CAMECO RESOURCES
CROW BUTTE OPERATION

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

(308) 665-2215
(308) 665-2341 – FAX

January 27, 2012

ATTN: Document Control Desk, Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Mail Stop T8-F5
Washington D.C. 20555-0001

Re: Annual Report of Changes, Tests, or Experiments
License No. SUA-1534
Docket No. 40-8943

ATTN: Document Control Desk:

Crow Butte Resources, Inc. (CBR) d/b/a Cameco Resources – Crow Butte Operation (CBO) is providing this annual report summarizing the changes, tests or experiments made under License Condition 9.4 of SUA-1534 during calendar year 2011. This report is made in accordance with the reporting requirements contained in License Condition 9.4 (E).

CBR's source material license was renewed on March 4, 1998. The renewed license contained Performance Based License Conditions (PBLC). In a PBLC, CBR is allowed to make changes or conduct tests and experiments under certain conditions. These changes, tests, and experiments must be reviewed and approved by the CBR Safety and Environmental Review Panel (SERP). During 2011, the CBR SERP approved nine changes.

The following materials are attached to provide the required summary information and documentation required by License Condition 9.4 (E).

- SERP Evaluation Index, which summarizes each SERP Action and tracks any modifications to an approved action affected by subsequent SERP actions.

- A copy of the text of each approved SERP Evaluation. These evaluations describe the change or test approved and the safety and environmental evaluation performed by the SERP. Supporting documentation is maintained on site for NRC review

FSME 21

By letter dated October 19, 2009, in the response to violation of 10 CFR 40.42 (h)(1) and 10 CFR 40.42 (i), CBO submitted a request for an alternate decommissioning (groundwater restoration) schedule for mine units 2 through 5. CBO also indicated in this request that an annual review of the groundwater decommissioning schedule would be added to the Annual Summary of Changes list.

By letter dated August 20, 2009, NRC approved the alternate decommissioning schedule for the above mentioned mine units. The following is the groundwater decommissioning status of these mine units at the end of 2011.

Summary of Groundwater Restoration at Mine Units 2 through 6

Mine Unit	Current Phase of Ground Water Restoration	Alternate Decommissioning Date	On Track to Meet Alternate Decommissioning Date (Yes / No)
2	Beginning stage of recirculation	July 1, 2012	*No
3	Beginning stage of recirculation	July 1, 2013	Yes
4	IX Treatment	January 1, 2015	Yes
5	IX / RO Treatment	July 1, 2016	Yes
6	**Wellfield bleed for excursion control		

* By April 30, 2012, a letter will be submitted to the NRC staff requesting an alternate restoration date.
** Mine Unit 6 was put into restoration on October 28, 2010. A request for an alternate decommissioning schedule was submitted on December 21, 2010.

If you have any questions or require further information, please do not hesitate to contact me at (308) 665-2215 ext. 111.

Sincerely,
CAMECO RESOURCES
CROW BUTTE OPERATION

Jim Stokey
General Manager

Enclosures: As Stated

cc: Mr. Ron Burrows
Project Manager
Office of Federal and State Materials and
Environmental Management Programs
US Nuclear Regulatory Commission
Mail Stop T8-F5
Washington, DC 20555-0001

cc: CBO – File

ec: CR – Cheyenne Office

2011 SERP Evaluation Index

CAMECO RESOURCES
CROW BUTTE OPERATION

Safety and Environmental Review Panel

2011 SERP Index

SERP Evaluation Number	Date	Action Taken	Modifications to Previous SERP Actions
SERP 11-01	29 April 2011	Wellhouse 55 Approval to Operate	None
SERP 11-02	29 April 2011	Replace baseline well in Mine Unit 3	None
SERP 11-03	29 April 2011	Replace baseline well in Mine Unit 4	None
SERP 11-04	17 May 2011	Excursion control well 3945 in Mine Unit 8	None
SERP 11-05	11 August 2011	Wellhouse 60 Approval to Operate	None
SERP 11-06	26 September 2011	Release Area South of RO Building from Restricted Use	None
SERP 11-07	18 November 2011	Add an Additional Well for use in MU 3 & 4	None
SERP 11-08	18 November 2011	Deep Disposal Well #2 Approval to Operate	None
SERP 11-09	9 December 2011	Wellhouse 62 Approval to Operate	None

SERP 11-01 Evaluation

Crow Butte Resources, Inc.

Safety and Environmental Review Panel

Evaluation Report – SERP 11-01

Wellhouse 55 Approval to Operate

April 29, 2011

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met to review and approve operation of Wellhouse 55 in Mine Unit 10 at the Crow Butte Uranium Project.

The SERP appointed for this evaluation consisted of the following members:

Name	Title	Area of Expertise
Jim Stokey	General Manager	Management
Larry Teahon	SHEQ Manager	Environment
Doug Pavlick	Operations Manager	Operations
Rhonda Grantham	Radiation Safety Officer	Radiation Safety
Bob Tiensvold	Maintenance Superintendent	Construction
Wade Beins	Senior Geologist	Well Construction
Steven Boeselager	Restoration Supervisor	Wellfield Operations
Tate Hagman	Administrative Supervisor	Instrumentation

Dr. Stokey is the SERP Chairman. Mr. Teahon was appointed SERP Secretary for this evaluation.

Purpose of SERP Evaluation

The purpose of this evaluation by the CBR SERP was to review and approve Wellhouse 55 for operation.

License Condition 9.4 allows CBR to make changes in the facility or procedures or conduct tests or experiments that are not presented in the approved application if such changes do not:

i. Result in any appreciable increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in any appreciable increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated);
iii. Result in any appreciable increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in any appreciable increase in the consequences of a malfunction of an SSC previously evaluated in the license application (as updated);
v. Create a possibility for an accident of a different type that any previously evaluated in the license application (as updated);
vi. Create a possibility for a malfunction of an SSC with a different result than previously evaluated in the license application (as updated);
vii. Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER) or the environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.
viii. For the purposes of SERP evaluations, SSC means any SSC which has been referenced in a staff SER, TER, EA, or environmental impact statement (EIS) and supplements and amendments.

The SERP evaluation was conducted in accordance with the instructions contained in the Safety, Health, Environment, and Quality Management System (SHEQMS) Volume II, *Management Procedures*, SHEQ-6, *Managing Change*. The SERP reviewed the Wellhouse startup checklists and supporting documentation and evaluated this information as compared with the requirements of the licensing basis, including the following documents:

- Title 10, Code of Federal Regulations;
- Source Materials License SUA-1534, Amendment No. 25 dated April 20, 2010;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. December 1995;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;

- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed change will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

Amendment 25 to SUA-1534 dated April 20, 2010 was reviewed for specific requirements related to approval and operation of a wellhouse.

Mine Unit 10 was previously approved by a CBR SERP (see SERP 07-01 dated April 10, 2007). Therefore, no review of monitor well location, installation or baseline sampling and Upper Control Limit determination is required for approval of Wellhouse 55.

License Condition 10.2: This License Condition requires that CBR construct all wells in accordance with the methods contained in the Section 3.1.2 of the approved License Renewal Application (LRA). License Condition 10.2 also requires that CBR perform mechanical integrity tests (MIT) for all injection and production wells.

The well construction methods in use for Wellhouse 55 are the same as those described in the LRA and contained in SHEQMS Volume III, *Operations Manual*, Procedure P-25, *Well Installation.* MITs were performed in accordance with SHEQMS Volume III, *Operations Manual*, Procedure P-23, *Mechanical Integrity Test (MIT).* All MIT data sheets were contained in the Notice of Intent to Operate Wellhouse 55 (or in the original Mine Unit 10 Notice of Intent) that was submitted to the NDEQ. These MIT data sheets were provided by the Senior Geologist and reviewed by the SERP. The records indicate that the MITs performed in Wellhouse 55 met the requirements.

License Condition 9.3: This License Condition requires that CBR conduct operations in accordance with the representations contained in the LRA. Section 3.1.3 of the LRA discusses construction materials, instrumentation, and monitoring requirements. Section 3.3 also discusses instrumentation, including wellhouse injection and production instrumentation and wet building alarms for wellhouses. Section 7.2.3 of the LRA requires that leak tests be performed on all wellfield piping before placing the system into production operations.

The SERP reviewed the Wellhouse Start-up Checklist for Wellhouse 55. This checklist was developed by the Wellfield Construction staff to document completion of all required actions before initiating operations in a wellhouse. Some of these actions are required by regulatory and licensing requirements, while some were developed over the course of mining experience at Crow Butte. Construction activities are governed by SHEQMS Volume III, *Operations Manual*, Procedure P-15, *Installation of Wellfield Pipelines*. The Maintenance Superintendent reviewed these items and stated that all had been completed and the appropriate controls were in place.
A copy of the Wellhouse Start-Up Checklist is attached to this SERP Evaluation. Supporting documentation in the form of pressure tests and ground continuity checks are also attached.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in February 1998 to determine whether the proposed change could cause substantive safety or environmental impacts.

