

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

5. Lease Serial No.
NMNM100549

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

SUBMIT IN TRIPLICATE - Other instructions on page 2

8. Well Name and No.
HH SO 8 5 FED 004 4H 3H

9. API Well No.
30-015-45990-00-X1

1. Type of Well
 Oil Well Gas Well Other

2. Name of Operator
CHEVRON USA INCORPORATED

Contact: LAURA BECERRA
E-Mail: LBECCERRA@CHEVRON.COM

3a. Address
6301 DEAUVILLE BLVD
MIDLAND, TX 79706

3b. Phone No. (include area code)
Ph: 432-687-7655

10. Field and Pool or Exploratory Area
POKER LAKE-DELAWARE, EAST

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec 17 T26S R27E NWNE 783FNL 1509FEL
32.047596 N Lat, 104.208588 W Lon

11. County or Parish, State
EDDY COUNTY, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Hydraulic Fracturing	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	Change to Original APD
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.

Chevron USA respectfully requests authorization to change the wellbore design from the original APDs approved May 2019.

The following changes were made to the original 9 Pt. drilling plans:

- Casing design changed to 4 string with a liner.
- Added a first intermediate string from surface to ~2,100'. Drilling fluid will be a saturated brine.
- Added a second intermediate string from surface to ~9,100'. We are no longer pumping a two stage cement job in this string. Cement planned to 300' into previous shoe. Drilling fluid will be a cut

Carlsbad Field Office
OCD Artesia

RECEIVED

JUL 23 2019

DISTRICT OF ARTESIA O.C.D.

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #473609 verified by the BLM Well Information System
For CHEVRON USA INCORPORATED, sent to the Carlsbad
Committed to AFMSS for processing by PRISCILLA PEREZ on 07/16/2019 (19PP2824SE)

Name (Printed/Typed) LAURA BECERRA Title REGULATORY SPECIALIST

Signature (Electronic Submission) Date 07/16/2019

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By NDUNGU KAMAU Title PETROLEUM ENGINEER Date 07/19/2019

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Office Carlsbad

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

Rev 10-29-19

Additional data for EC transaction #473609 that would not fit on the form

32. Additional remarks, continued

brine.

- Production string is planned as a liner.

The rest of the drilling plans remain unchanged. These changes apply to the following wells:

HH SO 8 5 FED 004 1H - 30-015-45987
HH SO 8 5 FED 004 2H - 30-015-45988
HH SO 8 5 FED 004 3H - 30-015-45989
HH SO 8 5 FED 004 4H - 30-015-45990 - Deepest well: 10,261' TVD
HH SO 8 5 FED 004 5H - 30-015-45991
HH SO 8 5 FED 004 6H - 30-015-45992

Revisions to Operator-Submitted EC Data for Sundry Notice #473609

	Operator Submitted	BLM Revised (AFMSS)
Sundry Type:	APDCH NOI	APDCH NOI
Lease:	NMNM118108	NMNM100549
Agreement:		
Operator:	CHEVRON USA INC 6301 DEAUVILLE BLVD MIDLAND, TX 79706 Ph: 432-687-7665	CHEVRON USA INCORPORATED 6301 DEAUVILLE BLVD MIDLAND, TX 79706 Ph: 432 687 7100
Admin Contact:	LAURA BECERRA REGULATORY SPECIALIST E-Mail: LBECERRA@CHEVRON.COM Ph: 432-687-7665	LAURA BECERRA REGULATORY SPECIALIST E-Mail: LBECERRA@CHEVRON.COM Ph: 432-687-7655
Tech Contact:	LAURA BECERRA REGULATORY SPECIALIST E-Mail: LBECERRA@CHEVRON.COM Ph: 432-687-7665	LAURA BECERRA REGULATORY SPECIALIST E-Mail: LBECERRA@CHEVRON.COM Ph: 432-687-7655
Location:		
State:	NM	NM
County:	EDDY	EDDY
Field/Pool:	PURPLE SAGE;WOLFCAMP (GAS)	POKER LAKE-DELAWARE, EAST
Well/Facility:	HH SO 8 5 FED 004 4H Sec 17 T26S R27E Mer NMP NWNE 783FNL 1509FEL	HH SO 8 5 FED 004 4H Sec 17 T26S R27E NWNE 783FNL 1509FEL 32.047596 N Lat, 104.208588 W Lon

1. FORMATION TOPS

The estimated tops of important geologic markers are as follows:

