Form 3160-5
(June 2015)

OCD – REC'D 6/18/2020

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.***

***SUBMIT IN TRIPLICATE - Other instructions on page 2***

5. Lease Serial No.
NMNM107369

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.
NMNM137168A

1. Type of Well
☐ Oil Well ☒ Gas Well ☐ Other

8. Well Name and No.
CICADA UNIT 19H

2. Name of Operator
CHEVRON USA INCORPORATED
Contact: LAURA BECERRA
E-Mail: LBECERRA@CHEVRON.COM

9. API Well No.
30-015-45426-00-X1

3a. Address
6301 DEAUVILLE BLVD
MIDLAND, TX 79706

3b. Phone No. (include area code)
Ph: 432-687-7665

10. Field and Pool or Exploratory Area
PURPLE SAGE-WOLFCAMP (GAS)

4. Location of Well *(Footage, Sec., T., R., M., or Survey Description)*
Sec 35 T25S R27E NWNW 245FNL 1060FWL
32.093079 N Lat, 104.165619 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 | | | |
|---|---|---|---|---|
| ☒ Notice of Intent | ☐ Acidize | ☐ Deepen | ☐ Production (Start/Resume) | ☐ Water Shut-Off |
| ☐ Subsequent Report | ☐ Alter Casing | ☐ Hydraulic Fracturing | ☐ Reclamation | ☐ Well Integrity |
| ☐ Final Abandonment Notice | ☐ Casing Repair | ☐ New Construction | ☐ Recomplete | ☒ Other Hydraulic Fracture |
| | ☐ Change Plans | ☐ Plug and Abandon | ☐ Temporarily Abandon | |
| | ☐ Convert to Injection | ☐ Plug Back | ☐ 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 submits the attached Frac Operations Plan with a detailed annulus pressure mitigation plan as discussed with Mandela Kamau on March 13, 2020.

gc 6/23/2020

Accepted for record – NMOCD

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

**Electronic Submission #515256 verified by the BLM Well Information System**
**For CHEVRON USA INCORPORATED, sent to the Carlsbad**
**Committed to AFMSS for processing by PRISCILLA PEREZ on 05/14/2020 (20PP2805SE)**

Name *(Printed/Typed)* LAURA BECERRA — Title REGULATORY SPECIALIST

Signature (Electronic Submission) — Date 05/13/2020

## THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By ACCEPTED — Title JONATHON SHEPARD PETROLEUM ENGINEER — Date 06/11/2020

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 ****

## Revisions to Operator-Submitted EC Data for Sundry Notice #515256

| | Operator Submitted | BLM Revised (AFMSS) |
|---|---|---|
| Sundry Type: | HF<br>NOI | HF<br>NOI |
| Lease: | NMNM107369 | NMNM107369 |
| Agreement: | NMNM137168A | NMNM137168A (NMNM137168A) |
| Operator: | CHEVRON USA INC<br>6301 DEAUVILLE BLVD<br>MIDLAND, TX 79706<br>Ph: 432-687-7665 | CHEVRON USA INCORPORATED<br>6301 DEAUVILLE BLVD<br>MIDLAND, TX 79706<br>Ph: 432 687 7100 |
| Admin Contact: | LAURA BECERRA<br>REGULATORY SPECIALIST<br>E-Mail: LBECERRA@CHEVRON.COM<br><br>Ph: 432-687-7665 | LAURA BECERRA<br>REGULATORY SPECIALIST<br>E-Mail: LBECERRA@CHEVRON.COM<br><br>Ph: 432-687-7665 |
| Tech Contact: | LAURA BECERRA<br>REGULATORY SPECIALIST<br>E-Mail: LBECERRA@CHEVRON.COM<br><br>Ph: 432-687-7665 | LAURA BECERRA<br>REGULATORY SPECIALIST<br>E-Mail: LBECERRA@CHEVRON.COM<br><br>Ph: 432-687-7665 |
| Location:<br>State:<br>County: | <br>NM<br>EDDY | <br>NM<br>EDDY |
| Field/Pool: | PURPLE SAGE;WOLFCAMP (GAS | PURPLE SAGE-WOLFCAMP (GAS) |
| Well/Facility: | CICADA UNIT 19H<br>Sec 35 T25S R27E Mer NMP NWNW 245FNL 1060FWL | CICADA UNIT 19H<br>Sec 35 T25S R27E NWNW 245FNL 1060FWL<br>32.093079 N Lat, 104.165619 W Lon |

# Delaware Basin
# Variance / Sundry for Federal Well

## Well Names:

| Well Name | | API |
|---|---|---|
| Cicada Unit | 19H | 30-015-45426 |

## CVX CONTACT:


Hannah Wardo
Wells Engineer

**MidContinent Business Unit**
Chevron North America Exploration & Production
1400 Smith St, Rm 43-174, Houston, TX 77002
Mobile: 832.963.9814
Office: 713.372.9032
Email: Hannah.Wardo@chevron.com

**Ben Krane**
Completions Engineer
Ben.Krane@chevron.com

**Chevron North American Exploration & Production**
1400 Smith St., 43163
Houston, TX 77002
Tel: 713-372-2497
Mobile: 661-388-8034

**Chevron is respectfully seeking approval to conduct frac operations as shown below:**
*1st Notification to BLM:* Phone call with Mandela on 3/13 and a follow-up email was sent with the details listed below.