Well construction and testing as described in the EA has been completed for the wells associated with Wellhouse 55.

Section 3.3.1 discusses leak testing of wellfield piping. The SERP reviewed the completion of pressure testing for piping systems associated with Wellhouse 55 and found that they meet the intent of the EA.

Financial Surety

The proposed change is covered in the NRC-approved financial surety maintained by CBR and approved by Amendment 25 to SUA-1534 in the amount of $28,902,051.

Safety Evaluation Report

The Safety Evaluation Report (SER) principally provides the basis for worker safety at Crow Butte and does not specifically address the issues related to approval of Wellhouse 55.

Technical Evaluation Reports

The SERP reviewed the Technical Evaluation Reports (TERs) prepared by NRC staff to support amendments made to SUA-1534 since renewal in 1998. None of the TERs

prepared since license renewal directly address issues related to approval of a new Wellhouse for operation.

Degradation of Essential Safety or Environmental Commitment

SUA-1534 allows CBR to make changes as long as they do not degrade the essential safety or environmental commitments made in the application. The SERP determined that safety commitments made in the LRA and discussed in the EA have been met and that startup of Wellhouse 55 in Mine Unit 10 will not degrade the safety and environmental commitments.

Based upon this evaluation of the licensing basis, the CBR SERP hereby approves startup and operation of Wellhouse 55 in Mine Unit 10.

Approved this 29th day of April, 2011.

Jim Stokey, General Manager
SERP Chairman

Larry Teahon, SHEQ Manager
SERP Secretary

4-29-11
Doug Pavlick, Operations Manager

Rhonda Grantham, Radiation Safety Officer

4/29/2011
Bob Tiensvold, Maintenance Superintendent

4-29-11
Steven Boeselager, Restoration Supervisor

Wade Beins, Senior Geologist

4-29-2011
Tate Hagman, Administrative Supervisor

STATE OF NEBRASKA

Dave Heineman
Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY
Michael J. Linder
Director
Suite 400, The Atrium
1200 'N' Street
P.O. Box 98922
Lincoln, Nebraska 68509-8922
Phone (402) 471-2186
FAX (402) 471-2909
website: www.deq.state.ne.us

APR 0 4 2011

Mr. Paul Goranson
Crow Butte Resources, Inc.
2020 Carey Ave. Ste. 600
Cheyenne, Wyoming 82001

Dear Mr. Goranson:

On March 21, 2011 the Nebraska Department of Environmental Quality received a submittal of information from Crow Butte Resources, Inc. The submittal serves as a Notice of Intent to Operate and contains Well Completion Reports and Casing Integrity Test Reports for the wells in Mine Unit 10, Well House 55.

The Department has reviewed the information submitted and determined that it is adequate and complete. Upper Control Limits and Restoration Values established for Mine Unit 10 have already been submitted and approved. Approval of the wells for Well House 55 of Mine Unit 10 will not alter those values. The Department hereby approves the Notice of Intent to Operate the wells in Well House 55 in Mine Unit 10.

If you have any questions concerning this matter, please contact Jenny Coughlin of my staff at (402) 471-4290.

Sincerely,

Michael J. Linder
Director

ML/jlc
word/CBR/letter/NOI_MU10_WH55.doc

Cc: Dave Carlson, NDEQ
Jim Stokey, CBR

Well House Start-Up Checklist

Well House # 55

Item	Description	Person		Comments	Date Completed	Initial	
	ermit To Operate	Beins/	Stokey		4/4/2011	BD	
2	Complete Pressure Testing (Trunkline and House)	McDowell/Tiensvold/	Stokey		4-29-11		
3	Pipelines checked for leaks	McDowell/Tiensvold/	Stokey		4-28-11		
4	Pipelines buried	McDowell/Tiensvold/	Stokey		4-28-11		
5	Pressure gauges manifolds	McDowell/Tiensvold/	Stokey		4-28-11		
6	Injection lines equipped with totalizing flow meters	McDowell/Tiensvold/	Stokey		4-28-11		
7	Injection and Production total flows can be measured	McDowell/Tiensvold/	Stokey		4-28-11		
8	Unused trunkline locked out by two separate means	McDowell/Tiensvold/	Stokey		4-28-11		
9	Isolation valves are closed and chained	McDowell/Tiensvold/	Stokey		4-28-11		
10	Map of 2" lines in house	McDowell/Beins/Tiensvold/	Stokey		4-28-11		
11	Well-field Layout map in house	McDowell/Beins/Tiensvold/	Stokey		4/29/11	BD	
12	Check berms	Teahon/Tiensvold/	Stokey		4/28/11	BD WO	
13	Pressure check oxygen lines	Roberts/Tiensvold/	Stokey		4-28-11	RR	
14	Continuity check on producers	Scoggan/Tiensvold/	Stokey		4-28-11		
15	Ground fault check	Scoggan/Tiensvold/	Stokey		4-28-11		
16	Communications wire check	Hagman/Tiensvold/	Stokey		4-28-11	TH	
17	Heater size check	Scoggan/Tiensvold/	Stokey		4-28-11		
18	Processor installed well house	Hagman/Tiensvold/	Stokey		4-28-11	TH	
19	UPS installed and operational	Scoggan/Tiensvold/	Stokey		4/28/11	BD	
20	Wet house alarm installed	Scoggan/Tiensvold/	Stokey		4-28-11		
21	Wet house alarm checked	Scoggan/Tiensvold/	Stokey		4-28-11		
22	Oxygen solenoid checked	Hagman/Tiensvold/	Stokey		4-28-11	TH	
23	Check fuses in control panel	Scoggan/Tiensvold/	Stokey		4-28-11		
24	Program MMI	Hagman/Tiensvold/	Stokey		4-28-11	TH	
25	Program PLC	Hagman/Tiensvold/	Stokey		4-28-11	TH	
26	Set Scalar Card 'K' Factors	K. Forbes/P. Dunn/Tiensvold/	Stokey		4-28-11	KF	
27	Off tags and lockouts	K. Forbes/P. Dunn/Tiensvold/	Stokey		4-28-11	KF	
28	Contaminated and uncontaminated cans	K. Forbes/P. Dunn/Tiensvold/	Stokey		4-28-11	KF	
29	Complete 2" lateral inspection	McDowell/Tiensvold/	Stokey		4-28-11		
30	Visually inspect entire system to plant	McDowell/Tiensvold/	Stokey		4-28-11		
31	Labels on Monitor Wells	McDowell/Tiensvold/	Stokey		4-28-11		
32	Valve Station Covers and Stairs Built	Roberts/Tiensvold/	Stokey		4-29-11	RR	
33	Manifold Pressure Switches Installed	Scoggan/Tiensvold/	Stokey		4-28-11		
34	Injection Filter Installed	McDowell/Tiensvold/	Stokey		4-28-11		
35	Filter instrumentation and gauges installed	McDowell/Tiensvold/	Stokey		4-28-11		
36	Electric door lock installed	Scoggan/Tiensvold/	Stokey		4-28-11		
37	Update Daily Walk Through Inspection form EHS 4-1	Teahon/Tiensvold/	Stokey		4/28/11	BD	

Well House Pressure Check Verification

Pressure check for Well House 55. Date: 4-28-11

Injection:
On 4-5-11 the injection ~~lines and 2~~" laterals were pressured to 125 psi. This was done using a centrifugal pump and potable water. The time interval was as follows:

Start: 125 psi at ~~AM / PM~~ 30 min.
Stop: 123 psi at ~~AM / PM~~

The section of trunk line checked was from valve station 11-2 to the well field in 11-3 and 11-55 Paul Stramp.

Production:
On 4-1-11 the production ~~trunk lines and 2"~~ laterals were pressured to 125 psi. This was done using a centrifugal pump and potable water. The pressure and time interval was as follows:

Start: 125 psi at ~~AM / PM~~ 30 min
Stop: 121 psi at ~~AM / PM~~

The section of trunk line was from valve station 11-2 to the well field in 11-3 11-55 Paul Stramp.

Oxygen:
On _____ the oxygen line was pressured to _____ psi. The pressure and time interval was as follows:

Start: _____ psi at _____ AM / PM
Stop: _____ psi at _____ AM / PM

The section of trunk line checked was from valve station _____ to the well field in _____

_____.

Kirk McDowell
Well Field Construction Foreman

Well House Pressure Check Verification

Pressure check for Well House 55. Date: 4-28-11

Injection:
On 4-25-11 the injection lines and 2" laterals were pressured to 125 psi. This was done using a centrifugal pump and potable water. The time interval was as follows:

Start: 125 psi at _____ ~~AM / PM~~ 30 min
Stop: 124 psi at _____ ~~AM / PM~~

The section of trunk line checked was from valve station 11-55 to the well field in WH 55 Paul Stump.

Production:
On 4-26-11 the production trunk lines and 2" laterals were pressured to 125 psi. This was done using a centrifugal pump and potable water. The pressure and time interval was as follows:

Start: 125 psi at _____ ~~AM / PM~~ 30 min
Stop: 123 psi at _____ ~~AM / PM~~

The section of trunk line was from valve station 11-55 to the well field in WH 55 Paul Stump.

