



CUSP 2023

WELLBORE DESIGN FOR RISK MANAGEMENT & FINANCIAL VIABILITY

June 21, 2023

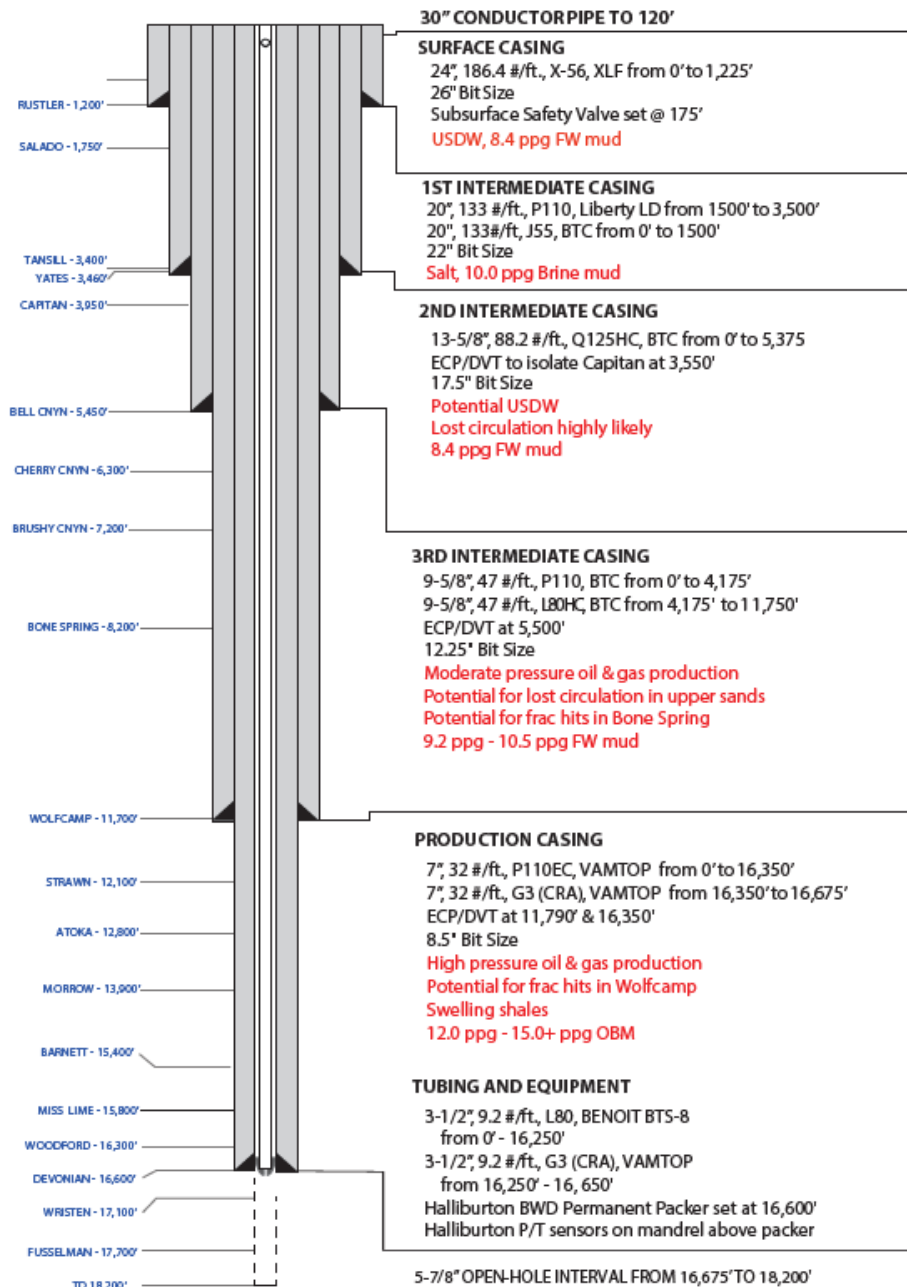
Gary Fisher, Permian Oilfield Partners LLC