**Background:** After cementing the production casing on Cicada Unit 19H in HNM Pad 1 Pkg 13 the initial CBL performed during Site Prep showed the TOC at 9240'. Shortly after this CBL was run the production by intermediate annulus showed 2500 psi. This pressure was bled down but returned within 24 hours. On 1/17/20 a USIT log was run but the results were insufficient. A second USIT run was made under 6000 psi from 10,270' to surface. The results were sent to ETC which concluded that there is a full column of cement from 10270' to surface but there are at least 1, possibly 2, channels that run the length of the vertical wellbore. The production by intermediate annulus was then bled to 0 psi form 2700 psi. This fluid bled off was gas except for 1 bbl of 8.4 ppg fluid which was collected during the last 1000 psi bled off. The pressure built back up to 400 psi over night and was bled to zero one last time on 1/29/20. The annulus pressure has been monitored ever since and stabilized at 2200 psi on 2/18/20. The option to remediate the well pre-frac has an extremely high likelihood of failure so the recommendation is to frac while managing backside pressure below maximum allowable wellhead operating pressure. Currently pending approval by BLM & Chevron before proceeding.

**Casing and MAWOP Information:** The burst and collapse pressures for each string of casing used in the well are listed below. The annulus pressure mitigation plan will be strictly followed to ensure that pressure never exceeds the mechanical limits of the 19H intermediate annulus. Chevron also has safety factors on top of these spec limits that will be discussed later where they are applicable.

| Selection Dropdown | Description | Size | Weight (lb/ft) | Grade | ID | Drift | Collapse Resistance (psi) | Internal Yield Pressure (psi) | Joint Yield Strength Lb. |
|---|---|---|---|---|---|---|---|---|---|
| Surface Casing - 13 3/8"-54.5# | Surface Casing | 13 3/8 | 54.5 | J-55 | 12.615 | 12.459 | 1130 | 2730 | 853000 |
| Intermediate Casing - 9 5/8"-43.5# | Intermediate Casing | 9 5/8 | 43.5 | L80-IC | 8.755 | 8.599 | 4830 | 6330 | 1005000 |
| Production Casing - 5 1/2"-20# | Production Casing | 5 1/2 | 20 | P110-IC | 4.778 | 4.653 | 12100 | 12630 | 641000 |

The following table was created for MAWOP using the FW shoe break down & worst-case scenario of 13.1 ppg mud on the backside:

| | Cicada Unit 19H | Cicada Unit 20H | Cicada Unit 21H | Cicada Unit 21H |
|---|---|---|---|---|
| C Annulus MAWOP (psi) | 163 | 164 | 172 | 171 |
| B Annulus MAWOP (psi) | 2911 (FW Shoe) / 3232 (mech) | 2179 | 2935 | 2197 |
| C Annulus Pop Off Set @ | 100 | 100 | 100 | 100 |
| B Annulus Pop Off Set @ | 2900 (FW Shoe) / 3200 (mech) | 2100 | 2900 | 2100 |

The table above shows the Maximum Allowable Wellhead Operating Pressure (MAWOP) that were calculated for both the intermediate shoe breakdown pressure using a fresh water (FW) gradient and for the weakest mechanical component (9-5/8" intermediate casing burst). The MAWOP for the shoe deviates from Chevron MCBU's standard practice of using a hydrostatic column of the mud weight that the casing was set in and instead uses a FW gradient. This has a safety factor being that the channels were likely caused by reservoir fluids/pressure that are lighter than FW. For the weakest mechanical component, all loads the exposed strings (5.5" production casing & 9-5/8" intermediate casing) could see were analyzed. The highest risk or first limiting factor was the burst load on the 9-5/8" intermediate casing due to the lack of isolation from the induced frac pressure.