Oxygen:
On 4-28-11 the oxygen line was pressured to 125 psi. The pressure and time interval was as follows:

Start: 125 psi at 14:00 AM / (PM)
Stop: 125 psi at 14:45 AM / (PM)

The section of trunk line checked was from valve station 54 to the well field in 55 Rodger Robert

Well Field Construction Foreman

Crow Butte Resources

Final Inspection of Piping Wellhead to Plant

Wellhouse: 55

Review of Pressure Test Data Complete: OK Bob T

Date: 4/29/11

Mine Manager:

W.F.C. Foreman:

Non-Service Lines Locked-Out: N/A

Item #	Well #	Initialed by	Comments
1	P 4015		
2	P 4134		
3	P 4598		
4	P 5377		
5	P 5379		
6	P 5387		
7	P 5393		
8	P 5406		
9	P 5408		
10	P 5413		
11	P 5418		
12	P 5421		
13	P 5422		
14	P 5424		
15	P 5426		
16	P 5429		
17	P 5430		
18	P 5434		
19	P 5435		

Item #	Well #	Initialed by	Comments
20	P 5438		
21	P 5442		
22	P 5642		
23	P 5643		
24	P 5656		
25	P 5663		
26	P 5664		
27	P 5675		
28	P 5679		
29	P 5680		
30	P 5755		

Item #	Well #	Initialed by	Comments
1	I 4017		
2	I 4100		
3	I 4133		
4	I 4136		
5	I 4137		
6	I 4140		
7	I 4593		
8	I 4594		
9	I 4595		
10	I 4596		
11	I 5375		
12	I 5376		
13	I [redacted]		Doesn't Exist - see end of list
14	I 5382		
15	I 5386		
16	I 5388		
17	I 5389		
18	I 5401		
19	I 5404		

Item #	Well #	Initialed by	Comments
20	I 5405		
21	I 5407		
22	I 5409		
23	I 5415		
24	I 5416		
25	I 5417		
26	I 5419		
27	I 5420		
28	I 5423		
29	I 5425		
30	I 5427		
31	I 5428		
32	I 5436		
33	I 5441		
34	I 5443		
35	I 5444		
36	I 5641		
37	I 5644		
38	I 5645		

Item #	Well #	Initialed by	Comments	
39	I 5647			
40	I 5657			
41	I 5665			
42	I 5673			
43	I 5674			
44	I 5676			
45	I 5678			
46	I 5725		ONLY 1 # Plate	- ordered BT
47	I 5742			
48	I 5743			
49	I 5744			
50	I 5745			
	I 5837		No # Plates	- ordered BT

CROW BUTTE RESOURCES, INC.
86 Crow Butte Road
P. O. Box 169
Crawford, Nebraska 69339-0169

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

GROUND RESISTANCE TEST RECORD

TEST SET USED: AEMC Model 3711 Ground Resistance Tester

GROUND TEST RESULTS: Wellhouse 55
OHMS: Resistance Total (Rt) = 8.07 OHMS

R1 is NRPPD pole ground rod, R2 and R3 are the ground rods installed at the header house

$$Rt = \frac{1}{(1/R1 + 1/R2 + 1/R3)}$$

$$Rt = \frac{1}{(1/23.8 + 1/23.2 + 1/25.8)}$$

Rt = 8.07Ohms

CONCLUSIONS:

THE TEST RESULTS ARE SATISFACTORY

TEST PERFORMED BY:

CROW BUTTE RESOURCES, INC.

Gabe Scoggan

Date: April 28, 2011

ground rods 23.8
23.2
25.8

Crow Butte Resources
Pump Continuity
Wellhouse **55**

Date: 4-28-11
Technician: Gabe Scoggan
Non-Service Lines Locked-Out: (Yes) No

Item #	Well #	Initial	Meter Reading		Comments
1	P 4015	GS	1.4	Ohms	
2	P 4134	GS	1.5	Ohms	
3	P 4598	GS	1.4	Ohms	
4	P 5377	GS	1.4	Ohms	
5	P 5379	GS	1.6	Ohms	
6	P 5387	GS	1.2	Ohms	
7	P 5393	GS	1.6	Ohms	
8	P 5406	GS	1.7	Ohms	
9	P 5408	GS	1.1	Ohms	
10	P 5413	GS	1.2	Ohms	
11	P 5418	GS	1.0	Ohms	
12	P 5421	GS	.8	Ohms	
13	P 5422	GS	.7	Ohms	
14	P 5424	GS	1.1	Ohms	
15	P 5426	GS	.8	Ohms	
16	P 5429	GS	1.6	Ohms	
17	P 5430	GS	1.3	Ohms	
18	P 5434	GS	1.5	Ohms	
19	P 5435	GS	.8	Ohms	

