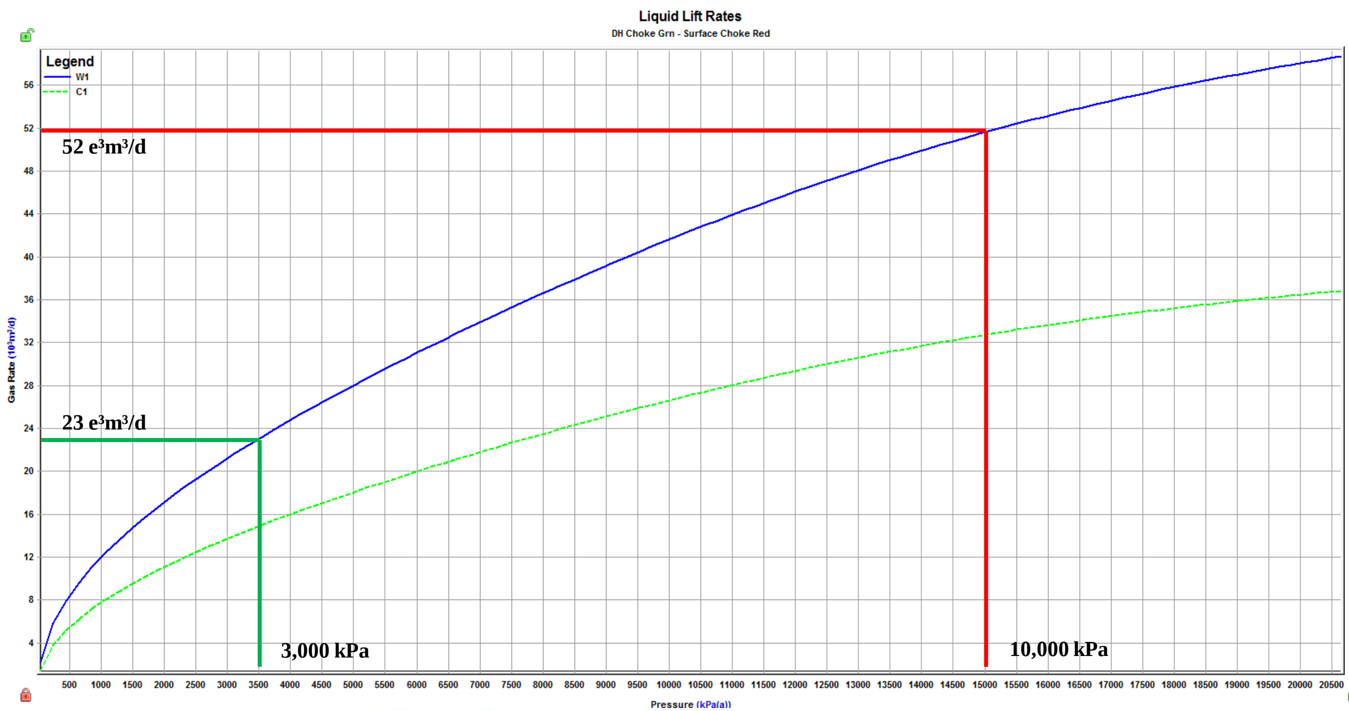
- Elimination of line heaters - $150K + initial investment
- A lot of line heaters are not fired after the first few months
- Cost of pipes valves etc. to relocate is still higher than the choke option
- Initial choke installation – +/- $7000
- Subsequent changes – under $5K – several changes may be needed depending on decline

Reduced Testing Issues

- Initial choke sized based on short flow after initial frac flow back – choke is run with recorders hanging below
- With the choke above the recorders. The choke provide stable trouble free testing
- Pressure data is not affected – pressure drop is above recorders
- Tests run trouble free with minimal interruption associated with hydrate and loading issues

Liquid Loading Issues

- Taking the pressure drop downhole reduces tubing pressure by allowing well to flow on line pressure. Lower tubing pressure increases velocity and lowers the loading point.
- During sizing, loading point is calculated to ensure choke is large enough to maintain steady flow.



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Choke Calculation Worksheet






FLOW CALCULATION FOR FLOW THROUGH CHOKES

COMPANY:	ABC O&G
LOCATION:	01-02-003-04W5
DATE:	31/3/2016

Graph Input

15/64	23.54
16/64	26.51
17/64	30.53

REQUIRED INFORMATION:
(enter data in blocks only)

Gas gravity	0.65	
upstream, or wellhead temp - deg C	80	
Upstream pressure - kPa	20000	
Single point coefficient	26.51	16/64

Single Point Flow e^3m^3/d

Gas Rate	105.58

Test Rate

q	100	e^3m^3
Pi	30000	kPa
Pwf	20000	kPa
n	1	(assumed)
C	0.0000002	$e^3m^3/d/kPa^2$

* Note - assumes critical flow conditions exist; downstream pressure must be 55% or less, than upstream pressure - below 55%, downstream pressure will not affect this calculation

