

**CAMECO RESOURCES  
CROW BUTTE OPERATION**



**86 Crow Butte Road  
P.O. Box 169  
Crawford, Nebraska 69339-0169**

**(308) 665-2215  
(308) 665-2341 – FAX**

September 19, 2017

USPS PRIORITY MAIL  
SIGNATURE CONFIRMATION

ATTN: Document Control Desk, Director  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

Subject: Source Materials License SUA-1534  
Docket No. 40-8943  
Spill near Shallow Monitor Well SM10-18

Attn: Document Control Desk:

On August 29, 2017 during routine biweekly water sampling of Cameco Resources, Crow Butte Operation (CBO) shallow monitor well SM10-18, the single parameter upper control limits (SCL) for conductivity and chloride were exceeded. As required by License Condition 11.5 of Source Materials License SUA-1534, a second sample was collected within 24 hours and analyzed for the three excursion indicator parameters. The results of the second sample exceeded the SCL for chloride and conductivity.

On August 31, 2017, CBO submitted a letter to the NRC describing the events leading up to the excursion and the proposed corrective actions to be implemented to help mitigate the excursion. To ensure that the excursion in SM10-18 was not caused due to the failure of a well casing, CBO continued to perform mechanical integrity tests (MITs) on all nearby injection wells. The attached map of Wellhouse 51 shows the location of mining and monitor wells in this area of the mine. CBO performed MITs on I-5328, I-5333, I-5347, I-5348, and I-5349. All the wells successfully passed the MIT criteria. Copies of the Casing Integrity Test Report for each well, including SM10-18 and P5309I, are attached.

On September 12, 2017, while preparing to MIT P5309I, it was discovered that the injection well was leaking from a split in the wellhead casing several inches below the ground surface. Due to the amount of saturated soil and the green vegetation in the area, it appeared the well had been leaking for an extended period of time. Attached are the spill worksheets used to calculate the

NMS 520

**CAMECO RESOURCES  
CROW BUTTE OPERATION**



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**Document Control Desk Director  
September 19, 2017  
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volume of the spill which is estimated to be 27,287 gallons. A review of wellfield inspection records indicates that well P5309I was inspected on July 20, 2017 during routine wellfield inspections with no indication of a leak in this area.

Due to the proximity of P5309I to SM10-18 (approximately 275 feet southeast of SM10-18) it is possible that this spill may be contributing to the exceedance of the excursion parameters in SM10-18. CBO notified Mr. Ron Burrows of the spill on September 13, 2017.

On September 14, 2017, CBO installed an electric pump and motor down SM10-18 and connected the discharge to P-5327 so that the pumped solutions are returned to the Central Processing Plant. Currently the well is flowing at 11 gallons per minute. Continual purging of the well has been successful in lowering the excursion parameters. Graphs are attached for the three excursion indicator parameters and water levels that cover the period January 31, 2017 to September 19, 2017.

In accordance with License Condition 11.5, CBO has increased the sampling frequency for SM10-18 to weekly until three consecutive weekly samples are below the exceeded UCLs. CBO will continue weekly sampling for an additional three weeks after this goal has been achieved as required by CBO's NDEQ Class III UIC Permit requirements. If the well has not exceeded the UCLs after these samples, it will be returned to normal status.

If you have any questions or require any further information, please do not hesitate to call me at (308) 665-2215 ext 114.