Item #	Well #	Initial	Meter Reading		Comments
20	P 5438	GS	1.5	Ohms	
21	P 5442	GS	.9	Ohms	
22	P 5642	GS	.8	Ohms	
23	P 5643	GS	.5	Ohms	
24	P 5656	GS	1.2	Ohms	
25	P 5663	GS	1.2	Ohms	
26	P 5664	GS	1.2	Ohms	
27	P 5675	GS	.7	Ohms	
28	P 5679	GS	1.3	Ohms	
29	P 5680	GS	1.1	Ohms	
30	P 5755	GS	1.4	Ohms	
	Sm 10-16	GS	.8	Ohms	
	Sm 10-21	GS	1.0	Ohms	
	Sm 10-17	GS	.8	Ohms	
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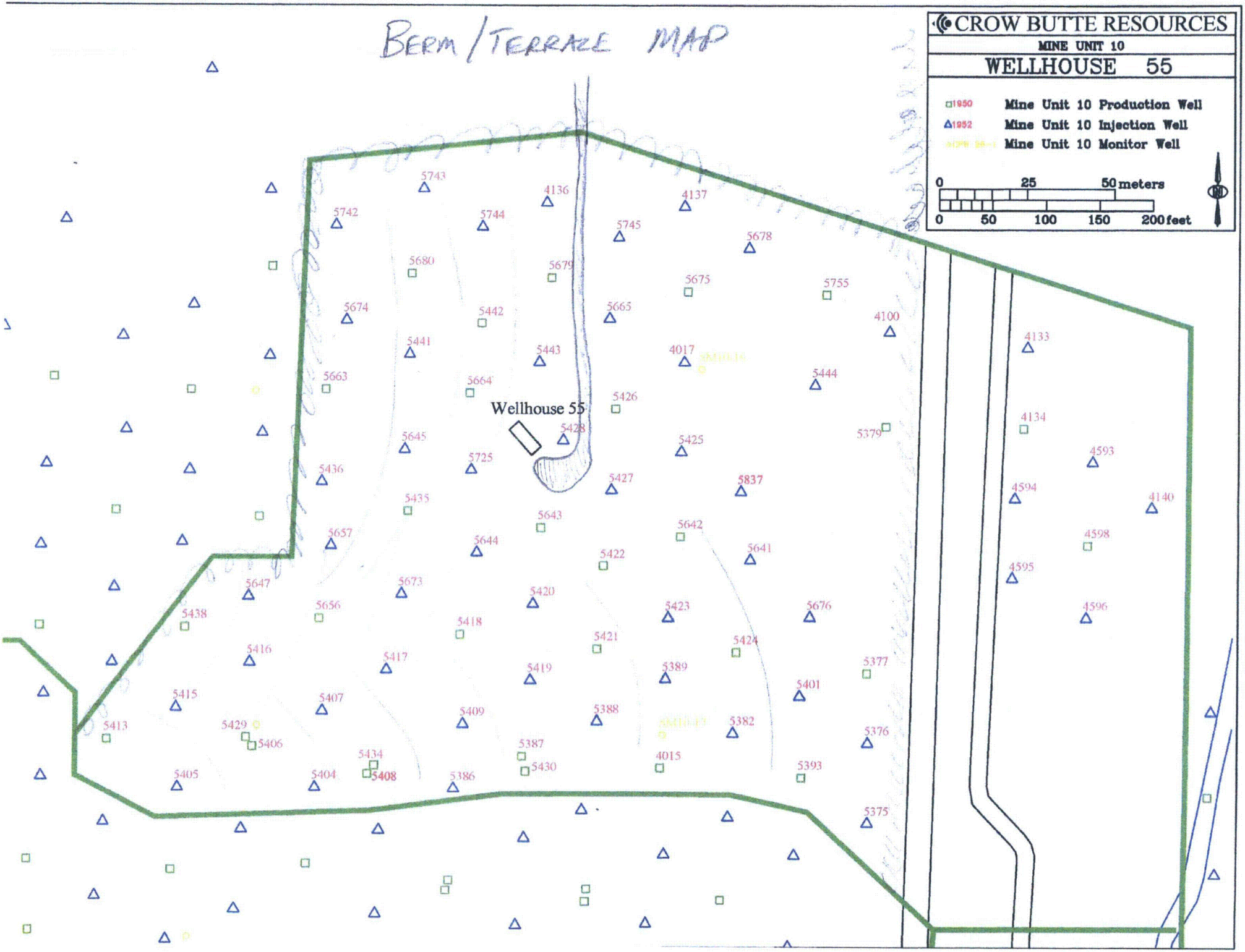
BERM / TERRACE MAP
CROW BUTTE RESOURCES
MINE UNIT 10
WELLHOUSE 55
Mine Unit 10 Production Well
Mine Unit 10 Injection Well
Mine Unit 10 Monitor Well
0 25 50 meters
0 50 100 150 200 feet
Wellhouse 55
5743
4136
4137
5742
5744
5745
5678
5680
5679
5675
5755
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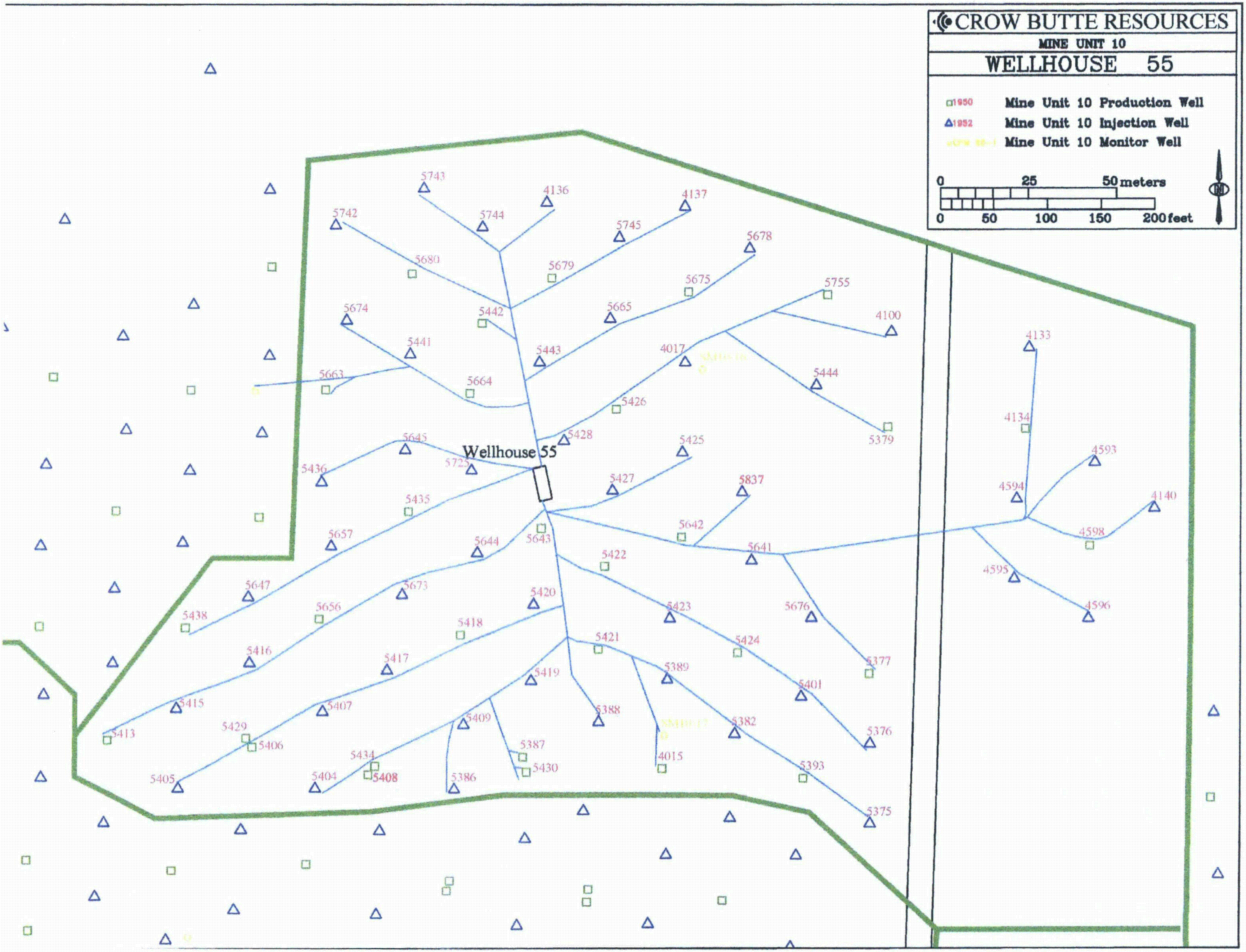
CROW BUTTE RESOURCES
MINE UNIT 10
WELLHOUSE 55
1950 Mine Unit 10 Production Well
1952 Mine Unit 10 Injection Well
Mine Unit 10 Monitor Well
0 25 50 meters
0 50 100 150 200 feet
N
Wellhouse 55
5743
4136
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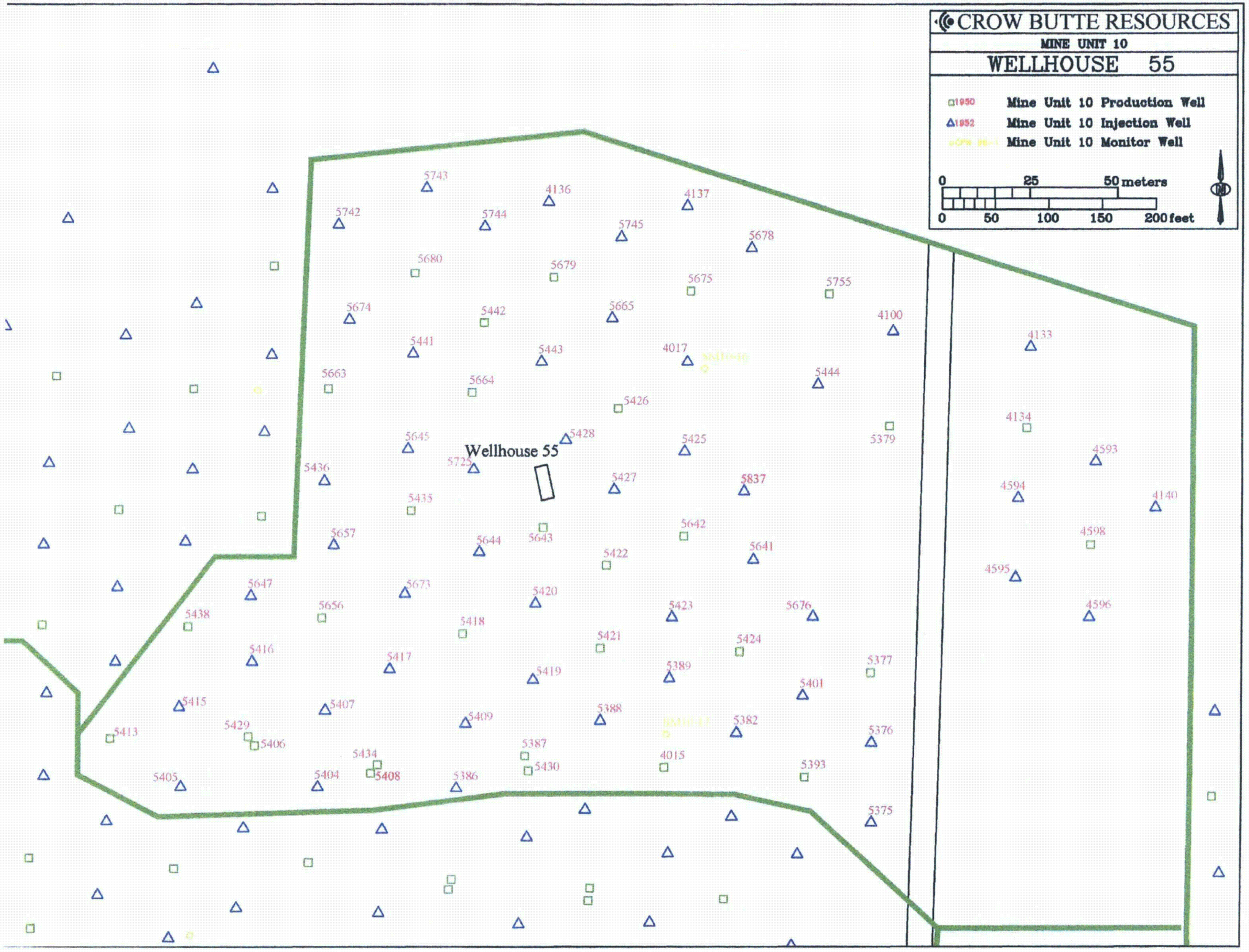
CROW BUTTE RESOURCES
MINE UNIT 10
WELLHOUSE 55
Mine Unit 10 Production Well
Mine Unit 10 Injection Well
Mine Unit 10 Monitor Well
0 25 50 meters
0 50 100 150 200 feet
N
Wellhouse 55
5743
4136
4137
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5680
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SERP 11-02 Evaluation

Crow Butte Resources, Inc.

