west virginia department of environmental protection

Office of Oil and Gas
601 57th Street, S.E.
Charleston, WV 25304
(304) 926-0450
fax: (304) 926-0452

Jim Justice, Governor
Austin Caperton, Cabinet Secretary
www.dep.wv.gov

January 19, 2018
PERMIT MODIFICATION APPROVAL
Horizontal 6A / Horizontal 6A Well - 1

CHEVRON APPALACHIA, LLC
700 CHERRINGTON PARKWAY

CORAOPOLIS, PA 15108

Re: Permit Modification Approval for TAYLOR C 9H
47-051-01826-00-00

Modified 9 5/8" to J-55, 5 1/2" Burst Pressure change to 14,360 psi, Production Cement to Type A, G, or H.

CHEVRON APPALACHIA, LLC

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.

If there are any questions, please feel free to contact me at (304) 926- 0450.

James A. Martin
Chief

Operator's Well Number: TAYLOR C 9H
Farm Name: WILLIAMS OHIO VALLEY MIDSTREAM, LLC
U.S. WELL NUMBER: 47-051-01826-00-00
Horizontal 6A / Horizontal 6A Well - 1
Date Issued: January 19, 2018

WW-6B
(04/15)

API NO. 47- 51 - 01826 MOD
OPERATOR WELL NO. 9H
Well Pad Name: Tayor C

STATE OF WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION, OFFICE OF OIL AND GAS
WELL WORK PERMIT APPLICATION

1) Well Operator:	Chevron Appalachia, LLC	49449935	Marshall	Clay	Glen Easton, WV
		Operator ID	County	District	Quadrangle

2) Operator's Well Number: 9H Well Pad Name: Tayor C

3) Farm Name/Surface Owner: Williams Ohio Valley Midstream Public Road Access: CR 17 Fork Ridge Road

4) Elevation, current ground: 1257' Elevation, proposed post-construction: 1236'

5) Well Type (a) Gas X Oil _____ Underground Storage _____
Other _____
(b)If Gas Shallow X Deep _____
Horizontal X

6) Existing Pad: Yes or No Yes JW 10/16/17

7) Proposed Target Formation(s), Depth(s), Anticipated Thickness and Expected Pressure(s):
Marcellus, 6533', 49' - 0.64 psi/ft

8) Proposed Total Vertical Depth: 6,555' GL

9) Formation at Total Vertical Depth: Marcellus

10) Proposed Total Measured Depth: 17,119'

11) Proposed Horizontal Leg Length: 9,214'

12) Approximate Fresh Water Strata Depths: 470' GL

13) Method to Determine Fresh Water Depths: 1 mi radius offset wells, freshwater wells, and freshwater base level

14) Approximate Saltwater Depths: 1276', 1880'-2370' KB: Francis 1V offset well

15) Approximate Coal Seam Depths: 800' GL

16) Approximate Depth to Possible Void (coal mine, karst, other): None

17) Does Proposed well location contain coal seams directly overlying or adjacent to an active mine? Yes X No Ireland

(a) If Yes, provide Mine Info: Name: Ireland Mine
Depth: 800' GL
Seam: Pittsburgh No. 8'
Owner: CONSOL Energy

RECEIVED
Office of Oil and Gas
OCT 19 2017
WV Department of
Environmental Protection

API NO. 47- 51 - 01826 MOD
OPERATOR WELL NO. 9H
Well Pad Name: Tayor C

18) **CASING AND TUBING PROGRAM**

TYPE	Size (in)	New or Used	Grade	Weight per ft. (lb/ft)	FOOTAGE: For Drilling (ft)	INTERVALS: Left in Well (ft)	CEMENT: Fill-up (Cu. Ft.)/CTS
Conductor	20"	New			40'	40'	141.8
Fresh Water	13 3/8"	New	J-55	54.5#	520'	520'	691.0
Coal							
Intermediate	9 5/8	New	J-55	40#	2,104'	2,104'	941.0
Production	5 1/2	New	P-110	20#	17,119'	17,119'	4090.0
Tubing							
Liners							