Chevrons casing design process and applied required safety factors were utilized to determine the mechanical MAWOP. A design factor of 1.2 for burst was applied and assumed the worst case hydrostatic of 13.1 ppg for the internal pressure profile. As per Chevron's casing design standard, an expected pore pressure (PP) of 8.9 ppg was used for the force calculations on the backside of the intermediate casing even though records show there is competent cement on the backside. When utilizing those values, it was determined that the MAWOP, including all safety factors, should remain below 3232 psi to prevent the burst of the intermediate casing.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Well TVD | 9992 | ft | | | | | |
| Shoe TVD | 9329 | ft | | | | | |
| MW in Annulus (Ran 5.5) | 13.1 | ppg | HP at Shoe | 6354.915 | | | |
| Fluid weight in Prod Csg | 8.33 | ppg | | | | | |
| Anticipated SP | 9000 | psi | | | | | |
| Anticipated Friction psi | 4000 | psi | | | | | |
| Induced BHP during Injection | 9328.13472 | psi | SP as Result | 2521.584 | SP+HP @Shoe | 8876.499 | |
| Max anticipated BHP in area | 6027 | psi | SP as Result | -779.376 | SP+HP @Shoe | 5575.539 | |

| Exposed Casing Strings | Burst Rtg (psi) | w/ SF (1.2) | Set TVD | Exp PP |
|---|---|---|---|---|
| 9-5/8" | 6330 | 5275 | 9329 | 8.9 |

| Load Case | | | |
|---|---|---|---|
| Exposed Casing Strings | External P (mid PP) | Internal 1 (HP) | MAWOP |
| 9-5/8" | 4311.951177 | 6354.9148 | 3232.04 |

**Forward Plan:** The proposal is to frac the well while monitoring pressure in the annulus and adhering to the same procedure and mitigations that have previously been endorsed by Chevron and BLM with one alteration. The alteration is to allow MAWOP to be increased to the intermediate shoe breakdown pressure using a FW gradient instead of the drilling mud that was in the wellbore when the production casing was landed. If this pressure cannot be maintained the maximum pressure limit would increase to the weakest mechanical component of the well (9-5/8" casing burst). This allows the annulus pressure rise to a higher value thus minimizing the bleed off frequency of higher hydrostatic fluid. These wells will be permitted for commingling and will have a verbal and written email approval from BLM prior to starting frac. Recent and current pads have been successfully frac'd without cement in the casing shoe on one or more wells by following the annulus mitigation plan, after gaining BLM alignment (SD Pad 10 and currently frac'ing SD Pad 18). This plan falls within Chevron's approved annulus mitigation plan except for allowing the shoe to breakdown break down pressure and will gain approval from BLM for the same. See below for the details of the plan forward:

- Annulus pressure management equipment/iron will be installed, restrained and tested as per business partner P&IDs and Chevron SOPs during site prep
- Pop-off valves will be installed on all annuli and will be set to the approved MAWOP values listed in the completion program for the wells to ensure the pressure cannot exceed MAWOP
    - 19H: Intermediate Casing Burst
    - 20H/21H/22H: 9-5/8" shoe breakdown pressure
- Digital transducers will be set on all annuli and will be monitored at all times during hydraulic fracturing operations
    - Alarms will be set to trigger at 75% of MAWOP
        - 19H int x prod alarm will be set to 95% due to the safety factors already in place
- For each stage on 19H pressure will slowly be brought up while getting pumps to treating rate.
    - As each group of pumps is brought on, let the surface pressure stabilize and ensure there is no direct communication with the annulus. If direct communication with the annulus is observed and unable be kept at or below MAWOP, frac operations will cease on the well and a plan will be developed & approved by both CVX and BLM prior to resuming operations on that well.
- The standard annulus mitigation procedure will be followed with one exception for 19H:
    - If any annuli reaches 80% of MAWOP, then the annuli will be bled off to 25% of MAWOP or for a total of 5 gal (whichever is achieved first) through the choke manifold.
        - 19H will not be bled off until MAWOP is reached due to the safety factors mentioned above and to reduce the amount of hydrostatic pressure removed from the well.
    - If annulus pressure is rising during a stage and reaches 95% of MAWOP, the frac crew will go to flush and attempt to clear the well of sand to avoid a screen out. If the annular pressure reaches MAWOP, the crew will shut down the pumps immediately and allow pressure to bleed off.
    - If annulus pressure cannot be bled below the required threshold to continue hydraulic operations, operations will be stopped on that well until a plan is developed and approved by all required personnel within Chevron and BLM.
    - The annulus can be bled down up to two times during a stage. If a third bleed off is required, then the stage must be terminated, and you must move on to the next interval.