Sincerely,  
CAMECO RESOURCES  
CROW BUTTE OPERATION

Larry Teahon  
SHEQ Manager









Enclosures: As Stated


cc: NRC – Deputy Director  
CBO – File


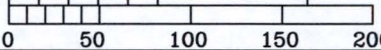
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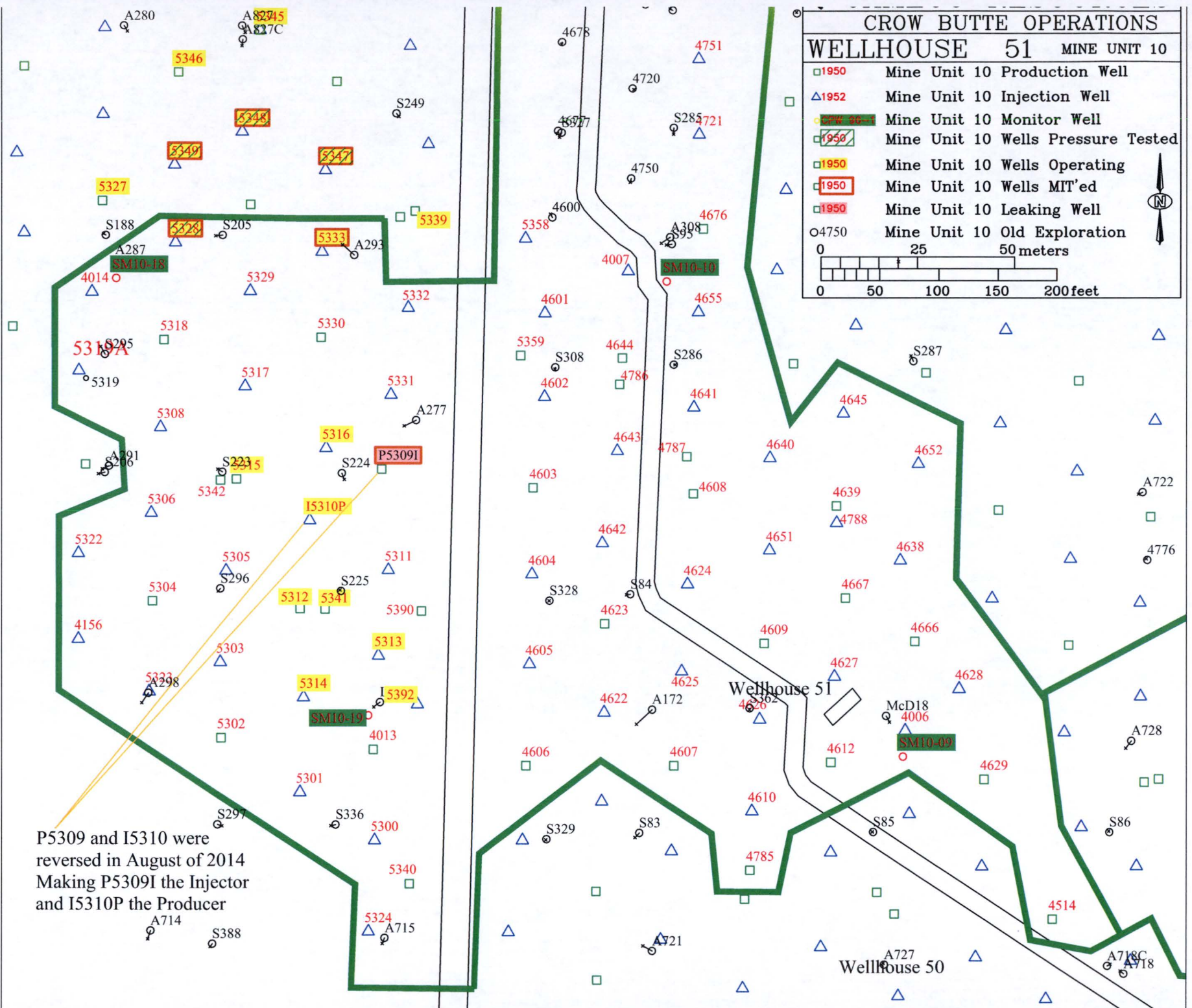
### CROW BUTTE OPERATIONS

#### WELLHOUSE 51 MINE UNIT 10

	Mine Unit 10 Production Well
	Mine Unit 10 Injection Well
	Mine Unit 10 Monitor Well
	Mine Unit 10 Wells Pressure Tested
	Mine Unit 10 Wells Operating
	Mine Unit 10 Wells MIT'ed
	Mine Unit 10 Leaking Well
	Mine Unit 10 Old Exploration





P5309 and I5310 were reversed in August of 2014 Making P5309I the Injector and I5310P the Producer