Elevation: 3268 ft

FORMATION	SUB-SEA TVD	TVD	MD	LITHOLOGIES	MIN. RESOURCES	PROD. FORMATION
Lamar		2,100			N/A	
Bell Canyon		2,337			N/A	
Cherry Canyon		3,182			N/A	
Brushy Canyon		4,331			N/A	
Bone Spring Limestone		5,973			N/A	
Avalon		6,083			N/A	
First Bone Spring		6,836			Oil	
Second Bone Spring		7,469			Oil	
SBSG 3rd Carb		8,239			Oil	
Third Bone Spring		8,690			Oil	
Wolfcamp A		9,036			Oil	
Wolfcamp B		9,541			Oil	
Wolfcamp C		9,867			Oil	
Wolfcamp D		9,962			Oil	
Target		9,901	20,308			Wolfcamp C

WELLBORE LOCATIONS	SUB-SEA TVD	RKB TVD	MD
SHL	3268	-	
KOP	-6058	9,326	9,367
FTP	-6633	9,901	10,271
LTP	-6633	9,901	20,308

2. ESTIMATED DEPTH OF WATER, OIL, GAS & OTHER MINERAL BEARING FORMATIONS

The estimated depths at which the top and bottom of the anticipated water, oil, gas, or other mineral bearing formations are expected to be encountered are as follows:

Substance	Formation	Depth
Deepest Expected Base of Fresh Water		450
Water	Lamar	2,100
Oil/Gas	Bell Canyon	2,337
Oil/Gas	Cherry Canyon	3,182
Oil/Gas	Brushy Canyon	4,331

All shows of fresh water and minerals will be reported and protected.

3. BOP EQUIPMENT

Chevron will have a minimum of a 5,000 psi rig stack (see proposed schematic) for drill out below surface casing. The stack will be tested as specified in the attached testing requirements. Batch drilling of the surface, intermediate, and production will take place. A full BOP test will be performed per hole section, unless approval from BLM is received otherwise. Flex choke hose will be used for all wells on the pad (see attached specs and variance). BOP test will be conducted by a third party.

Chevron requests a variance to use a FMC Technologies UH-S Multibowl wellhead, which will be run through the rig floor on surface casing. BOPE will be nipped up and tested after cementing surface casing. Subsequent tests will be performed as needed, not to exceed 30 days. The field report from FMC Technologies and BOP test information will be provided in a subsequent report at the end of the well. Please see the attached wellhead schematic. An installation manual has been placed on file with the BLM office and remains unchanged from previous submittal. All tests performed by third party.

4. CASING PROGRAM

a. The proposed casing program will be as follows:

Purpose	From	To	Hole Size	Csg Size	Weight	Grade	Thread	Condition
Surface	0'	450'	17-1/2"	13-3/8"	54.5 #	J-55	BTC	New
Intermediate	0'	2,115'	12-1/4"	9-5/8"	40#	L-80	BTC	New
Production	0'	9,136'	8-3/4"	7"	29.0 #	P-110	BLUE	New
Production Liner	8,836'	20,308'	6-1/8"	4-1/2"	11.6 #	P-110	W521	New

b. Casing design subject to revision based on geologic conditions encountered.

A "Worst Case" casing design for wells in a particular area is used below to calculate the Casing Safety Factors. If for any reason the

c. casing design for a particular well requires setting casing deeper than the following "worst case" design, then the Casing Safety Factors will be recalculated & sent to the BLM prior to drilling.

d. Chevron will fill casing at a minimum of every 20 jts (~840') while running for intermediate and production casing in order to maintain collapse SF.

SF Calculations based on the following "Worst Case" casing design:

Surface Casing:	450'	ftTVD
Intermediate Casing:	2,580'	ftTVD
Production Casing:	9,350'	ftTVD
Production Casing:	20,308'	ftMD

Casing String	Min SF Burst	Min SF Collapse	Min SF Tension	Min SF Tri-Axial
Surface	1.41	5.09	3.56	1.54
Intermediate	2.93	3.02	4.63	3.48
Production	1.14	1.86	1.62	1.41
Production Liner	1.13	1.28	1.92	1.36

The following worst case load cases were considered for calculation of the above Min. Safety Factors:

