west virginia department of environmental protection

Office of Oil and Gas
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Charleston, WV 25304
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Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
www.dep.wv.gov

PERMIT MODIFICATION APPROVAL

April 05, 2016

CABOT OIL & GAS CORPORATION
FIVE PENN CENTER WEST, SUITE 401
PITTSBURGH, PA 152760000

Re: Permit Modification Approval for API Number 502118, Well #: SHONK 113

MODIFIED PLUGGING PROCEDURE TO BETTER ACCOUNT FOR CASING COLLAPSE

Oil and Gas Operator:
The Office of Oil and Gas has reviewed the attached permit modification for the above referenced permit. The attached modification has been approved and well work may begin. Please be reminded that the oil and gas inspector is to be notified twenty-four (24) hours before permitted well work is commenced.

Please call James Martin at 304-926-0499, extension 1654 if you have any questions.

Sincerely,

Gene Smith

Gene Smith
Assistant Chief of Permitting
Office of Oil and Gas

5-02118 P

Shonk Land Co. #113
API # 47 – 005 - 02118
PLUGGING PROCEDURE

Current Configuration
Elevation – 2107" GL
TD @ 5665' MD
TVD @ 3625'
13-3/8" conductor @ 40' KB
9-5/8" – 32# casing @ 891' KB (220 sx, 10 bbls CTS)
7" – 23# J-55 casing @ 3048' KB (310 sx, 15 bbls CTS)
4" – 11.6# N-80 casing @ 5642' w/ packer @ 2937' KB & calculated cement top @ 2300'
2 3/8" IJ Tubing @ 5592' (upper 554' pulled; 5038' remain in hole)
Rods – 3766' of mixed 7/8" & ¾" rods. (upper 554' pulled; 3212' remain in hole)
2-3/8" tubing & rods parted @ 554' due to collapsed casing; sitting in hole below collapse
No water reported
Coal @ 23' – 27', 540' – 543', & 805' – 809'
Measured depth of Weir @ 3770' KB (MD)
Weir frac'd through port collars @ 5611', 5142', 4740', 4293', & 3846'

OBJECTIVE: Mill-out collapsed area in 4 ½" casing @ +/- 553'; fish & retrieve tubing & rods from well; then P&A well.

PROCEDURE

1. Contact Glasgow Office a minimum of 48 hours prior to starting work.
2. Contact State Inspector a minimum of 24 hours prior to starting work.
3. Prepare JSA Form and LOTO procedures as required prior to commencing any work.
4. Blow down well.
5. Install necessary containment measures.
6. MIRU Service Rig.
7. Remove wellhead. Install BOP's.
8. Lay 2" line from wellhead to pit/tank and stake down securely.
9. MIRU WL unit w/ downhole camera. RIH to collapse area @ 553'-554'. Goal is to obtain renewed look at collapse in casing to refine procedure if necessary. RDMO WL unit.
10. Using vacuum truck, load hole w/FW & kill well. Hole volume is +/-80 bbls.
11. Install necessary tanks, pump, & circulating equipment to prepare for milling & circulating. Plan to begin with water as circulating fluid unless problems are encountered. (NOTE: make arrangements for "Air/Foam" system if needed in the event of fluid loss).
12. MU BHA consisting of bladed concave junk mill on bottom, and necessary spiral & bladed stabilizers, & pony drill collars to achieve approximately ~30' assembly. (NOTE: Drift Diameter is 3.875". The OD of all tools on BHA should be sized as close as possible to drift diameter so as to add stability and avoid wobble in assembly)
13. PU BHA. RIH w/ six DC's and 2 3/8" workstring to collapsed spot in 4 ½" @ 553'-554'. Apply minimum weight and mill away the collapsed area. Avoid "kicking off", keep assembly centered, goal is to "shave" away the indentation in the pipe. Collapse could be a few feet to several feet in length. Continue milling until collapse area is passable, or until sitting down on parted tubing below collapse.
14. Once collapse area is adequately removed, circulate hole clean, POH w/ BHA.
15. TIH w/ 2 3/8" workstring & overshot tool. Latch onto collar of 2 3/8" tubing @ +/-554' which is looking up below collapse, and begin to pull the tubing along w/ the rods inside.
16. Pull 1 or 2 joints, set tubing in slips, pull rods out of well (~3212' remain in hole).
17. Pull a total of +/- 1268' of tubing, leaving end of tubing @ +/- 3770' (ie @ the Weir formation).