Hobbs, NM



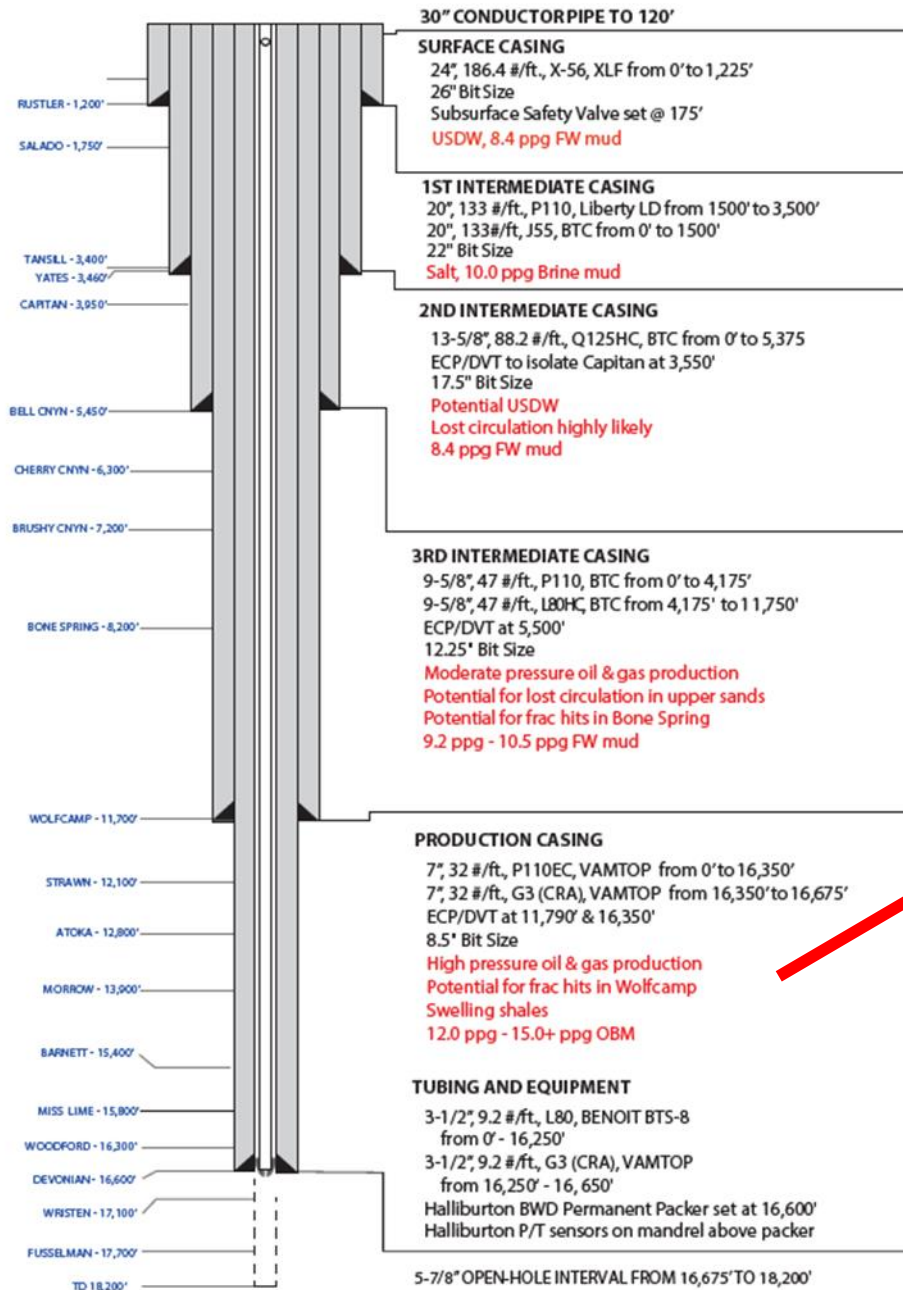
PERMIAN OILFIELD
PARTNERS

Overview



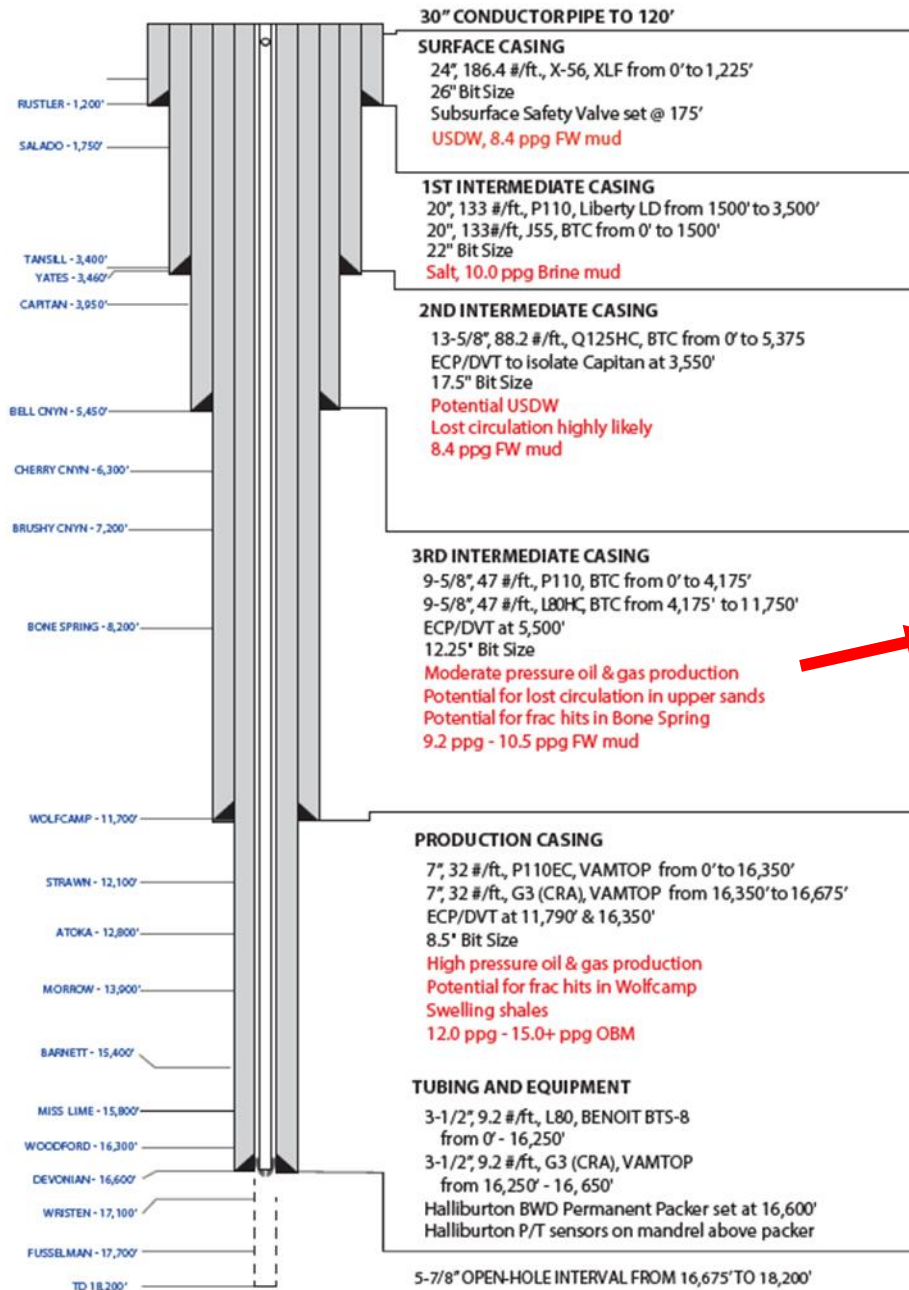
- Operational requirements
 - Rate
 - Longevity
 - Mission critical?
 - Monitoring
- Regulatory requirements
 - USDW's
 - Cementing
 - Surface pressure limit
 - DVT & Packer
 - Seismicity
- Financial constraints
 - Capital constraints
 - Op Ex constraints
- Geology & risk
 - Lost circulation
 - Well control
 - Injectivity
 - H2S
- Construction specifications & risk
 - Cement
 - Fishing
 - Product availability
 - Product cost
 - Coring & logging
 - Drilling rig selection
 - OH vs CH completion
- Iterative process