Burst Design	Surf	Int	Prod	Prod Lnr
Pressure Test- Surface, Int, Prod Csg P external: Mud weight above TOC, PP below P internal: Test psi + next section heaviest mud in csg	X	X	X	X
Displace to Gas- Surf Csg P external: Mud weight above TOC, PP below P internal: Dry Gas from Next Csg Point	X			
Gas over mud (60/40) - Int Csg P external: Mud weight above TOC, PP below P internal: 60% gas over 40% mud from hole TD PP		X		
Stimulation (Frac) Pressures- Prod Csg P external: Mud weight above TOC, PP below P internal: Max inj pressure w/ heaviest injected fluid			X	X
Tubing leak- Prod Csg (packer at KOP) P external: Mud weight above TOC, PP below P internal: Leak just below surf, 8.45 ppg packer fluid			X	X
Collapse Design	Surf	Int	Prod	Prod
Full Evacuation P external: Mud weight gradient P internal: none	X	X	X	X
Cementing- Surf, Int, Prod Csg P external: Wet cement P internal: displacement fluid - water	X	X	X	X
Tension Design	Surf	Int	Prod	Prod
100k lb overpull	X	X	X	X

5. **CEMENTING PROGRAM**

Slurry	Type	Top	Bottom	Sacks	Yield	Density	%Excess	Water	Volume	Additives
Surface					(cu.ft/sk)	(ppg)	Open Hole	gal/sk	cuft.	
Tail	Class C	0'	450'	377	1.33	14.8	10	6.37	501	Extender, Antifoam, Retarder
Intermediate Csg.										
Lead	Class C	0'	1,115'	150	2.56	11.9	10	14.66	384	Extender, Antifoam, Retarder, Viscosifier
Tail	Class C	1,115'	2,115'	287	1.33	14.8	10	6.38	382	Extender, Antifoam, Retarder, Viscosifier
Production										
Lead	Class C	1,815'	8,500'	565	2.46	11.9	10	14.05	1391	Extender, Antifoam, Retarder, Viscosifier
Tail	Class C	8,636'	9,136'	59	1.4	14.5	10	6.77	83	Extender, Antifoam, Retarder, Viscosifier
Production Liner										
Lead	Class C	8,836'	19,308'	775	1.4	14.5	10	6.77	1085	Extender, Antifoam, Retarder, Viscosifier
Tail	Acid Sol Class H	19,308'	20,308'	47	2.19	15	10	9.54	104	Extender, Antifoam, Retarder, Viscosifier

1. Final cement volumes will be determined by caliper.
2. Surface casing shall have at least one centralizer installed on each of the bottom three joints starting with the shoe joint.
3. Production casing will have one solid body type centralizer on every joint in the lateral, then every other joint to KOP. Bowspring type centralizers will be run from KOP to intermediate casing and surface.

6. MUD PROGRAM

From	To	Type	Weight	Viscosity	Filtrate	Notes
0'	450'	Fresh water mud	8.3 - 8.9	26-30	N/C	
450'	2,115'	Brine	9.5 - 10.2	40-45	<20	
2,115'	9,136'	WBM	8.3 - 9.6	40-45	<20	
9,136'	20,308'	OBM	9.2 - 11.6	50-80	12 - 15	Due to wellbore stability, the mud program may exceed the MW weight window needed to maintain overburden of pore pressure.

A closed system will be used consisting of above ground steel tanks. All wastes accumulated during drilling operations will be contained in a portable trash cage and removed from location and deposited in an approved sanitary landfill. Sanitary wastes will be contained in a chemical porta-toilet and then hauled to an approved sanitary landfill.

All fluids and cuttings will be disposed of in accordance with New Mexico Oil Conservation Division rules and regulations. And transporting of E&P waste will follow EPA regulations and accompanying manifests.

A mud test shall be performed every 24 hours after mudding up to determine, as applicable: density, viscosity, gel strength, filtration, and pH.

Visual mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume. When abnormal pressures are anticipated – a pit volume totalizer (PVT), stroke counter, and flow sensor will be used to detect volume changes indicating loss or gain of circulating fluid volume.

A weighting agent and lost circulating material (LCM) will be onsite to mitigate pressure or lost circulation as hole conditions dictate.

7. TESTING, LOGGING, AND CORING

The anticipated type and amount of testing, logging, and coring are as follows:

- a. Drill stem tests are not planned.
- b. The logging program will be as follows:

TYPE	Logs	Interval	Timing
Mudlogs	2 man mudlog	Surface casing shoe through prod hole TD	While drilling or circulating
LWD	MWD Gamma	Int. and Prod. Hole	While Drilling

- c. Conventional whole core samples are not planned.
- d. A directional survey will be run.