Safety and Environmental Review Panel

Evaluation Report – SERP 11-02

Replacement of Mine Unit 3 Baseline Restoration Well

April 29, 2011

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met to review a proposal to replace a Mine Unit 3 baseline restoration well at the Crow Butte Uranium Project.

The SERP appointed for this evaluation consisted of the following members:

Name	Title	Area of Expertise
Jim Stokey	General Manager	Management
Larry Teahon	SHEQ Manager	Regulatory Environment
Rhonda Grantham	Radiation Safety Officer	Radiation Safety
Wade Beins	Senior Geologist	Well Construction
Steven Boeselager	Restoration Supervisor	Wellfield Operations

Mr. Stokey is the SERP Chairman. Mr. Teahon was appointed SERP Secretary for this evaluation.

Purpose of SERP Evaluation

The purpose of this evaluation by the CBR SERP was to review a proposed replacement for a baseline restoration well in Mine Unit 3 with a nearby well. Specifically, well BL-5 is a Mine Unit 3 baseline restoration well that produces too much sand and is unusable for the intended purpose. Therefore, CBR would like to replace BL-5 with P-224. P-224 is completed and screened in the same zones of the Chadron Formation as BL-5. Additionally, P-224 is located approximately 55 feet south of BL-5.

CBR is required by License Condition 10.3 and the Nebraska Department of Environmental Quality (NDEQ) UIC Permit, Part II.C to designate and baseline sample one injection or production well per acre. (Current NRC license and NDEQ permit require one baseline sample per four acres). This designation is made in the Notice of Intent submitted to NDEQ before placing a Mine Unit in operation. In addition, at the time that Mine Unit 3 was placed in operation, CBR was required to submit baseline sampling data and calculations of the monitor wells upper control limits to NRC for approval. (The CBR SERP is now responsible for approving these requirements for new Mine Units under the Performance-Based License Condition).

In the request for approval submitted to NRC for Mine Unit 3 in July 1999, CBR identified BL-5 as one of the thirteen baseline restoration wells for the Mine Unit. Baseline water quality data was submitted for these restoration wells and was used to calculate the proposed restoration criteria for the Mine Unit.

In 1992, this well was producing sand, so the 3-inch screen was pushed down the well and was replaced with a 2-inch screen. From 1992 to 1994, CBR attempted to put the well into production, but it continued to produce sand, and was later used only as an injection well (I-371) in the operation of Mine Unit 3.

CBR subsequently tried pumping this well in 2009 and 2010 and found it to still be producing too much sand to function as a reliable well. Although BL-5 has passed the MIT testing, CBR has been unsuccessful in rehabilitating the 2-inch screen.

As a designated restoration well, CBR will be required to collect samples from BL-5 following the completion of the current groundwater restoration activities in Mine Unit 3. In accordance with the restoration requirements in the UIC permit and CBR's Mine Unit 3 Restoration Plan, restoration wells must be sampled for the restoration parameters during the stabilization phase of restoration. The data that results from this sampling is used to determine the effectiveness of restoration.

The requirement to obtain samples from BL-5 at the completion of groundwater restoration presents CBR with practical difficulties that are not easy to address. It is difficult to obtain reliable filtered samples without sanding up the entire piping network.

Based on these practical concerns, CBR proposes to abandon BL-5 and to designate P-244 as a replacement restoration well for Mine Unit 3. CBR believes that P-224 is an acceptable replacement for BL-5 for this purpose based on the following:

- Physical Proximity: Well P-224 is located approximately 55 feet south of BL-5. A scale map depicting the location of both wells is attached. It is also selected to adequately represent the mine unit due to the extent of the screened interval and was

intentionally not moved to be closer to CM1-2, which is the nearest baseline well.

- Screened Interval: Well P-224 is completed in the same zones of the Chadron Formation as BL-5 when baseline sampling was performed. Well P-224 was originally installed as a production well for Mine Unit 3.

  BL-5 Completion Information (October 1990):

  Telescope screen hung on K Packer
  K Packer depth: 678 ft.
  Blank: 25 ft.
  Screen: 20 ft. (703 ft. to 723 ft.)

  P-224 Completion Information (June 1992)

  Telescope screen hung on K Packer
  K Packer depth: 694 ft.
  Blank: 10 ft.
  Screen: 20 ft. (704 ft. to 724 ft.)

- Baseline Water Quality: As noted above, well BL-5 was originally installed as a baseline monitor well for Mine Unit 3. The well had baseline sampling performed with three samples obtained between 1990 and 1991.

  Well P-224 was installed as a Mine Unit 3 production well in 1992. Based on the physical proximity and similar screened interval as discussed above, the baseline analytical data for the two wells is projected to very similar.

The following is the data from BL-5:

Parameter	Well BL-5	
	Mean	Standard Deviation
Ammonia (mg/l)	0.36	0.07
Arsenic (mg/l)	<0.001	0
Barium (mg/l)	<0.1	0
Cadmium (mg/l)	<0.01	0
Chloride (mg/l)	188.76	5.51
Copper (mg/l)	0.01	.01
Fluoride (mg/l)	0.74	0.11
Iron (mg/l)	<0.05	0
Mercury (mg/l)	<0.001	0
Manganese (mg/l)	<0.01	0
Molybdenum (mg/l)	<0.1	0
Nickel (mg/l)	<0.05	0
Nitrate (mg/l)	0.05	0.08
Lead (mg/l)	<0.05	0
Radium-226 (pCi/l)	7.47	1.65
Selenium (mg/l)	<0.001	0
Sulfate (mg/l)	367.67	14.57
Uranium (mg/l)	0.02	0
Vanadium (mg/l)	<0.1	0
Zinc (mg/l)	<0.01	0
pH (S.U.)	8.44	0.16
Calcium (mg/l)	8.90	1.21
Total Carbonate (mg/l)	260.33	34.06
Potassium (mg/l)	10.53	0.42
Magnesium (mg/l)	2.67	0.49
Sodium (mg/l)	396.33	17.67
Total Dissolved Solids (mg/l)	1123.67	76.3

Because P-224 and BL-5 intersect the same hydrologic zones and meet the permit criteria, (one baseline restoration well per acre) CBR does not propose to the change the restoration goals previously approved by NDEQ for Mine Unit 3.

Summary of SERP Evaluation

License Condition 9.4 allows CBR to make changes in the facility or procedures or conduct tests or experiments that are not presented in the approved application if such changes do not:

i. Result in any appreciable increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in any appreciable increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated);
iii. Result in any appreciable increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in any appreciable increase in the consequences of a malfunction of an SSC previously evaluated in the license application (as updated);
v. Create a possibility for an accident of a different type that any previously evaluated in the license application (as updated);
vi. Create a possibility for a malfunction of an SSC with a different result than previously evaluated in the license application (as updated);
vii. Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER) or the environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.
viii. For the purposes of SERP evaluations, SSC means any SSC which has been referenced in a staff SER, TER, EA, or environmental impact statement (EIS) and supplements and amendments.

The SERP evaluation was conducted in accordance with the instructions contained in the Safety, Health, Environment, and Quality Management System (SHEQMS) Volume II, *Management Procedures*, SHEQ-6, *Managing Change*. The SERP reviewed the supporting documentation and evaluated this information as compared with the requirements of the licensing basis, including the following documents:

- Title 10, Code of Federal Regulations;
- Source Materials License SUA-1534, Amendment No. 25 dated April 20, 2010;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. December 1995;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed change will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

Amendment 25 to SUA-1534 dated April 20, 2010 was reviewed for specific requirements related to the proposed change.

License Condition 10.3(A) specifically states the requirements for designation of baseline restoration wells at the Crow Butte project:

"Three samples shall be collected from production and injection wells at a minimum density of one production or injection well per 4 acres. These samples shall be collected at least 14 days apart."

Although P-224 has not had three baseline samples collected, CBO feels, due to the proximity of BL-5 to P-224 (within the one acre boundary) the baseline values would be very similar.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in February 1998 to determine whether the proposed change could cause substantive safety or environmental impacts.

Section 3.3.2 of the EA addresses preoperational groundwater sampling and bases its conclusions on the designation of one restoration well per 4 acres. The proposed change will continue to implement this licensing basis.

Financial Surety

The proposed change to the Mine Unit 3 baseline restoration wells will have no affect on the NRC-approved financial surety maintained by CBR and approved by Amendment 25 to SUA-1534 in the amount of $28,902,051.

Safety Evaluation Report

The Safety Evaluation Report (SER) principally provides the basis for worker safety at Crow Butte and does not specifically address the issues related to approval of the proposed change.

Degradation of Essential Safety or Environmental Commitment

SUA-1534 allows CBR to make changes as long as they do not degrade the essential safety or environmental commitments made in the application. The SERP determined that environmental commitments made in the LRA and discussed in the EA would continue to be met with the proposed changes to the Mine Unit 3 baseline restoration wells. There will be no reduction in the number of wells or amount of sampling required during restoration of Mine Unit 3.