BONNETTS Wireline

Size	Coeff	Rate	Decimal Equiv
4/64	1.24	4.94	0.063
5/64	2.14	8.52	0.078
6/64	3.26	12.98	0.094
7/64	4.61	18.36	0.109
8/64	6.25	24.89	0.125
9/64	7.99	31.82	0.141
10/64	10.02	39.90	0.156
11/64	12.27	48.87	0.172
12/64	14.44	57.51	0.188
13/64	17.45	69.49	0.203
14/64	20.38	81.16	0.219
15/64	23.54	93.75	0.234
16/64	26.51	105.58	0.250
17/64	30.53	121.59	0.266
18/64	34.36	136.84	0.281
19/64	38.43	153.05	0.297
20/64	43.64	173.80	0.313
21/64	47.23	188.09	0.328
22/64	51.97	206.97	0.344
23/64	56.93	226.72	0.359
24/64	61.21	243.77	0.375
25/64	67.54	268.98	0.391
26/64	73.18	291.44	0.406
27/64	79.05	314.82	0.422
28/64	85.14	339.07	0.438
29/64	91.47	364.28	0.453
30/64	98.02	390.36	0.469
31/64	104.79	417.33	0.484
32/64	112.72	448.91	0.500

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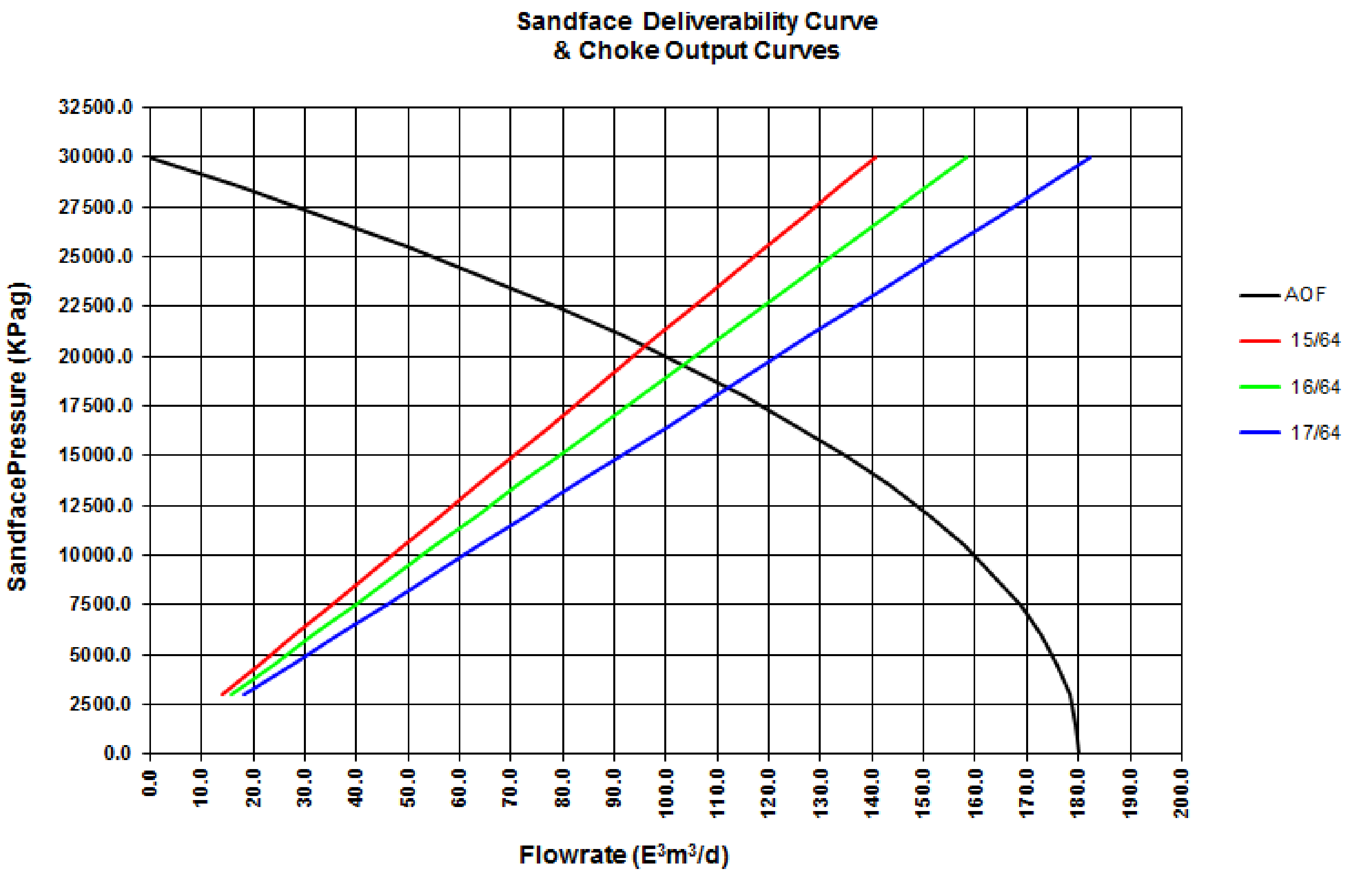
Calculation Sheet Continued



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Frequently Asked Questions






- What choke do I need that will deliver a specific amount of gas at a defined flowing tubing pressure?
- What about stored tubing volume and high initial startup rates? Does the choke control the reservoir drawdown?
- Where in the deviation can a choke be set?
- Have you seen any problems with scale?
- Can I size the choke a bit bigger, and then take some pressure drop at surface?






Contact Information

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