**CAMECO RESOURCES  
CROW BUTTE OPERATION**

**SPILL ANALYSIS WORKSHEET**

Spill Parameter		Data Entry Column	
Enter date of spill		September 12, 2017	
Enter the well and wellhouse or other location where the spill occurred		P5309L-51	
Enter an "x" in the box for production or injection		Production	
		Injection	x
Enter the volume of the spill in gallons (if known from operating data)		gal	
Enter the area affected by the spill in square feet		912	ft <sup>2</sup>
Enter the average depth of moisture in the spill area in inches		120	in
Calculated spill volume from affected area		27,287	gal
Maximum of known or calculated spill volumes from above		27,287	gal
Spill volume recovered:		0	gal
Spill volume used for reporting purposes (maximum minus volume recovered)		27,287	gal
Unat concentration in mg/l		0.9	mg/l
Ra226 concentration in pCi/l		1,130	pCi/l
Regulation	Condition	Enter Yes or No	Reporting Requirement
NDEQ Statute	Did the fluid enter a surface water of the state or threaten to enter a surface water of the state?	no	No reporting necessary
NDEQ Statute	Does the spill have the potential to affect shallow groundwater?	yes	Make management notifications (EMS Program, Volume VIII, Chapter 10) to telephone NDEQ within 24 hours and follow-up with a written report within seven days.
NDEQ Statute	Did the spill leave the area within the monitor well ring?	no	No reporting necessary
None	Does a condition exist that if not corrected may lead to a significant spill?	no	No reporting necessary
10 CFR 40.60(b)(1)	Did an unplanned contamination event occur that: required public or worker access to be restricted for more than 24 hours by imposing additional radiological controls or by prohibiting entry into the area; and, involved a quantity of material greater than five times the lowest annual intake specified in appendix B of 10 CFR part 20.1001-20.2401; and, required access to be restricted for a reason other than to allow isotopes with a half-life of less than 24 hours to decay prior to decontamination?	no	No reporting is necessary
10 CFR 40.60(a)	Did the cause of the spill involve an event that prevents immediate protective action necessary to avoid exposures of regulatory limits (fires, explosions, toxic gas release, etc.)?	no	No reporting is necessary
10 CFR Subpart M	Did the spill cause or threaten to cause an individual to receive an intake of 5 times the annual limit on intake (ALI) had the individual be present for 24 hours or received an intake in excess of one occupational annual limit on intake.	no	No reporting is necessary
Name of individual completing report		Pete Dunn	
Regulation	Condition	Result of Calculation	Reporting Requirement
10 CFR 40.60(b)(1)	Calculated activity of Ra226 released by this spill. If the spill involves a quantity of material greater than 5 times the lowest ALI listed in appendix B of 10 CFR 20, then the spill may be reportable under Subpart M. See the determination of reporting under 10 CFR 40.60 above (i.e., was access restricted for more than 24 hours).	1.17E+02 uCi	Reporting may be required pursuant to 10 CFR 40.60(b)(1); see above
10 CFR 40.60(b)(1)	Calculated activity of natural uranium released by this spill. If the spill involves a quantity of material greater than 5 times the lowest ALI listed in appendix B of 10 CFR 20, then the spill may be reportable reportable under Subpart M. See the determination of reporting under 10 CFR 40.60 above (i.e., was access restricted for more than 24 hours).	0.00E+00 uCi	Reporting not required

Instructions: Enter required data in shaded cells. When all data is entered, review conclusions in "Reporting Requirements" column. If reporting is required, make notifications per SHEQ Volume VIII, (CBR-EPRP-010).



**BASIC SPILL WORKSHEET**

Well ID: P5309I  
Date: \_\_\_\_\_

Operator: Pete Dunn  
Injector  Producer  Chemical

Area of Rectangular shapes – Record width(s), length(s), and moisture depth(s)

#1	Width (ft.) <u>24'</u>	Length (ft.) <u>33'</u>	<u>792</u>	Depth (in.) <u>120"</u>
#2	Width (ft.) <u>3'</u>	Length (ft.) <u>40'</u>	<u>120</u>	Depth (in.) <u>120"</u>
#3	Width (ft.) _____	Length (ft.) _____	_____	Depth (in.) _____

Or

Area of circular shapes -  $\pi r^2$  (3.14 x (1/2 diameter)<sup>2</sup>) \_\_\_\_\_ Depth (in.) \_\_\_\_\_  
Gallons recovered (if any) \_\_\_\_\_

Details of spill and other measurements (method of discovery, cause of spill, flow readings, etc) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