Underground Injection Control Permit NE0122611

As noted in the Purpose section above, the Class III Underground Injection Control (UIC) permit issued by the NDEQ specifies similar requirements for designation and sampling of baseline restoration wells. On September 03, 2010, NDEQ approved the proposal to replace BL-5 with P-224. A copy of the NDEQ approval letter is included as an attachment.

Based upon this evaluation of the licensing basis, the CBR SERP hereby approves the proposed replacement of BL-5 with P-224.

Approved this 29th day of April 2011.

Jim Stokey, General Manager
SERP Chairman

Larry Teahon, SHEQ Manager
SERP Secretary

Wade Beins, Senior Geologist

Rhonda Grantham, Radiation Safety Officer

Steven Boeselager, Restoration Supervisor

STATE OF NEBRASKA

Dave Heineman
Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY
Michael J. Linder
Director
Suite 400, The Atrium
1200 'N' Street
P.O. Box 98922
Lincoln, Nebraska 68509-8922
Phone (402) 471-2186
FAX (402) 471-2909
website: www.deq.state.ne.us

Paul Goranson, President
Crow Butte Resources, Inc.
2020 Carey Ave, Suite 600
Cheyenne, Wyoming 82001

SEP 0 3 2010

Dear Mr. Goranson:

On August 12, 2010, the Nebraska Department of Environmental Quality (NDEQ) received a request from Crow Butte Resources, Inc. (CBR) to replace Mine Unit #3 baseline restoration well BL5 with P224 because BL5 produces too much sand to be usable for its intended purpose. In this letter, CBR provided documentation that P224 is completed and screened in the same zones of the Chadron Formation as BL5. Additionally, P224 is located approximately 55 feet south of BL5.

NDEQ has reviewed the baseline water quality data submitted for Mine Unit #3 in 1992, and concurs with CBR's assertion that the baseline water quality data gathered in 1990 and 1991 from BL5 can be applied to P224. Part II.C. of CBR's Class III injection permit (NE0122611) requires at least one baseline restoration well per four acres within the mine unit. This requirement continues to be met if P224 is used as a baseline well. No changes to the restoration goals previously approved by NDEQ for Mine Unit 3 are proposed.

The Department has reviewed the well completion reports for both wells and the preoperational ground water quality data associated with all baseline monitoring wells in Mine Unit 3. The Department has determined that P224 will make an adequate replacement for BL5 based on physical proximity and similar screen intervals of the two wells. The Department will now consider P224 as a baseline restoration well for Mine Unit #3.

Please contact Jennifer Abrahamson of my staff at (402) 471-4290 if you have any additional requests or questions concerning the contents of this letter. Thank you for your cooperation.

Sincerely,

Michael Linder
Director

ML/jla
CBR/letter/replacement_BL5.doc

Cc: Jim Stokey, CBR
Dave Carlson, NDEQ
Ron Burrows, NRC

Cameco

CAMECO RESOURCES
Crow Butte Operation
86 Crow Butte Road
P.O. Box 169
Crawford, NE
69339 USA

Tel: (308) 665-2215
Fax: (308) 665-2341
www.cameco.com

August 4, 2010

Michael Linder, Director
Nebraska Department
of Environmental Quality
P.O. Box 98922
Lincoln, NE 68509-8922

Re: Request to Replace Baseline Restoration Well
Class III Underground Injection Control Permit Number NE 0122611

Dear Mr. Linder:

Crow Butte Resources, Inc. (CBR) is submitting this request for approval to replace a baseline restoration well at the Crow Butte Uranium Project. Specifically, Well BL5 is a Mine Unit 3 baseline restoration well and is unusable for its intended purpose. Therefore, CBR would like to replace BL5 with P224. This request provides the relevant information to support the proposed change.

CBR is required by the UIC Permit, Part II.C to designate and sample one injection or production well per 4 acres as a restoration well. This designation is made in the Notice of Intent submitted to NDEQ before placing a mine unit in operation. In the Notice of Intent submitted for Mine Unit 3 on November 19, 1992, CBR identified injection well BL5 as one of the thirteen restoration wells for Mine Unit 3. Baseline water quality data was submitted for these restoration wells and was used to calculate the proposed restoration criteria for the mine unit.

In 1992, this well was producing sand, so the 3-inch screen was pushed down the well and was replaced by 2-inch screen. From 1992 to 1994, CBR attempted to put the well into production, but it always produced sand, and was later used only as an injection well in the operation of Mine Unit 3.

CBR subsequently tried to pump this well in 2009 and in 2010. It is still producing too much sand to allow its use as a baseline well. Although well BL5 passes MIT testing, CBR has been unsuccessful in rehabilitating the 2-inch screen.

As a designated restoration well, CBR will be required to collect samples from BL5 following the completion of groundwater restoration activities in Mine Unit 3 that are now in progress. In accordance with the restoration requirements in the UIC permit and CBR's Restoration Plan for Mine Unit 3, restoration wells must be sampled for the restoration parameters during the stabilization phase of restoration. The data that results from this sampling is used to determine the effectiveness of restoration.

The requirement to obtain samples from BL5 at the completion of groundwater restoration presents CBR with practical difficulties that are not easy to address. It is difficult to obtain reliable samples and filtering to get a sample without sanding up the pipe network.

Based on these practical concerns, CBR proposes to abandon well BL5 and to designate well P224 as a replacement restoration well for Mine Unit 3. CBR believes that P224 is an acceptable replacement for BL5 for this purpose based on the following reasons.

- Physical Proximity: Well P224 is located approximately 55 feet south of BL5. A scale map depicting the location of both wells is attached as Enclosure 1. It is also selected to adequately sample the whole mine unit and intentionally was not moved to be close to CM1-2, which is the nearest baseline well.

- Screened Interval: Well P224 is completed in the same zones of the Chadron Formation as BL5 when baseline sampling was performed. Well P224 was originally installed as a production well for the Mine Unit 3 operation. The completion information for both wells is listed below:

  Well BL5 Completion Information:

  Telescope screen hung on K Packer
  K Packer depth: 678 ft.
  Blank: 25 ft.
  Screen: 20 ft. (703 ft. to 723 ft.)

  Well P224 was completed in June 1992 as a production well for Mine Unit 3.

  Well P224 Completion Information:

  Telescope screen hung on K Packer
  K Packer depth: 694 ft.
  Blank: 10 ft.
  Screen: 20 ft. (704 ft. to 724 ft.)

- Baseline Water Quality: As noted above, well BL5 was originally installed as a baseline monitor well. The well had baseline sampling performed with 3 samples obtained between 1990 and 1991.

Well P224 was installed as a Mine Unit 3 production well in 1990. Based on the physical proximity and similar screened interval as discussed above, the baseline analytical data for the two wells is projected to be very similar.

Following is the data from BL5:

Parameter	Well BL5	
	Mean	Standard Deviation
Ammonia (mg/l)	0.36	0.07
Arsenic (mg/l)	<0.001	0
Barium (mg/l)	≤0.1	0
Cadmium (mg/l)	≤0.01	0
Chloride (mg/l)	18.67	5.51
Copper (mg/l)	0.01	.01
Fluoride (mg/l)	0.74	0.11
Iron (mg/l)	≤0.05	0
Mercury (mg/l)	≤0.00	0
Manganese (mg/l)	≤0.01	0
Molybdenum (mg/l)	≤0.1	0
Nickel (mg/l)	≤0.05	0
Nitrate (mg/l)	0.05	0.08
Lead (mg/l)	≤0.05	0
Radium-226 (pCi/l)	7.47	1.65
Selenium (mg/l)	0.00	0
Sulfate (mg/l)	367.67	14.57
Uranium (mg/l)	0.02	0
Vanadium (mg/l)	≤0.1	0
Zinc (mg/l)	≤0.01	0
pH (S.U.)	8.44	0.16
Calcium (mg/l)	8.9	1.21
Total Carbonate (mg/l)	260.33	34.06
Potassium (mg/l)	10.53	0.42
Magnesium (mg/l)	2.67	0.49
Sodium (mg/l)	396.33	17.67
Total Dissolved Solids (mg/l)	1123.67	76.3

CBR does not propose to change the restoration goals previously approved by NDEQ for Mine Unit 3. A copy of the Baseline Water Analysis Report for Well BL5 is attached as Enclosure 2, and a copy of the Summary of Baseline Sampling is attached as Enclosure 3.

Because P224 and BL5 intersect the same hydrologic zones and meet the required permit criteria, CBR requests that NDEQ approve this change to Mine Unit 3 and allow plugging of BL5.

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

Sincerely,

CROW BUTTE RESOURCES, INC.