Production



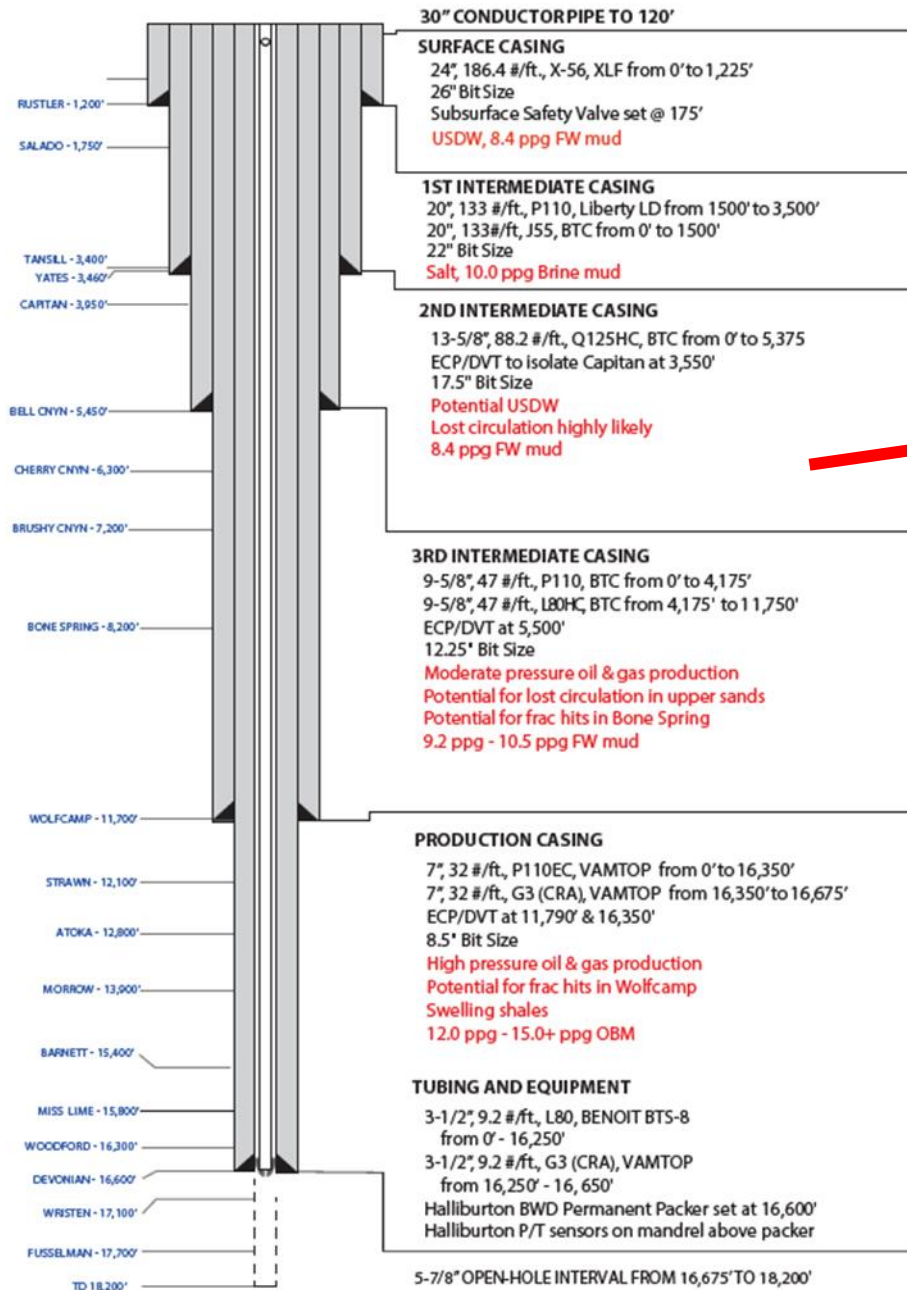
- Bit sizes 5.875" & 8.5"
- Size, weight & grade selection
 - 7" min size to fit 3.5" tubing & hardware
 - Fishable?
 - 32# P-110 min after collapse, burst, tension calcs
 - Alternatives if SF not met
 - Corrosion Resistant Alloys (CRA) & why
- Thread selection
 - Premium/semi-premium
 - MIT is critical
- DV tool placement
 - Cementing
 - Remediation difficult
 - Regulatory requirements
 - Fiber optics
- Drilling risk
 - Well control
 - Frac hits
 - Swelling shales
 - Stuck pipe
 - Wireline logging
 - Whole cores