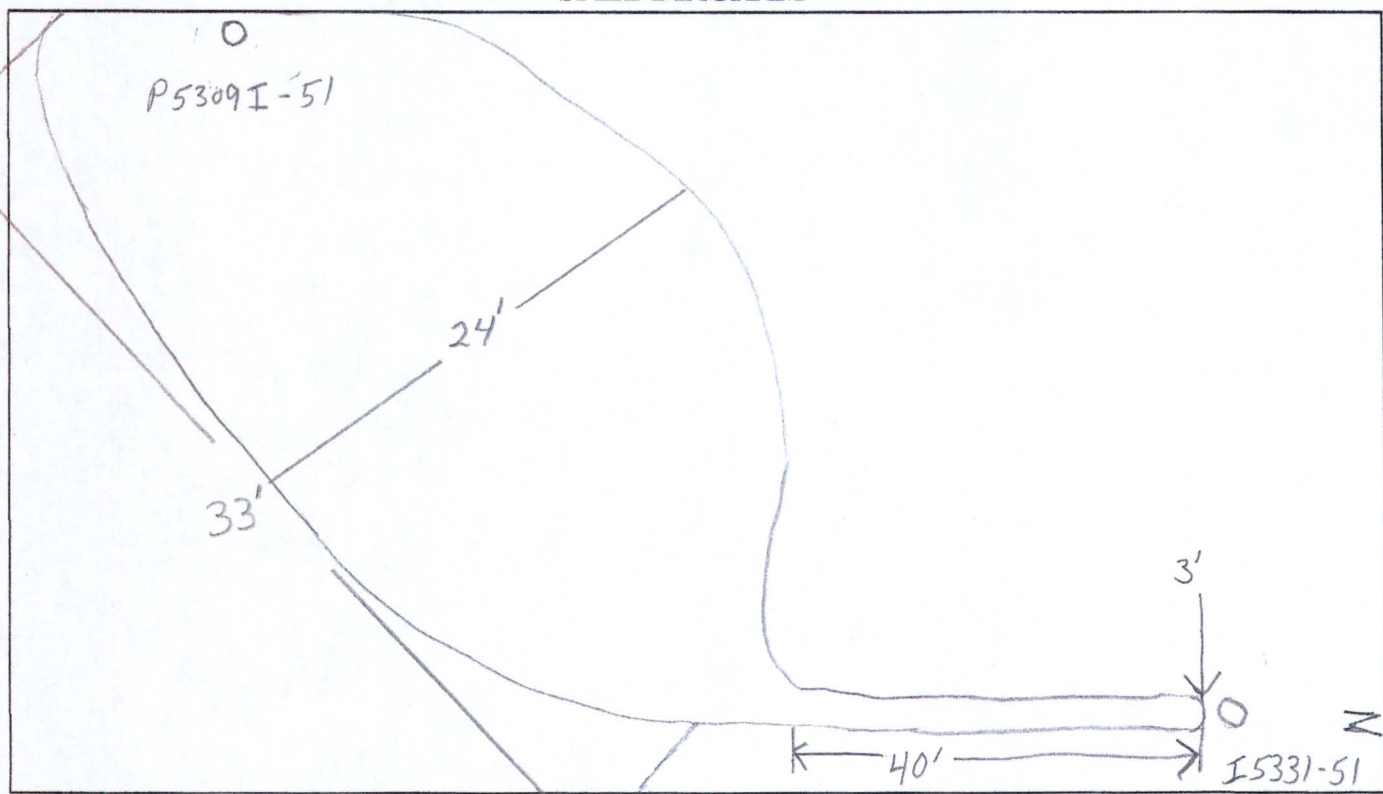
Northing \_\_\_\_\_ Easting \_\_\_\_\_ Distance to nearest: Community \_\_\_\_\_  
Stream \_\_\_\_\_ and Well/Dugout \_\_\_\_\_

Entered in Spill Notification Determination program: Date 9/13/17 Time 1400

Notifications made per program and SHEQ Volume VIII, CBR-EPRP-010:  
Person Notified: Bob Tiensvold Date and Time 9/12/17 1400

Signature: \_\_\_\_\_

**SPILL DIAGRAM**





# Nebraska Department of Environmental Quality

## Casing Integrity Test Report

Company: Crow Butte	Permit No: NE0122611
Project: Crow Butte	Well No: 5309
Casing Type: Certa-Lok	Diameter: 4.5 in.
Hole Depth: 420 ft.	Casing Depth: 419 ft.
Screened Interval 1 Top: 376 ft.	Screened Interval 2 Top: ft.
Screened Interval 1 Bottom: 405 ft.	Screened Interval 2 Bottom: ft.
Screened Interval 3 Top: ft.	Screened Interval 4 Top: ft.
Screened Interval 3 Bottom: ft.	Screened Interval 4 Bottom: ft.
Depth to K-Packer: 365 ft.	Depth to Test Packer(s) Top: <u>Ground Level</u> ft.
	Bottom: <u>353</u> ft.

Comments: work over

Time	Elapsed Time (Min)	Pressure (PSIG)
0855	0	125
0900	5	124
0905	10	123
0910	15	122
0915	20	121

Well Tag ID Number: 5309

Test Performed By: Rodger Robert

Date: 9-13-17

Calibration Performed By: Rodger Robert

Date: 9-13-17

### CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on inquiry of those individuals immediately responsible for obtaining information, I believe that the information is true, accurate, and complete. Further, I certify awareness that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

By Robert Dunn  
PRINTED NAME OF PERSON SIGNING

Senior Technician, Wellfield Operations  
TITLE

By Robert Dunn  
SIGNATURE

9-18-17  
DATE



# Nebraska Department of Environmental Quality

## Casing Integrity Test Report

Company: Crow Butte	Permit No: NE0122611
Project: Crow Butte	Well No: 5328
Casing Type: Certa-Lok	Diameter: 4.5 in.
Hole Depth: 430 ft.	Casing Depth: 419 ft.
Screened Interval 1 Top: 389 ft.	Screened Interval 2 Top: ft.
Screened Interval 1 Bottom: 408 ft.	Screened Interval 2 Bottom: ft.
Screened Interval 3 Top: ft.	Screened Interval 4 Top: ft.
Screened Interval 3 Bottom: ft.	Screened Interval 4 Bottom: ft.
Depth to K-Packer: 377 ft.	Depth to Test Packer(s) Top: <u>Ground Level</u> ft.
	Bottom: <u>368</u> ft.