8. ABNORMAL PRESSURES AND HYDROGEN SULFIDE

- a. No abnormal pressure or temperatures are expected. Estimated BHP is: 3,897 psi
- b. Hydrogen sulfide gas is not anticipated. An H2S Contingency plan is attached with this APD in the event that H2S is encountered

**PECOS DISTRICT
DRILLING CONDITIONS OF APPROVAL**

**OPERATOR'S NAME: CHEVRON USA INCORPORATED
LEASE NO.: NMNM100549
COUNTY: EDDY**

HH SO 8 5 FED 004 1H

LOCATION: Section 17, T.26 S., R.27 E., NMPM
SURFACE HOLE FOOTAGE: 783'/N & 1584'/E
BOTTOM HOLE FOOTAGE: 280'/S & 1590'/E

HH SO 8 5 FED 004 2H

LOCATION: Section 17, T.26 S., R.27 E., NMPM
SURFACE HOLE FOOTAGE: 783'/N & 1559'/E
BOTTOM HOLE FOOTAGE: 280'/S & 1254'/E

HH SO 8 5 FED 004 3H

LOCATION: Section 17, T.26 S., R.27 E., NMPM
SURFACE HOLE FOOTAGE: 783'/N & 1534'/E
BOTTOM HOLE FOOTAGE: 280'/S & 1170'/E

HH SO 8 5 FED 004 4H

LOCATION: Section 17, T.26 S., R.27 E., NMPM
SURFACE HOLE FOOTAGE: 783'/N & 1509'/E
BOTTOM HOLE FOOTAGE: 280'/S & 750'/E

HH SO 8 5 FED 004 5H

LOCATION: Section 17, T.26 S., R.27 E., NMPM
SURFACE HOLE FOOTAGE: 783'/N & 1484'/E
BOTTOM HOLE FOOTAGE: 280'/S & 30'/E

HH SO 8 5 FED 004 6H

LOCATION: Section 17, T.26 S., R.27 E., NMPM
SURFACE HOLE FOOTAGE: 783'/N & 1459'/E
BOTTOM HOLE FOOTAGE: 280'/S & 330'/E

ALL PREVIOUS COAs STILL APPLY.

A. CASING

Primary Casing Design:

1. The **13-3/8** inch surface casing shall be set at approximately **450** feet (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8 hours** or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)
 - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing is:

Option 1 (Single Stage):

- Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.**

Option 2:

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.
- b. Second stage above DV tool:

- Cement to surface. If cement does not circulate, contact the appropriate BLM office.

Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst or potash.

- ❖ In **High Cave/Karst Areas** if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.

3. The minimum required fill of cement behind the 7 inch production casing is:

Option 1 (Single Stage):

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

Option 2:

Operator has proposed a DV tool, the depth may be adjusted as long as the cement is changed proportionally. The DV tool may be cancelled if cement circulates to surface on the first stage.

- a. First stage to DV tool: Cement to circulate. If cement does not circulate off the DV tool, contact the appropriate BLM office before proceeding with second stage cement job.

- b. Second stage above DV tool:

- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

4. The minimum required fill of cement behind the 4-1/2 inch production liner is:

- Cement should tie-back **100 feet** into the previous casing. Operator shall provide method of verification.

B. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).

- 2.

Option 1:

- a. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.

Option 2:

1. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **5000 (5M)** psi.
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.

GENERAL REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

Chaves and Roosevelt Counties
Call the Roswell Field Office, 2909 West Second St., Roswell NM 88201.
During office hours call (575) 627-0272.
After office hours call (575)

Eddy County
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,
(575) 361-2822

Lea County
Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240, (575)
393-3612

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
 - b. When the operator proposes to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - BOP/BOPE test to be conducted per Onshore Oil and Gas Order No. 2 as soon as 2nd Rig is rigged up on well.
2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
- 3: Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a

larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. Whenever any seal subject to test pressure is broken, all the tests in OOGO2.III.A.2.i must be followed.
 - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been

done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).