3rd Intermediate



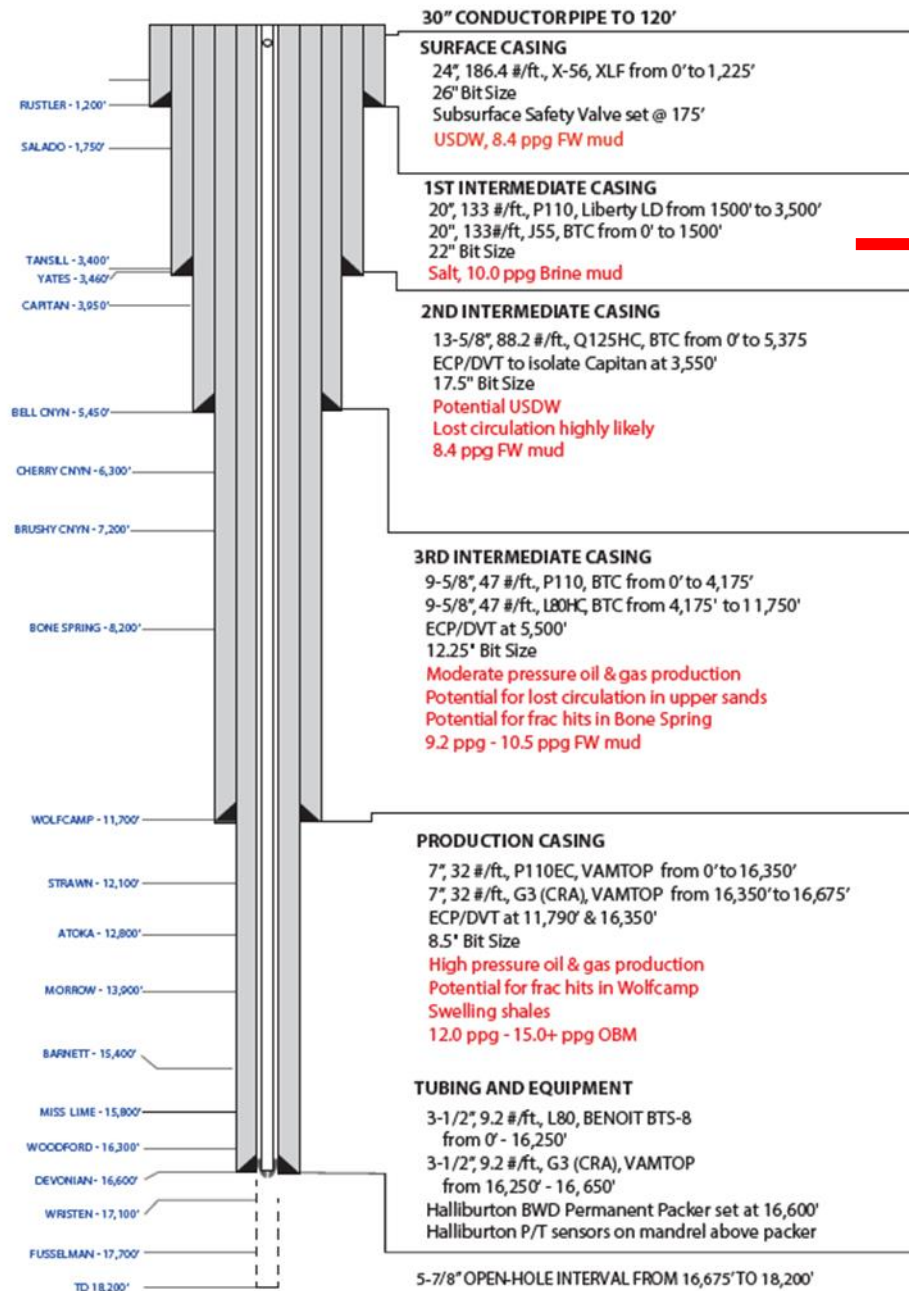
- Bit size 12.25"
- Size, weight & grade selection
 - 9.625" min size to fit 7" casing
 - Fishable? 10.75" casing?
 - Mixed string – why?
 - Alternatives if SF not met
- Thread selection
 - Standard API
 - Cost effective
 - Easy to run
- DV tool placement
 - Cementing
 - 1" remediation possible
 - Perf & squeeze possible
 - Regulatory requirements
- Drilling risk
 - Well control
 - Frac hits
 - Lost circulation
 - Stuck pipe