Comments: 5yr Retest

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Time	Elapsed Time (Min)	Pressure (PSIG)
9:00	0	125
9:05	5	124
9:10	10	122
9:15	15	120
9:20	20	118

Well Tag ID Number: 5328

Test Performed By: Dominic

Date: 8/3/17

Calibration Performed By: D46

Date: 8/3/17

**CERTIFICATION**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on inquiry of those individuals immediately responsible for obtaining information, I believe that the information is true, accurate, and complete. Further, I certify awareness that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

By Robert Dunn

PRINTED NAME OF PERSON SIGNING

Senior Technician, Wellfield Operations

TITLE

By Robert Dunn

SIGNATURE

9-6-17

DATE



# Nebraska Department of Environmental Quality

## Casing Integrity Test Report

Company: Crow Butte	Permit No: NE0122611
Project: Crow Butte	Well No: 5333
Casing Type: Certa-Lok	Diameter: 4.5 in.
Hole Depth: 420 ft.	Casing Depth: 409 ft.
Screened Interval 1 Top: 378 ft.	Screened Interval 2 Top: ft.
Screened Interval 1 Bottom: 402 ft.	Screened Interval 2 Bottom: ft.
Screened Interval 3 Top: ft.	Screened Interval 4 Top: ft.
Screened Interval 3 Bottom: ft.	Screened Interval 4 Bottom: ft.
Depth to K-Packer: 367 ft.	Depth to Test Packer(s) Top: <i>Ground Level</i> ft.
	Bottom: <i>358</i> ft.

Comments: *Maint*

Time	Elapsed Time (Min)	Pressure (PSIG)
<i>11:00</i>	<i>0</i>	<i>125</i>
<i>11:05</i>	<i>5</i>	<i>124</i>
<i>11:10</i>	<i>10</i>	<i>122</i>
<i>11:15</i>	<i>15</i>	<i>121</i>
<i>11:20</i>	<i>20</i>	<i>120</i>

Well Tag ID Number: *5333*

Test Performed By: *Rodger Roberts*  
Date: *9-12-17*

Calibration Performed By: *Rodger Roberts*  
Date: *9-12-17*

**CERTIFICATION**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on inquiry of those individuals immediately responsible for obtaining information, I believe that the information is true, accurate, and complete. Further, I certify awareness that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

By <b>Robert Dunn</b>	Senior Technician, Wellfield Operations
<small>PRINTED NAME OF PERSON SIGNING</small>	<small>TITLE</small>
<i>Robert Dunn</i>	<i>9-18-17</i>
<small>SIGNATURE</small>	<small>DATE</small>





# Nebraska Department of Environmental Quality

## Casing Integrity Test Report

Company:	Crow Butte	Permit No:	NE0122611
Project:	Crow Butte	Well No:	5347
Casing Type:	Certa-Lok	Diameter:	4.5 in.
Hole Depth:	420 ft.	Casing Depth:	409 ft.
Screened Interval 1 Top:	371 ft.	Screened Interval 2 Top:	ft.
Screened Interval 1 Bottom:	395 ft.	Screened Interval 2 Bottom:	ft.
Screened Interval 3 Top:	ft.	Screened Interval 4 Top:	ft.
Screened Interval 3 Bottom:	ft.	Screened Interval 4 Bottom:	ft.
Depth to K-Packer:	359 ft.	Depth to Test Packer(s) Top:	Groundlevel ft.
		Bottom:	348 ft.

Comments: Maint.

Time	Elapsed Time (Min)	Pressure (PSIG)
0115	0	125
0120	5	124
0125	10	123
0130	15	122
0135	20	121

Well Tag ID Number: 5347

Test Performed By: Rodger Robert  
Date: 9-12-17

Calibration Performed By: Rodger Robert  
Date: 9-12-17

### CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on inquiry of those individuals immediately responsible for obtaining information, I believe that the information is true, accurate, and complete. Further, I certify awareness that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