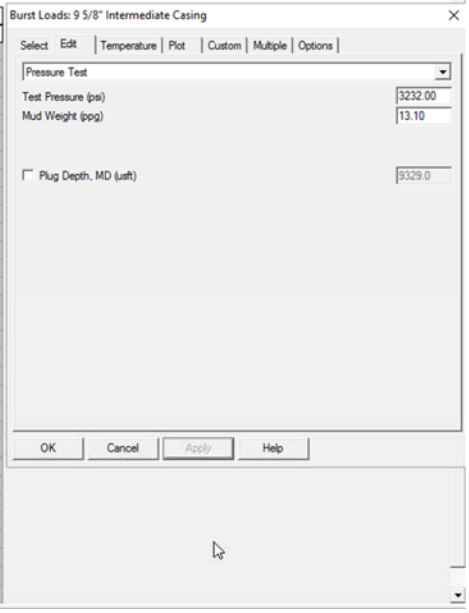
- If two stages in a row cannot be completed due to an inability to keep annulus pressure below the required threshold, then the well of concern will cease operations and will not resume hydraulic fracturing operations on that well until a plan is developed and approved by all required personnel within Chevron.

- This plan will be followed during site-prep, hydraulic fracturing operations, plug drill out operations and during the production of the well.
  - After hydraulic fracturing operations either before or after drill out an injection test will be performed on any annuli with pressure. If injection is sufficient to bullhead cement, the well will be remediated via bull heading cement down the annulus. If injection is not sufficient for injection, a test of the annulus will be performed and BLM will be notified of the results.

**Stress Check Results**

Minimum Safety Factors

| | Depth (MD) (usft) | OD/Weight/Grade | Connection | Minimum Safety Factor (Abs) | | | |
|---|---|---|---|---|---|---|---|
| | | | | Burst | Collapse | Axial | Triaxial |
| 1 | 33 | 9 5/8", 43.500 ppf, L-80 | LTC, L-80 | 1.46 B17 | 4.51 C2 | 1.81 A4 J | 1.62 B17 |
| 2 | 33 | | | 1.46 B17 | 4.51 C2 | 1.81 A4 J | 1.62 B17 |
| 3 | 450 | | | 1.47 B17 | 4.86 C2 | 1.87 A4 J | 1.63 B17 |
| 4 | 2000 | | | 1.52 B17 | 3.62 C4 | 2.16 A4 J | 1.68 B17 |
| 5 | 2250 | | | 1.52 B17 | 3.27 C4 | 2.22 A4 J | 1.69 B17 |
| 6 | 2250 | | | 1.52 B17 | 3.27 C4 | 2.00 A4 J | 1.68 B17 |
| 7 | 2307 | | | 1.53 B17 | 3.20 C4 | 2.01 A4 J | 1.69 B17 |
| 8 | 3482 | | | 1.56 B17 | 2.20 C4 | 2.26 A4 J | 1.73 B5 |
| 9 | 3520 | | | 1.56 B5 | 2.18 C4 | 2.27 A4 J | 1.73 B5 |
| 10 | 3540 | | | 1.56 B5 | 2.17 C4 | 2.27 A4 J | 1.73 B5 |
| 11 | 4815 | | | 1.45 B5 | 2.68 C4 | 2.63 A4 J | 1.59 B5 |
| 12 | 4815 | | | 1.45 B5 | 2.67 C4 | 2.63 A4 J | 1.61 B5 |
| 13 | 7017 | | | 1.30 B5 | 3.37 C2 | 3.59 A4 J | 1.41 B5 |
| 14 | 7329 | | | 1.28 B5 | 3.23 C2 | 3.78 A4 J | 1.39 B5 |
| 15 | 8663 | | | 1.20 B5 | 2.38 C2 | 4.93 A4 J | 1.29 B5 |
| 16 | 8749 | | | 1.22 B5 | 2.34 C2 | 5.03 A4 J | 1.30 B5 |
| 17 | 9104 | | | 1.20 B5 | 2.19 C2 | 5.49 A4 J | 1.28 B5 |
| 18 | 9194 | | | 1.23 B5 | 2.16 C2 | 5.61 A4 J | 1.31 B5 |
| 19 | 9200 | | | 1.23 B5 | 2.16 C2 | (4.55) C2 J | 1.31 B5 |
| 20 | 9201 | | | 1.23 B5 | 2.16 C2 | (4.55) C2 J | 1.31 B5 |
| 21 | 9328 | | | 1.31 B5 | 2.11 C2 | (4.42) C2 J | 1.39 B5 |
| 22 | 9329 | | | 1.31 B5 | 2.11 C2 | (4.42) C2 J | 1.39 B5 |
| 23 | | | | | | | |
| 24 | J | Connection Jump Out | | | | | |
| 25 | B5 | Pressure Test | | | | | |
| 26 | B17 | Gas over Mud Ratio | | | | | |
| 27 | C2 | Cementing | | | | | |
| 28 | C4 | Lost Returns with Mud Drop | | | | | |
| 29 | A4 | Overpull Force | | | | | |
| 30 | ( ) | Compression | | | | | |
| 31 | | | | | | | |




As you can see a surface pressure of 3232 psi on the intermediate by production casing annulus, assuming 13.1 ppg mud, is still within the 1.2 safety factor for the casing.