Larry Teahon

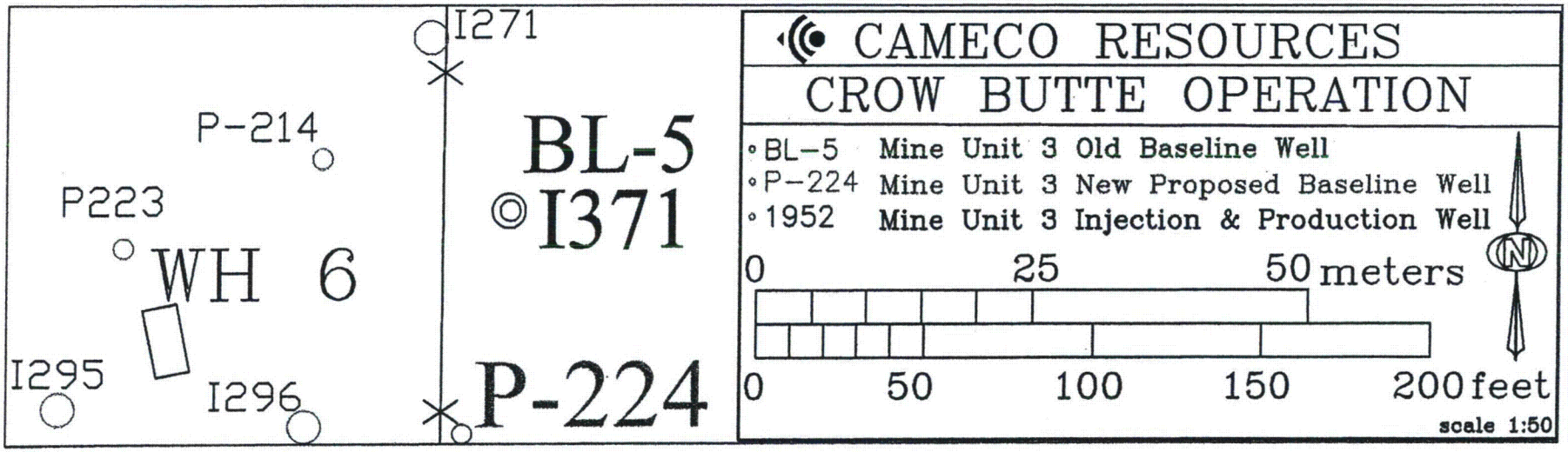
Larry Teahon
SHEQ Manager

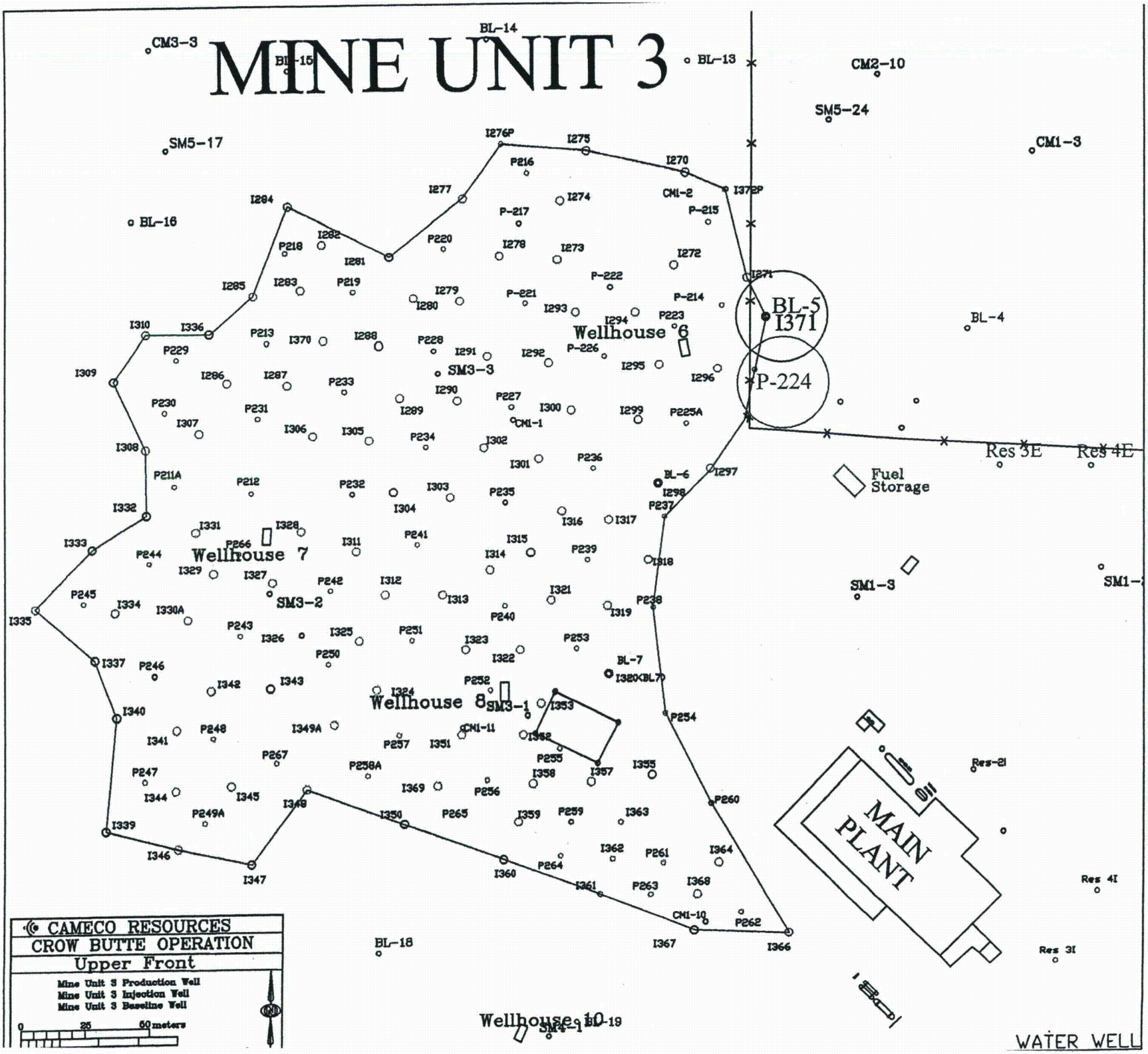
Enclosures

cc: Dave Carlson – NDEQ Northwest Field Office, Chadron
Joe Brister - Cheyenne File
CBO File

Enclosure 1

BL5 Vicinity Map


I271
P-214
P223
WH 6
I295
I296
BL-5
I371
P-224
CAMECO RESOURCES
CROW BUTTE OPERATION
◦ BL-5 Mine Unit 3 Old Baseline Well
◦ P-224 Mine Unit 3 New Proposed Baseline Well
◦ 1952 Mine Unit 3 Injection & Production Well
0 25 50 meters
0 50 100 150 200 feet
scale 1:50


MINE UNIT 3
CM3-3
BL-14
BL-15
BL-13
CM2-10
SM5-24
SM5-17
CM1-3
BL-16
BL-5
I371
BL-4
P-224
Wellhouse 6
Wellhouse 7
Wellhouse 8
SM3-3
SM3-2
SM3-1
SM1-3
Res 3E
Res 4E
Fuel Storage
MAIN PLANT
Res-2I
Res 4I
Res 3I
BL-18
BL-19
Wellhouse 10
SM4-1
WATER WELL
CAMECO RESOURCES
CROW BUTTE OPERATION
Upper Front
Mine Unit 3 Production Well
Mine Unit 3 Injection Well
Mine Unit 3 Baseline Well
0
25
50 meters
GN

Enclosure 2

BL5 and P224

Preoperational Baseline Sample Results

FERRET EXPLORATION COMPANY OF NEBRASKA, INC. - CROW BUTTE PROJECT
BASELINE WATER ANALYSIS REPORT

Sample I.D.:	BL-5	BL-5	BL-5		
Sample Date:	12-05-90	12-26-90	01-14-91		
Report Date:	01-08-91	01-21-91	02-07-91	Mean	Standard Deviation
Laboratory I.D. #:	90-32635	91-0015	91-0528		
MAJOR IONS mg/l:					
Ca	7.6	10.0	9.1	8.90	± 1.21
Mg	2.1	3.0	2.9	2.67	± 0.49
Na	376	408	405	396.33	± 17.67
K	10.4	11.0	10.2	10.53	± 0.42
CO3	5.0	3.9	0	2.97	± 2.63
HCO3	259	334	342	311.67	± 45.79
SO4	354	383	366	367.67	± 14.57
Cl	185	186	195	188.67	± 5.51
NH4	0.29	0.43	0.37	0.36	± 0.07
NO2	<0.01	0.36	<0.01	≤0.13	± 0.20
NO3	0.14	<0.01	0.01	0.05	± 0.08
F	0.87	0.66	0.70	0.74	± 0.11
SiO2	14.8	12.6	13.7	13.70	± 1.10
TDS @ 180 C	1062	1209	1100	1123.67	± 76.30
Cond (umho/cm)	1828	1959	1927	1904.67	± 68.30
Dilute Cond (umho/cm)	2026	2109	2098	2077.67	± 45.08
Alk - CaCO3	221	280	280	260.33	± 34.06
pH (std units)	8.62	8.40	8.30	8.44	± 0.16
TRACE METALS mg/l:					
Al	<0.10	<0.10	<0.10	≤0.10	± 0.00
As	<0.001	<0.001	<0.001	≤0.00	± 0.00
Ba	<0.10	<0.10	<0.10	≤0.10	± 0.00
B	1.07	1.03	0.93	1.01	± 0.07
Cd	<0.01	<0.01	<0.01	≤0.01	± 0.00
Cr	<0.05	<0.05	<0.05	≤0.05	± 0.00
Cu	0.02	<0.01	0.01	0.01	± 0.01
Fe	<0.05	<0.05	<0.05	≤0.05	± 0.00
Pb	<0.05	<0.05	<0.05	≤0.05	± 0.00
Mn	<0.01	<0.01	<0.01	≤0.01	± 0.00
Hg	<0.001	<0.001	<0.001	≤0.00	± 0.00
Mo	<0.10	<0.10	<0.10	≤0.10	± 0.00
Ni	<0.05	<0.05	<0.05	≤0.05	± 0.00
Se	<0.001	<0.001	<0.001	≤0.00	± 0.00
V	<0.10	<0.10	<0.10	≤0.10	± 0.00
Zn	<0.01	<0.01	<0.01	≤0.01	± 0.00
RADIOMETRIC:					
U (mg/l)	0.0179	0.0208	0.0214	0.02	± 0.00
Ra226 (pCi/l)	7.5	5.8	9.1	7.47	± 1.65
Ra Prec. ±	0.7	0.6	1.4	0.90	± 0.44
QUALITY ASSURANCE DATA:					
Anion meq:	17.06	18.89	18.76		
Cation meq:	17.21	18.82	18.61		
A/C Balance:	0.991	1.004	1.008		
Calc TDS mg/l:	1087	1187	1174		
TDS A/C Bal:	0.977	1.018	0.937		
Calc Dil. Cond.:	1988	2164	2142		
Dil. Cond. Bal:	1.019	0.974	0.980		