By Robert Dunn  
PRINTED NAME OF PERSON SIGNING

By Robert Dunn  
SIGNATURE

Senior Technician, Wellfield Operations  
TITLE

9-18-17  
DATE



# Nebraska Department of Environmental Quality

## Casing Integrity Test Report

Company: Crow Butte	Permit No: NE0122611
Project: Crow Butte	Well No: 5348
Casing Type: Certa-Lok	Diameter: 4.5 in.
Hole Depth: 420 ft.	Casing Depth: 409 ft.
Screened Interval 1 Top: 377 ft.	Screened Interval 2 Top: ft.
Screened Interval 1 Bottom: 401 ft.	Screened Interval 2 Bottom: ft.
Screened Interval 3 Top: ft.	Screened Interval 4 Top: ft.
Screened Interval 3 Bottom: ft.	Screened Interval 4 Bottom: ft.
Depth to K-Packer: 362 ft.	Depth to Test Packer(s) Top: <i>Ground Level</i> ft.
	Bottom: <i>353</i> ft.

Comments: Maint

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Time	Elapsed Time (Min)	Pressure (PSIG)
<i>1055</i>	<i>0</i>	<i>125</i>
<i>1100</i>	<i>5</i>	<i>124</i>
<i>1105</i>	<i>10</i>	<i>123</i>
<i>1110</i>	<i>15</i>	<i>122</i>
<i>1115</i>	<i>20</i>	<i>121</i>

Well Tag ID Number: *5348*

Test Performed By: *Rodger Roberts*

Date: *9-13-17*

Calibration Performed By: *Rodger Roberts*

Date: *9-13-17*

**CERTIFICATION**

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on inquiry of those individuals immediately responsible for obtaining information, I believe that the information is true, accurate, and complete. Further, I certify awareness that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

By **Robert Dunn**  
PRINTED NAME OF PERSON SIGNING

By *Robert Dunn*  
SIGNATURE

**Senior Technician, Wellfield Operations**  
TITLE

DATE



# Nebraska Department of Environmental Quality

## Casing Integrity Test Report

Company: Crow Butte	Permit No: NE0122611
Project: Crow Butte	Well No: 5349
Casing Type: Certa-Lok	Diameter: 4.5 in.
Hole Depth: 420 ft.	Casing Depth: 409 ft.
Screened Interval 1 Top: 380 ft.	Screened Interval 2 Top: ft.
Screened Interval 1 Bottom: 404 ft.	Screened Interval 2 Bottom: ft.
Screened Interval 3 Top: ft.	Screened Interval 4 Top: ft.
Screened Interval 3 Bottom: ft.	Screened Interval 4 Bottom: ft.
Depth to K-Packer: 368 ft.	Depth to Test Packer(s) Top: <i>Ground Level</i> ft.
	Bottom: <i>358</i> ft.

Comments: *Maint*

Time	Elapsed Time (Min)	Pressure (PSIG)
<i>1230</i>	<i>0</i>	<i>125</i>
<i>1235</i>	<i>5</i>	<i>124</i>
<i>1240</i>	<i>10</i>	<i>123</i>
<i>1245</i>	<i>15</i>	<i>122</i>
<i>1250</i>	<i>20</i>	<i>121</i>

Well Tag ID Number: *5349*

Test Performed By: *Rodger Robert*

Date: *9-13-17*

Calibration Performed By: *Rodger Robert*

Date: *9-13-17*

### CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on inquiry of those individuals immediately responsible for obtaining information, I believe that the information is true, accurate, and complete. Further, I certify awareness that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

By <b>Robert Dunn</b>	Senior Technician, Wellfield Operations
<small>PRINTED NAME OF PERSON SIGNING</small>	<small>TITLE</small>
<i>Robert Dunn</i>	<i>9-18-17</i>
<small>SIGNATURE</small>	<small>DATE</small>



# Nebraska Department of Environmental Quality

## Casing Integrity Test Report

Company: Crow Butte	Permit No: NE0122611
Project: Crow Butte	Well No: SM10-18
Casing Type: Certa-Lok	Diameter: 4.5 in.
Hole Depth: 105 ft.	Casing Depth: 59 ft.
Screened Interval 1 Top: 66 ft.	Screened Interval 2 Top: 86 ft.
Screened Interval 1 Bottom: 76 ft.	Screened Interval 2 Bottom: 101 ft.
Screened Interval 3 Top: ft.	Screened Interval 4 Top: ft.
Screened Interval 3 Bottom: ft.	Screened Interval 4 Bottom: ft.
Depth to K-Packer: 56 ft.	Depth to Test Packer(s) Top: <u>Ground Level</u> ft.
	Bottom: <u>48</u> ft.

Comments: maint.