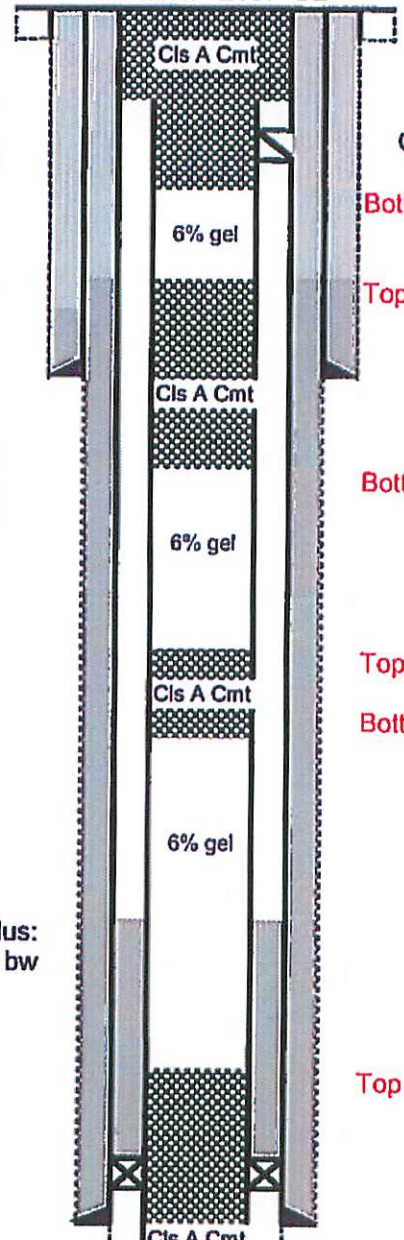
502118 P

18. Pump 30 bbls of 6% gel followed by 15 bbls (70 sx) of Class A cement for plug 1 from 3770' to 2800'.
19. Displace w/ 10 bbls of 6% Gel. PU tubing above cement top & circulate clean.
20. WOC minimum 8 hours.
21. RIH with workstring – tag TOC to confirm.
22. Pull work string up to 2200' and pump 3 bbls (15 sx) of Class A cement for plug 2 from 2200' to 2000'.
23. Displace w/ 7.5 bbls of 6% Gel.
24. Pull work string up to 1200' and pump ~~6~~ 7 bbls (~~30 sx~~ 35 SX) of Class A cement for plug 3 from 1200' to 700'.
25. Displace w/ 2.5 bbls of 6% Gel.
26. Pull work string up to 500'. WOC over-night.
27. Tag plug 3 to verify TOC @ 700'. POH w/ workstring.
28. RIH w/ string shot, shoot off the 4 ½" casing at +/-500'. Pull casing out of hole.
29. RIH w/ 2 3/8" workstring to +/-600', carefully entering the stub.
30. Pump 21 bbls (100 sx) of Class A cement for plug 4 from 600' to surface' (NOTE: If it is apparent that 4x7 annulus is taking cement, continue to pump extra cement until cement returns to surface).
31. TOOH with work string and lay down.
32. RDMO Cementing equipment.
33. Place monument as required by law on top of well bore.
34. Reclaim well site.

NOTE: Per discussions between Cabot & DEP personnel, it is agreed that this procedure is "Subject to Change" based on findings and results in the Field.