 - Rig size

2nd Intermediate



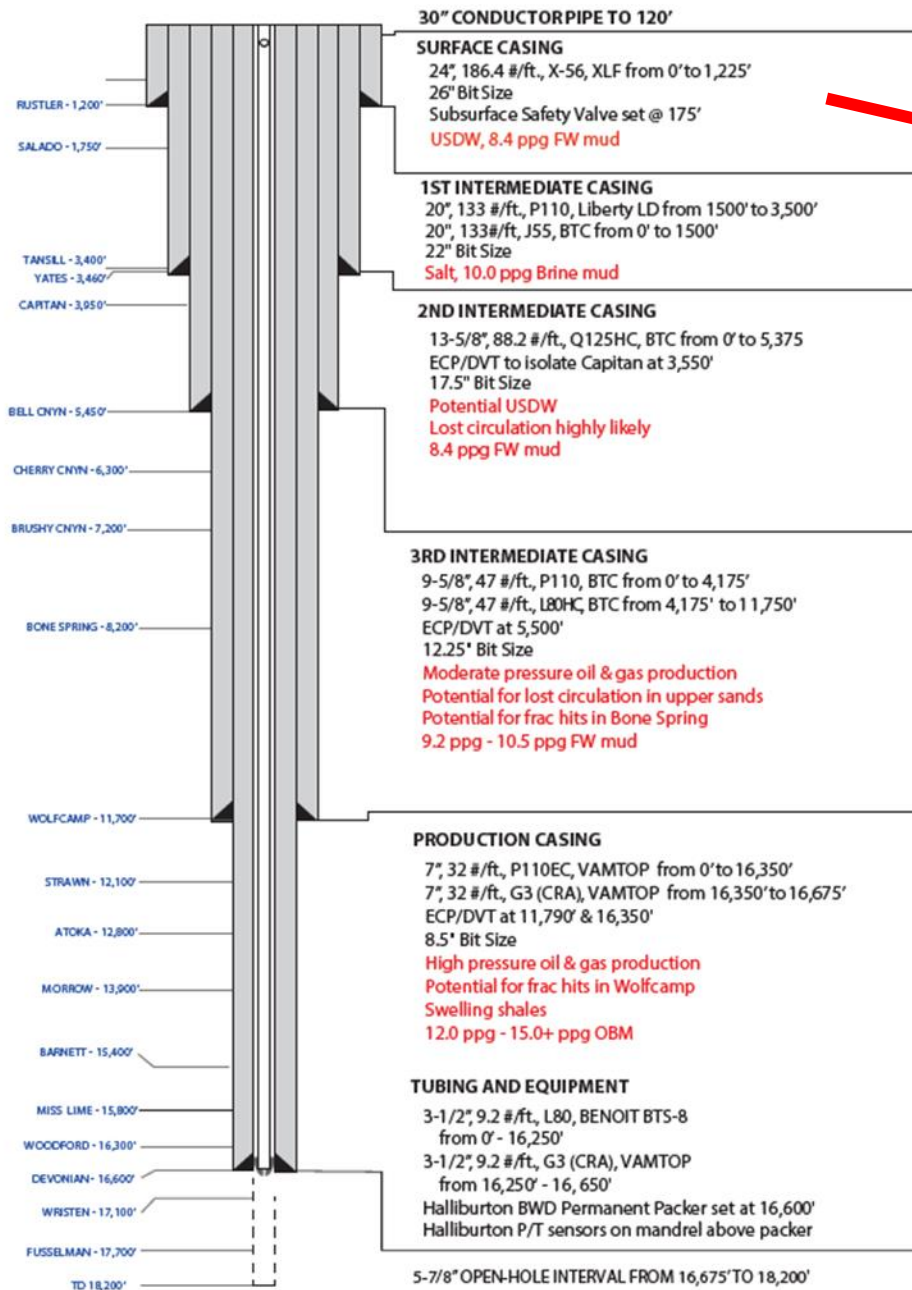
- Bit size 17.5"
- Size, weight & grade selection
 - 13.375" vs. 13.625" & API standards
 - Fishable?
 - Alternatives if SF not met
 - Procedural changes
- Thread selection
 - Standard API
 - Cost effective
 - Easy to run
- DV tool placement
 - Cementing
 - Remediation highly likely
 - 1" remediation possible
 - Perf & squeeze possible
 - Regulatory requirements
- Drilling risk
 - Lost circulation
 - Stuck pipe