- b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the plug. However, **no tests** shall commence until the cement has had a minimum of 24 hours setup time, except the casing pressure test can be initiated immediately after bumping the plug (only applies to single stage cement jobs).
- c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.
- e. The results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test

does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

NMK7192019

Wedge 521®

Printed on: 05/09/2019



Outside Diameter	4.500 in.	Min. Wall Thickness	87.5%	(*) Grade P110	
Wall Thickness	0.250 in.	Connection OD Option	REGULAR	COUPLING	PIPE BODY
Grade	P110*	Drift	API Standard	Body: White	1st Band: White
		Type	Casing	1st Band: -	2nd Band: -
				2nd Band: -	3rd Band: -
				3rd Band: -	4th Band: -

PIPE BODY DATA

GEOMETRY

Nominal OD	4.500 in.	Nominal Weight	11.60 lbs/ft	Drift	3.875 in.
Nominal ID	4.000 in.	Wall Thickness	0.250 in.	Plain End Weight	11.36 lbs/ft
OD Tolerance	API				

PERFORMANCE

Body Yield Strength	367 x1000 lbs	Internal Yield	10690 psi	SMYS	110000 psi
Collapse	7580 psi				

CONNECTION DATA

GEOMETRY

Connection OD	4.695 in.	Connection ID	3.960 in.	Make-up Loss	3.620 in.
Threads per in	3.36	Connection OD Option	REGULAR		

PERFORMANCE

Tension Efficiency	64.2 %	Joint Yield Strength	235.614 x1000 lbs	Internal Pressure Capacity	10690.000 psi
Compression Efficiency	84.8 %	Compression Strength	311.216 x1000 lbs	Max. Allowable Bending	71.9 °/100 ft
External Pressure Capacity	7580.000 psi				

MAKE-UP TORQUES

Minimum	3600 ft-lbs	Optimum	4300 ft-lbs	Maximum	6300 ft-lbs
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OPERATION LIMIT TORQUES

Operating Torque	14000 ft-lbs	Yield Torque	21000 ft-lbs
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Notes

This connection is fully interchangeable with:

Wedge 521® - 4.5 in. - 10.5 / 11 / 12.6 / 13.5 lbs/ft

Connections with Dopeless® Technology are fully compatible with the same connection in its Standard version

For further information on concepts indicated in this datasheet, download the Datasheet Manual from www.tenaris.com

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Print Datasheet Comparison

2 selected connections



Blue®

Blue®-SD

Min. Wall
Thickness: 87.5
Drift: API Standard
Type: Casing
Connection OD Option:
REGULAR

Min. Wall
Thickness: 87.5
Drift: Special Drift
Type: Casing
Connection OD Option:
REGULAR

Pipe Features

Outside Diameter	7 in.	7 in.
Wall Thickness (Weight)	0.408 in.(lbs/ft)	0.408 in.(lbs/ft)
Grade Tenaris Grades	P110	P110

PIPE BODY DATA

GEOMETRY

Nominal OD	7 in.	7 in.
OD Tolerance	API	API
Nominal Weight	29.00 lbs/ft	29.00 lbs/ft
Drift	6.059 in.	6.125 in.

Nominal ID	6.184 in.	6.184 in.
Wall Thickness	0.408 in.	0.408 in.
Plain End Weight	28.75 lbs/ft	28.75 lbs/ft

PERFORMANCE

Collapse	8530 psi	8530 psi
Body Yield Strength	929 x1000 lbs	929 x1000 lbs
Internal Yield	11220 psi	11220 psi
SMYS	110000 psi	110000 psi

CONNECTION DATA

GEOMETRY

Connection OD	7.677 in.	7.68 in.
Coupling Length	10.551 in.	10.55 in.
Connection ID	6.118 in.	6.19 in.
Make-up Loss	4.480 in.	4.480 in.
Threads per in	4	4
Connection OD Option	REGULAR	REGULAR

PERFORMANCE

Tension Efficiency	100.0 %	100.0 %
Joint Yield Strength	929 x1000 lbs	929 x1000 lbs
Internal Pressure Capacity	11220 psi	11220 psi
Compression Efficiency	100 %	89.3 %
Compression Strength	929 x1000 lbs	829.597 x1000 lbs
Max. Allowable Bending	72 °/100 ft	64.3 °/100 ft

External Pressure Capacity	8530 psi	8530 psi
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Coupling Face Load	433000 lbs	433000 lbs
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MAKE-UP TORQUES

Minimum	10480 ft-lbs	9060 ft-lbs
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Optimum	11640 ft-lbs	10070 ft-lbs
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Maximum	12800 ft-lbs	11080 ft-lbs
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SHOULDER TORQUES

Minimum	1750 ft-lbs	1510 ft-lbs
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Maximum	9890 ft-lbs	8560 ft-lbs
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OPERATION LIMIT TORQUES

Operating Torque	29100 ft-lbs	25220 ft-lbs
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Yield Torque	36380 ft-lbs	31520 ft-lbs
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Notes

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