

**CAMECO RESOURCES
CROW BUTTE OPERATION**



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July 26, 2017

**USPS PRIORITY MAIL
SIGNATURE CONFIRMATION**

Marty Link, Water Quality Division Administrator
Nebraska Department of Environmental Quality
P.O. Box 98922
Lincoln, NE 68509-8922

Class I UIC Permit NE0211670
Deep Disposal Well #1 (DDW #1) Well Workover

Dear Ms. Link:

In accordance with Part II, F (1) of Class I UIC Permit NE0211670, Crow Butte is submitting for approval, a well workover procedure to be performed on the DDW #1. During the evening of July 8, 2017, the annulus pressure reading and seal pot fluid level on DDW #1 began to decrease. Over a twelve hour period the fluid level in the seal pot went from 28" to zero. During this same time period although the annulus pressure decreased it remained 150 psi above the injection pressure. As a result of the lost fluid in the seal pot, on July 9, 2017, at 8:30 a.m., the well was shut in until a third party consultant could mechanically integrity test the well. From July 12-15, 2017, various mechanical integrity tests were performed on the well. Based on these tests, it was been determined that the packer in this well had failed.

The following actions were taken:

July 12, 2017: Ran plug into tubing profile below the packer via electric line; conducted successful internal tubing pressure test from 875.5 to 857.3 psi for 1 hour (2% loss)
Conducted annulus pressure test from 866.0 to 540.2 psi for 1 hour (37.6% loss); retrieved plug from profile.

July 13, 2017: Rigged-up workover rig; released packer and pulled 28 joints injection tubing.

July 14, 2017: Pulled remaining tubing; picked-up workstring and casing scraper; ran scraper to 3,518' KB; Picked-up retrievable bridge plug (RBP) and work packer.

July 15, 2017: Ran in with RBP and packer and tested the following intervals with various tool configurations (note all casing pressure tests passed);



- Test 1 - retrievable bridge plug (RBP) set at 3,418' KB; Packer not set; Test all casing above 3,418' KB; Lost 6.7% after 60 min (test passed) with an observed leak at the power swivel connection (rig equipment)
- Test 2 - RBP set at 3,424' KB; Packer not set; Test all casing above 3,424' KB; gained 0.4% after 65 min (test passed)
- Test 3 - RBP set at 3,424' KB; Packer set at 3,320' KB; Test casing between 3,424' and 3,320' KB; Lost 0.6% after 40 min (test passed)
- Test 4 - RBP set at 3,424' KB; Packer set at 3,015' KB; Test casing between 3,424' and 3,015' KB; Gained 0.2% after 20 min (test passed)
- Test 5 - RBP set at 3,424' KB; Packer set at 3,015' KB; Test casing above 3,015' KB; Lost 1.0% after 30 min (test passed)

Test Result Summary

Test #	1
RBP Depth (ft KB)	3,418
Packer	na
Note: Leak in swivel	
dt	Pressure
(min)	(psi)
1	925
60	862.8
% loss	6.7

Test #	2
RBP	3,424
Packer	na
Removed swivel	
dt	Pressure
(min)	(psi)
1	961.8
65	965.3
% loss	-0.4

Test #	3
RBP	3,424
Packer	3,320
dt	Pressure
(min)	(psi)
1	907
40	901.4
% loss	0.6
Test #	5
RBP	3,424

Test #	4
RBP	3,424
Packer	3,015
dt	Pressure
(min)	(psi)
1	868
20	869.4
% loss	-0.2



Packer	3,015
Backside test	
dt	Pressure
(min)	(psi)
1	922
30	912.9
% loss	1

Test 2 is the most representative of the required MIT for casing pressure test as the RBP was set one foot below the last packer setting depth and was run for more than 1 hour with no leaks observed at surface (as with Test 1). The test was passed with no net pressure loss observed thus demonstrating casing integrity.

From this information, it was determined that the MIT failure mechanism must have been the packer.

July 16, 2017: Scanned out tools/equipment; sent the crews home; equipment was put on standby.

Crow Butte scheduled a tubing and packer replacement that began on July 19, 2017. The work was supervised by Petrotek (consultant) and completed by Key Energy Services (vendor).

The following items were completed:

1. Ran in with workstring and pulled the RBP.
2. Ran in with new nickel-coated packer (7" Baker Hornet) on 4 ½" 11.6# casing ran as injection tubing to 3,423' KB.
3. Some of the existing joints on the pulled injection string along with some uncoated joints were used and will be replaced with 4 ½" 11.6 lb/ft L-80 LTC casing (run as tubing) coated with TK-99 and KC couplings as soon as the materials are available. (Estimated 4-8 weeks)
4. Displaced annulus with packer fluid; set the packer at 3,423' KB.
5. Successfully performed a MIT in accordance with Part B, Section 6 on the Class I UIC Permit (NE0211670).
6. On July 21, 2017, returned the well to service following NDEQ approval.

On July 23, 2017 at 10:23 a.m. the well was operating at an annulus pressure of 606.6 psi and a seal pot reading of 17 5/8". At 10:46 a.m., the annulus pressure had decreased to 574.4 psi and the seal

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pot had declined to 15 3/4" as a result of these decreases the well was shut in at 12:10 p.m. The NDEQ was notified on July 24, 2017, that the well had been shut in.

On July 25, 2017, a third party consultant ran a plug into the injection tubing profile below the packer via electric line and conducted a successful internal tubing pressure test and annulus pressure test. When the pressure was released from the injection tubing it caused a drop in the annulus pressure indicating that when the well is operating under a vacuum annulus fluid is being pulled into the injection tubing through a leaking joint.

Proposed Corrective Action Plan/Workover

July 26, 2017

1. Spot drilling rig and rig up to the well.
2. Release the packer, trip out the injection tubing string and lay tubing string down.
3. Receive new uncoated injection tubing (93 joints).

July 27-28, 2017

1. Run in the well with new injection tubing.
2. Set the packer at the current depth and make up the wellhead.
3. Perform a MIT in accordance with Part B, Section 6 on the Class I UIC Permit (NE0211670).
4. Connect surface piping
5. Put the well back into service upon NDEQ approval.

If you have any questions regarding this submittal, please feel free to contact me at (308) 665-2215, ext. 122.

Sincerely,
Cameco Resources
Crow Butte Operation

Bob Tiensvold
Restoration Manager

cc: Ron Burrows - NRC
CBO - File
cc: CR - Electronic File
Dave Miesbach - NDEQ Groundwater Unit Supervisor
Kory Winters - NDEQ Field Office
Amanda Jones - NDEQ Program Coordinator