1st Intermediate



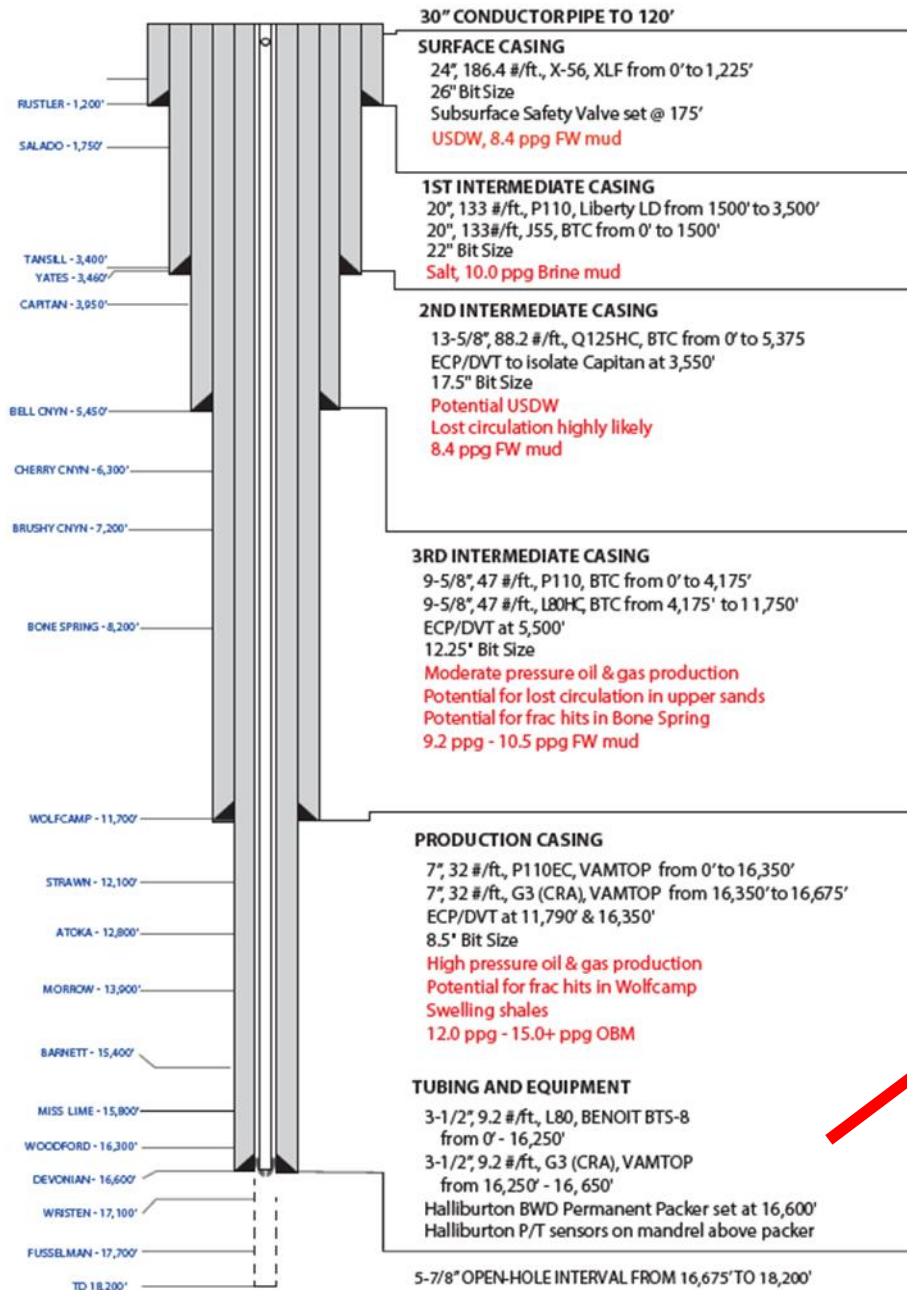
- Bit size 22.5"
- Size, weight & grade selection
 - 20" very common, 133# is non-API @ P-110
 - Fishable?
 - Mixed string – why?
 - Alternatives if SF not met
- Thread selection
 - Standard API best
 - Premium here due to availability
 - Cost effective
 - Easy to run
- Cementing
 - 1" remediation possible
 - Perf & squeeze possible
 - Regulatory requirements
- Drilling risk
 - Verticality
 - High pressure air pockets