JW 10/16/17

TYPE	Size (in)	Wellbore Diameter (in)	Wall Thickness (in)	Burst Pressure (psi)	Anticipated Max. Internal Pressure (psi)	Cement Type	Cement Yield (cu. ft./k)
Conductor	20"	26"					
Fresh Water	13 3/8"	17 1/2	0.380"	2,730 psi	1,911 psi	Class A	1.18
Coal							
Intermediate	9 5/8"	12 1/4	0.395"	3,950 psi	2,768 psi	Class A	1.19
Production	5 1/2"	8 1/2"	0.361"	14,360 psi	9,975 psi	Class A, G or H	1.15
Tubing							
Liners							

PACKERS

Kind:				
Sizes:				
Depths Set:				

RECEIVED
Office of Oil and Gas
OCT 19 2017
WV Department of
Environmental Protection

WW-6B
(10/14)

API NO. 47- 51 - 01826 H6D
OPERATOR WELL NO. 9H
Well Pad Name: Tayor C

JW 10/16/17

19) Describe proposed well work, including the drilling and plugging back of any pilot hole:

Drill 17 1/2" hole to 600 then run and cement 13 3/8" casing to surface covering the fresh water. Drill 12.25" hole to 2,330' then run and cement to surface 9 5/8" casing, covering the Big Injun. Drill 8 1/2" hole to KOP at 5,078'. Drill 8 1/2" curve and lateral to 17,119' MD and 6,555 TVD. Run 5 1/2" production casing and cement back to surface.

20) Describe fracturing/stimulating methods in detail, including anticipated max pressure and max rate:

Chevron will utilizing plug and perf method with 45 stages using 8,572 bbl of fluid and 315,000 lbm of sand per stage.

21) Total Area to be disturbed, including roads, stockpile area, pits, etc., (acres): 22.01

22) Area to be disturbed for well pad only, less access road (acres): 4.66

23) Describe centralizer placement for each casing string:

There will be a bow spring centralizer every two jts on the Water string and intermediate. Vertical Production: bow spring - (1) per every other jt over coupling; Curve and Lateral: solid composite (1) per jt of csg to KOP.

24) Describe all cement additives associated with each cement type:

For the Water String the blend will contain Class A cement 3% CaC12 , and flake. The intermediate will contain Class A cement 3% CaC12, Salt, and flake. The Production cement will have a lead and tail cement. The lead will contain Class A cement, KCl, dispersant, suspension agent, and retarder. The tail will contain Class A cement, Calcium Carbonate, KCl, dispersant, de-foamer, suspension agent, and friction reducer.

25) Proposed borehole conditioning procedures:

Well will be circulated a minimum of 3 bottoms up once casing point has been reached on all hole sections and until uniform mud properties are achieved.

*Note: Attach additional sheets as needed.

51-01826 MOD

Susan Laird
Permitting Assistant, HES Permitting

January 15, 2018

West Virginia DEP
Office of Oil & Gas
601 57th Street SE
Charleston, WV 25304-2345

RE: Taylor C 1H, 2HA, 3H, 5H, 7H & 9H
Casing Modification Change

Dear Mr. Brewer,

Please accept this as our formal request for a modification to the Well Permit Application (WW-6B) for the Taylor C 1H, 2HA, 3H, 5H, 7H and 9H Casing & Tubing Program.

See below the explanations for the modifications from our drilling department:

- Reason for the 9-5/8" casing change to J-55 was this satisfies our global requirements for casing design and saves money.
- The 5-1/2" burst pressure changed because we switched to a different provider who specifically manufactures their casing to a higher yield stress, thus increasing burst pressure.
- The cement yields have changed because we have changed our slurries and with our provider we wanted to have flexibility to use class A, G or H cement types.

If you have any question please contact me at (412) 865-2504.

Sincerely,

Susan Laird

Appalachian Mountain Business Unit
Chevron North America Exploration and Production Company
700 Cherrington Parkway
Coraopolis, PA 15108
Tel 412-865-2504
slaird@chevron.com