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Time	Elapsed Time (Min)	Pressure (PSIG)
10:10	0	125
10:15	5	123
10:20	10	120
10:25	15	118
10:30	20	116

Well Tag ID Number: SM 10-18

Test Performed By: Daniel [Signature]

Date: 8/30/17

Calibration Performed By: DH

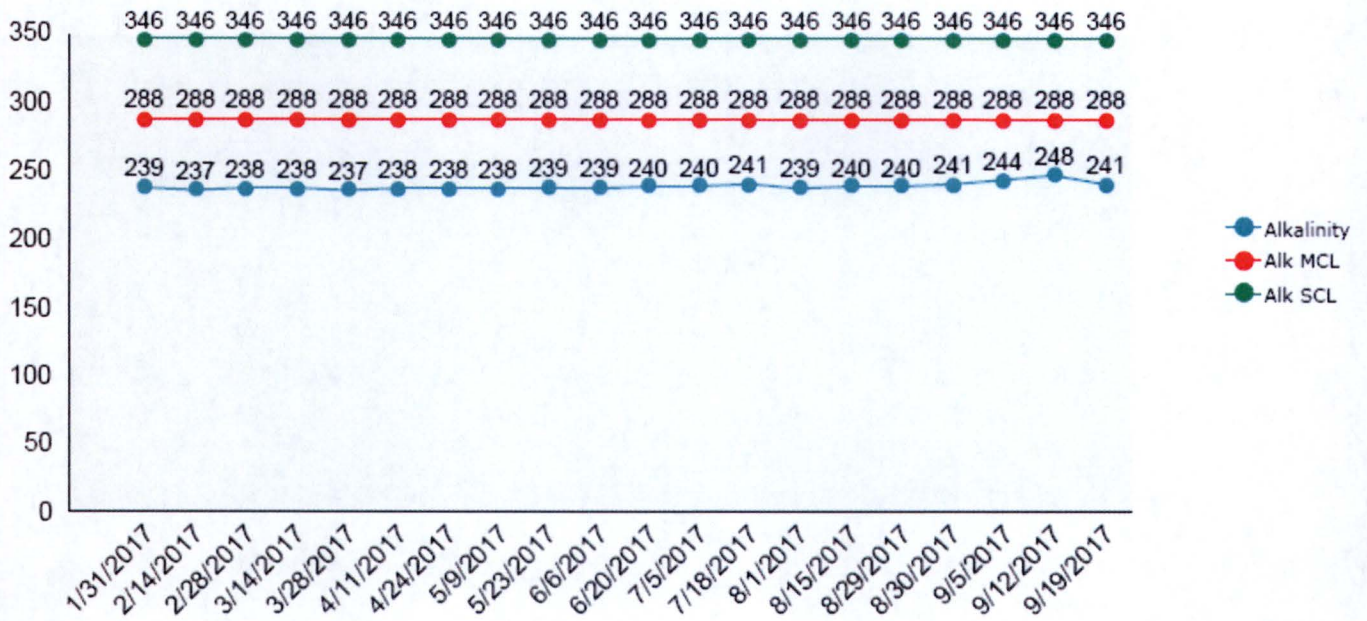
Date: 8/30/17

### CERTIFICATION

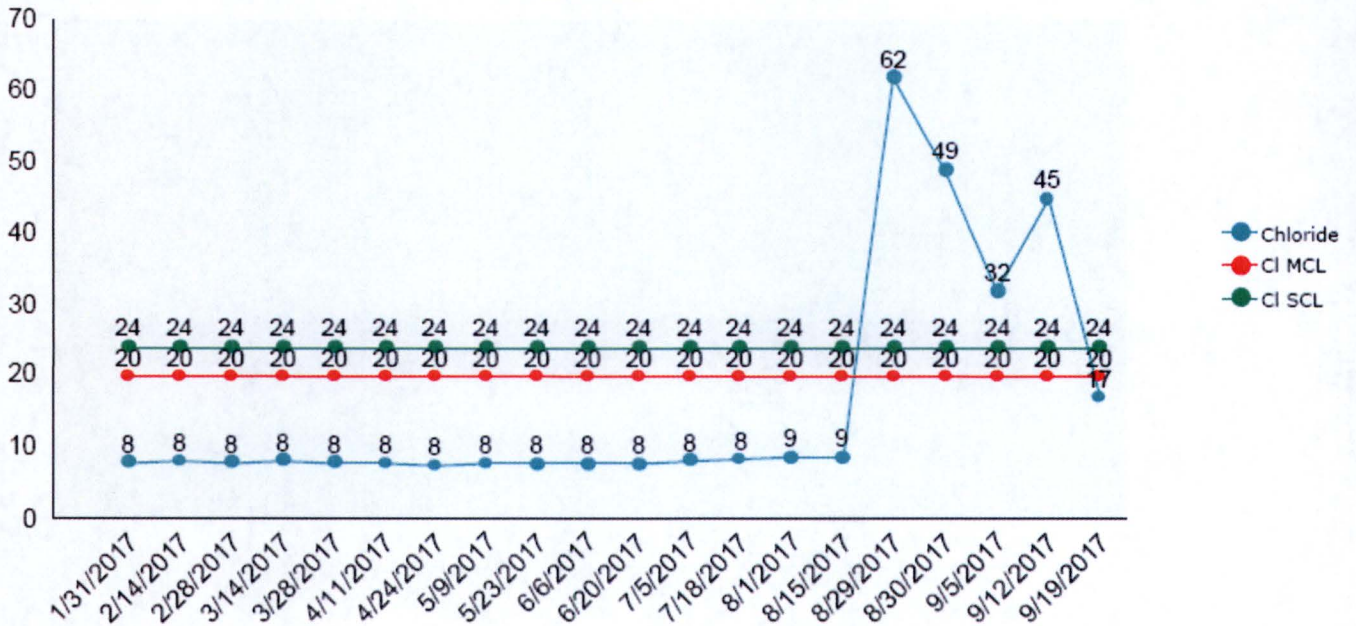
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on inquiry of those individuals immediately responsible for obtaining information, I believe that the information is true, accurate, and complete. Further, I certify awareness that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.