502118P

Shonk Land Co 113H
47-005-02118
Current Configuration
Elevation - 2107' GL



Coal @ 23' - 27'

Coal @ 540' - 543'

Coal @ 805' - 809'

Coal @ 987 - 990
Peerless / No. 2 Gas

13-3/8" 37# conductor @ 41' KB

Upper +/-500' of 4 1/2" casing pulled

COLLAPSE: in 4 1/2" csg @ +/-553' - milled out to ID

Bottom of cement plug 4 @ 600'

Top of cement plug 3 @ 700'

9 5/8" 32# casing @ 891' KB
220 sx, 10 bbls CTS
(4/26/07)

Bottom of cement plug 3 @ ~~1100'~~ 1200'. JWM

Top of cement plug 2 @ 2000'

Bottom of cement plug 2 @ 2200'

CMT pumped into 4x7 annulus:
1 bw; 60 sx Class A; 2 bw
(5/30/07)

Original Calculated TOC @ 2300'
(no bond log)

Top of cement plug 1 @ 2800'

Pkr @ 2937' KB
7" 23# J-55 casing @ 3048' KB
310 sx, 15 bbls CTS
(5/3/07)

4 1/2" 11.6# N-80 casing @ 5642' MD (5/29/07)
w/ 5 stage pkr system
Port Collars @ 5611', 5142', 4740', 4293', & 3846'
Frac completed: 6/6/07 TIL: 6/19/07 - 1 mmcfd, 320#

Weir @ 3770' KB (MD)
3440' TVD (MD)

Bottom of cement plug 1 @ 3770'

3,766' Rods (12/5/11) - not shown
Seating Nipple in tubing @ 3,760' MD

DTD @ 5665' MD (5/28/07)
TVD @ 3625' MD

502118 P

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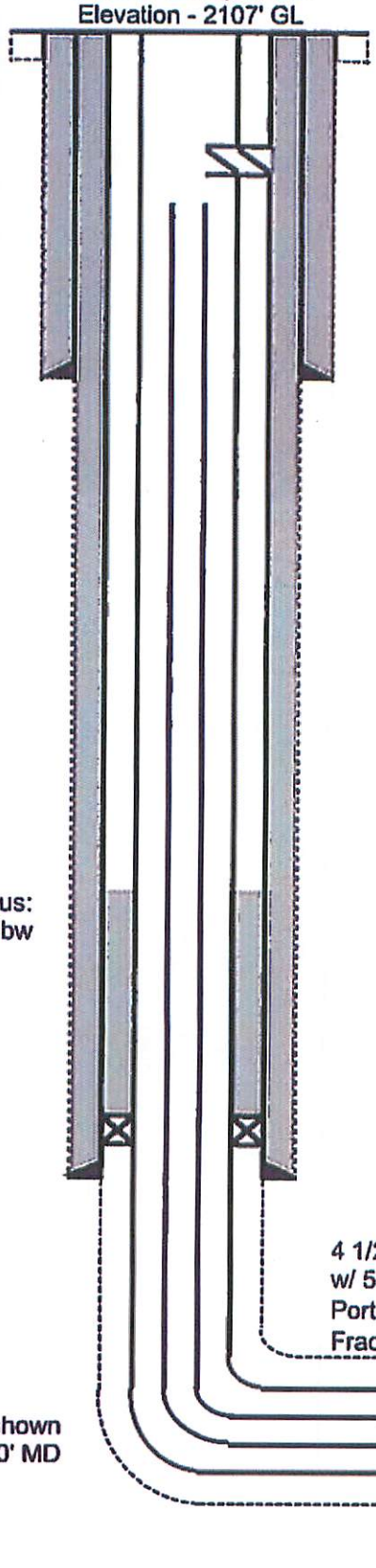

Coal @ 23' - 27'

Coal @ 540' - 543'

Coal @ 805' - 809'

13-3/8" 37# conductor @ 41' KB

COLLAPSE: in 4 1/2" casing @ +/-553'
3 Strings collapsed: Estimate 1 1/2" opening per camera

Tbg & rods parted @ 554'

9 5/8" 32# casing @ 891' KB
220 sx, 10 bbls CTS
(4/26/07)

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1 bw; 60 sx Class A; 2 bw
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TVD @ 3625' MD