Surface



- Bit size 26"
- Size, weight & grade selection
 - Non-API
 - 24" min size to fit 20" casing
 - Fishable?
 - 24" not common to area
 - High cost operationally
 - Alternatives if SF not met
- Thread selection
 - Not critical
 - Welded?
- Drilling risk
 - Minimal
 - Verticality

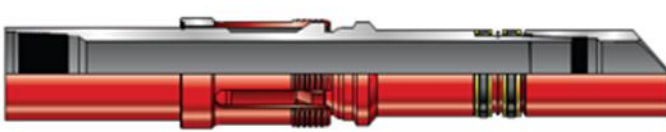
Tubing



- Size, weight & grade selection
 - 3.5" size for desired flow rate
 - Fishable?
 - L-80 due to sour service
 - Corrosion Resistant Alloys (CRA) & why
 - Packer fluid
 - Plant dehydration capabilities
 - No-flow procedures
- Thread selection
 - Premium gas tight – don't skimp here
 - MIT is critical
 - Testing during running
- Is corrosion allowed?
 - Risk of downtime vs. cost
 - Maintenance vs. upfront capital (EBITDA vs. depreciation)
- Required jewelry
 - SSSV
 - Press-Temp gauges
 - Fiber optic DTS?
 - Control lines



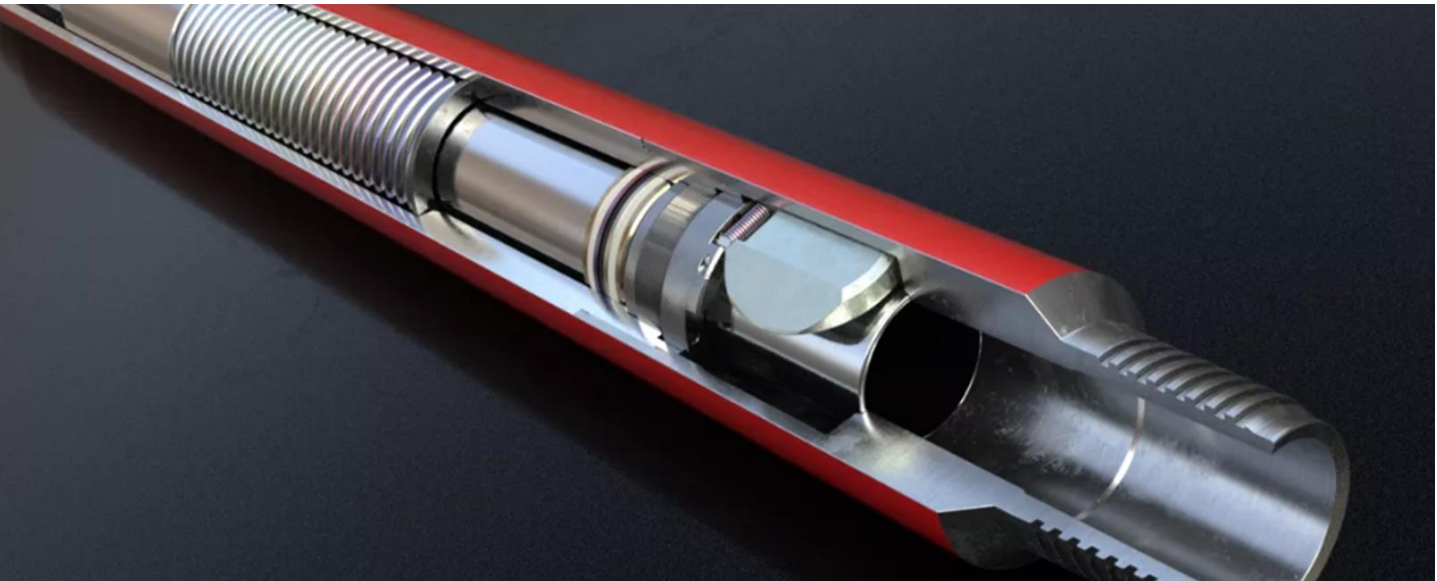
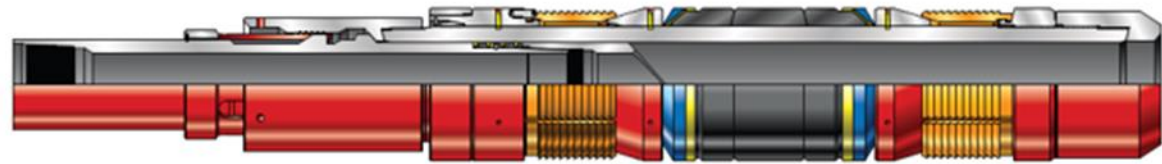
Injection String Hardware



Versa-Latch Seal Assembly Locator



CWIA Permanent Packer



Injection String Hardware

| Installation | Depth | Length | Jts. | Description |
|--------------|-------|--------|------|--|
| | 22 | | | 22) One Joint 3 1/2" 9.2# VAMTOP |
| | 21 | | | 21) 3 1/2" 9.2# VAMTOP Tubing Subs As Needed For Space Out |
| | 20 | | | 20) 3 1/2" 9.2# VAMTOP Tubing |
| | 19 | | | 19) 6' x 3 1/2" 9.2# VAMTOP Tubing Sub |
| | 18 | | | 18) 3 1/2" NE HES SSSV Nickel Alloy 925 w/Alloy 825 Control Line 3 1/2" 9.2# VAMTOP Box x Pin, 2.813" R Profile |
| | 17 | | | 17) 6' x 3 1/2" 9.2# VAMTOP BxP Tubing Sub |
| | 16 | | | 16) 3 1/2" 9.2# VAMTOP Tubing |
| | 15 | | | 15) TBA Joints 9.2# VAMTOP G3 Tubing |
| | 14 | | | 14) 8' x 3 1/2" 9.2# VAMTOP BxP G3 Sub or Equivalent |
| | 13 | | | 13) 2.562" R Nipple 3 1/2" 9.2# VAM TOP BxP NA 925 |
| | 12 | | | 12) 6' x 3 1/2" 9.2# VAMTOP Box x Pin G3 Sub or Equivalent |
| | 11 | | | 11) Opsis PT Sensor Mandrel 3 1/2" 9.2# VAM TOP Box x Box |
| | 10 | | | 10) 8' x 3 1/2" 9.2# VAM TOP Pin x Pin G3 Sub or Equivalent |
| | 9 | | | 9) 4.00" Landed PTP Seal Assembly 9.2# VAM TOP Nickel Alloy 925 |
| | 8 | | | 8) 7" 26-32# x 4.00" TWA Packer Nickel Alloy 925 |
| | 7 | | | 7) 4.00" x 10' SBE Nickel Alloy 925 4 3/4"-8 UN 2A Pin x Pin |
| | 6 | | | 6) 4.00" SBE Adapter x 2 7/8" 6.4# VAM TOP BxB NA 925 |
| | 5 | | | 5) 8' x 2 7/8" 6.4# VAM TOP PxP Tbg Sub G3 Sub or Equivalent |
| | 4 | | | 4) 2.313" R Nipple 2 7/8" 6.4# VAM TOP Box x Pin Nickel Alloy 925 |
| | 3 | | | 3) 8' x 2 7/8" 6.4# VAM TOP BxP Tbg Sub G3 Sub or Equivalent |
| | 2 | | | 2) 2.313" XN Nipple 2 7/8" 6.4# VAM TOP Box x Pin Nickel Alloy 925 |
| | 1 | | | 1) 2 7/8" 6.4# VAM TOP Super 13 Chrome Pump Out Plug w/Standard Insert |



THANK YOU

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