By <u>Robert Dunn</u>	Senior Technician, Wellfield Operations
<small>PRINTED NAME OF PERSON SIGNING</small>	<small>TITLE</small>
By <u>Robert Dunn</u>	<u>9-6-17</u>
<small>SIGNATURE</small>	<small>DATE</small>

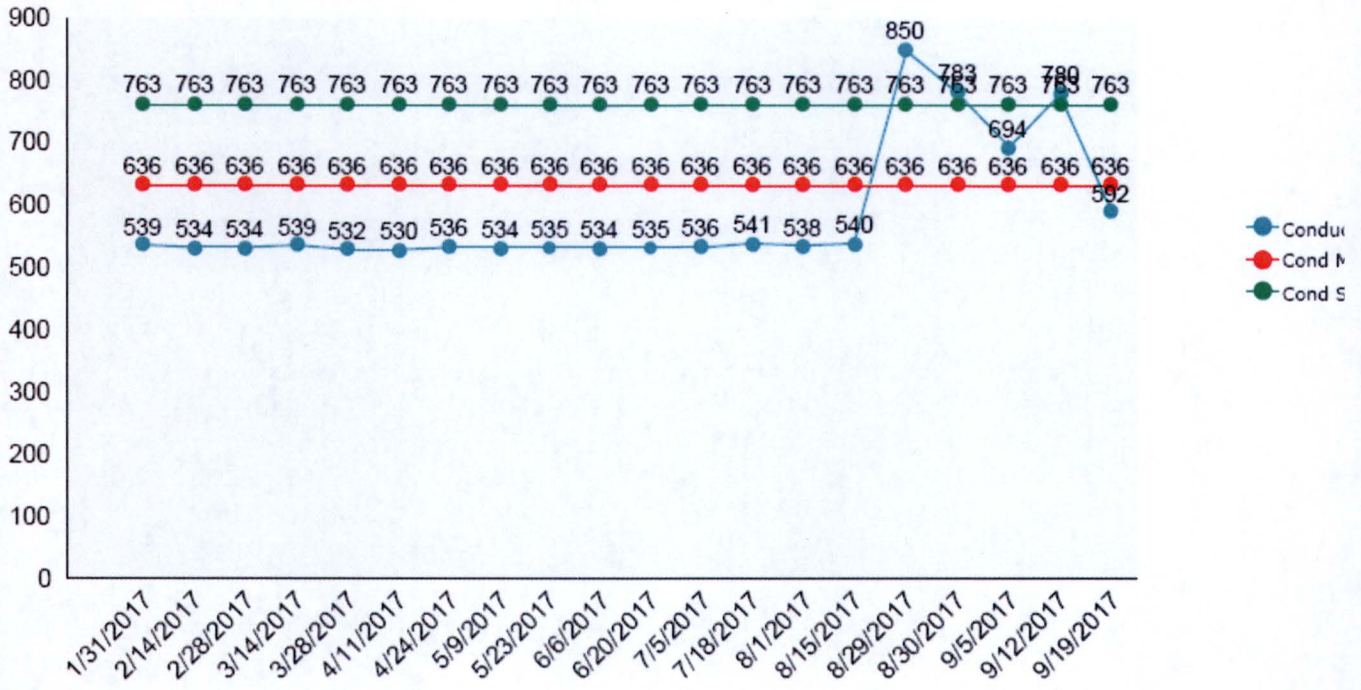
### Alkalinity



### Chloride



### Conductivity



### Water Level