Q.A. MANAGER:
Energy Laboratories, Inc.
Casper, WY 82601

FERRET EXPLORATION COMPANY OF NEBRASKA, INC. - CROW BUTTE PROJECT
BASELINE WATER ANALYSIS REPORT

Sample I.D.:	BL-5	BL-5	BL-5		
Sample Date:	12-05-90	12-26-90	01-14-91		
Report Date:	01-08-91	01-21-91	02-07-91	Mean	Standard Deviation
Laboratory I.D. #:	90-32635	91-0015	91-0528		
MAJOR IONS mg/l:					
Ca	7.6	10.0	9.1	8.90	± 1.21
Mg	2.1	3.0	2.9	2.67	± 0.49
Na	376	408	405	396.33	± 17.67
K	10.4	11.0	10.2	10.53	± 0.42
CO3	5.0	3.9	0	2.97	± 2.63
HCO3	259	334	342	311.67	± 45.79
SO4	354	383	366	367.67	± 14.57
Cl	185	186	195	188.67	± 5.51
NH4	0.29	0.43	0.37	0.36	± 0.07
NO2	<0.01	0.36	<0.01	≤0.13	± 0.20
NO3	0.14	<0.01	0.01	0.05	± 0.08
F	0.87	0.66	0.70	0.74	± 0.11
SiO2	14.8	12.6	13.7	13.70	± 1.10
TDS @ 180 C	1062	1209	1100	1123.67	± 76.30
Cond (umho/cm)	1828	1959	1927	1904.67	± 68.30
Dilute Cond (umho/cm)	2026	2109	2098	2077.67	± 45.08
Alk - CaCO3	221	280	280	260.33	± 34.06
pH (std units)	8.62	8.40	8.30	8.44	± 0.16
TRACE METALS mg/l:					
Al	<0.10	<0.10	<0.10	≤0.10	± 0.00
As	<0.001	<0.001	<0.001	≤0.00	± 0.00
Ba	<0.10	<0.10	<0.10	≤0.10	± 0.00
B	1.07	1.03	0.93	1.01	± 0.07
Cd	<0.01	<0.01	<0.01	≤0.01	± 0.00
Cr	<0.05	<0.05	<0.05	≤0.05	± 0.00
Cu	0.02	<0.01	0.01	0.01	± 0.01
Fe	<0.05	<0.05	<0.05	≤0.05	± 0.00
Pb	<0.05	<0.05	<0.05	≤0.05	± 0.00
Mn	<0.01	<0.01	<0.01	≤0.01	± 0.00
Hg	<0.001	<0.001	<0.001	≤0.00	± 0.00
Mo	<0.10	<0.10	<0.10	≤0.10	± 0.00
Ni	<0.05	<0.05	<0.05	≤0.05	± 0.00
Se	<0.001	<0.001	<0.001	≤0.00	± 0.00
V	<0.10	<0.10	<0.10	≤0.10	± 0.00
Zn	<0.01	<0.01	<0.01	≤0.01	± 0.00
RADIOMETRIC:					
U (mg/l)	0.0179	0.0208	0.0214	0.02	± 0.00
Ra226 (pCi/l)	7.5	5.8	9.1	7.47	± 1.65
Ra Prec. ±	0.7	0.6	1.4	0.90	± 0.44
QUALITY ASSURANCE DATA:					
Anion meq:	17.06	18.89	18.76		
Cation meq:	17.21	18.82	18.61		
A/C Balance:	0.991	1.004	1.008		
Calc TDS mg/l:	1087	1187	1174		
TDS A/C Bal:	0.977	1.018	0.937		
Calc Dil. Cond.:	1988	2164	2142		
Dil. Cond. Bal:	1.019	0.974	0.980		

Q.A. MANAGER:
Energy Laboratories, Inc.
Casper, WY 82601

Enclosure 3

Parameter	Groundwater Standard	MU-3 Baseline	MU-3 Standard Deviation	MU-3 NDEQ Restoration Value
Ammonium (mg/L)	10.0	<0.329	N/A	10.0
Arsenic (mg/L)	0.05	<0.001	N/A	0.05
Barium (mg/L)	1.0	<0.1	N/A	1.0
Cadmium (mg/L)	0.005	<0.01	N/A	0.005
Chloride (mg/L)	250.0	197.6	16.7	250.0
Copper (mg/L)	1.0	<0.0108	N/A	1.0
Fluoride (mg/L)	4.0	0.719	0.05	4.0
Iron (mg/L)	0.3	<0.05	N/A	0.3
Mercury (mg/L)	0.002	<0.001	N/A	0.002
Manganese (mg/L)	0.05	<0.01	N/A	0.05
Molybdenum (mg/L)	1.0	<0.1	N/A	1.0
Nickel (mg/L)	0.15	<0.05	N/A	0.15
Nitrate (mg/L)	10.0	<0.0728	N/A	10.0
Lead (mg/L)	0.05	<0.05	N/A	0.05
Radium (pCi/L)	5.0	165	222.5	611.0
Selenium (mg/L)	0.05	<0.00115	N/A	0.05
Sodium (mg/L)	N/A	428	27.6	4280
Sulfate (mg/L)	250.0	377.0	13.4	404.0
Uranium (mg/L)	5.0	0.115	0.158	5.0
Vanadium (mg/L)	0.2	<0.1	N/A	0.2
Zinc (mg/L)	5.0	<0.0131	N/A	5.0
pH (Std. Units)	6.5 - 8.5	8.37	0.3	6.5 – 8.5
Calcium (mg/L)	N/A	13.3	3.1	133.0
Total Carbonate (mg/L)	N/A	358.7	24.8	592.0
Potassium (mg/L)	N/A	13.9	4.0	139.0
Magnesium (mg/L)	N/A	3.5	0.9	35.0
TDS (mg/L)	N/A	1183.0	47.4	1183.0

Notes:
N/A = Not Applicable

CAMECO RESOURCES
CROW BUTTE OPERATION

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

(308) 665-2215
(308) 665-2341 – FAX

August 31, 2010

Mr. Michael Linder
Director
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

Subject: Request to Replace Baseline Restoration Well
Class III UIC Permit Number NE0122611

Dear Mr. Linder:

On August 4, 2010 Crow Butte sent to you a letter requesting that baseline restoration well BL5 be replaced with well P224. In the submittal, page 6, Enclosure 2 had well P224 inadvertently listed. Please replace this page with the enclosed revised page.

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

Sincerely,
CROW BUTTE OPERATION

Larry Teahon

Larry Teahon
SHEQ Manager

Enclosure

cc: Dave Carlson – NDEQ, Chadron Field Office
Joe Brister – Cheyenne Office
CBO - File

Enclosure 2

BL5

Preoperational Baseline Sample Results

SERP 11-03 Evaluation

Crow Butte Resources, Inc.

Safety and Environmental Review Panel

Evaluation Report – SERP 11-03

Replacement of Mine Unit 4 Baseline Restoration Well

April 29, 2011

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met to review a proposal to replace a Mine Unit 4 baseline restoration well at the Crow Butte Uranium Project.

The SERP appointed for this evaluation consisted of the following members:

Name	Title	Area of Expertise
Jim Stokey	General Manager	Management
Larry Teahon	SHEQ Manager	Regulatory Environment
Rhonda Grantham	Radiation Safety Officer	Radiation Safety
Wade Beins	Senior Geologist	Well Construction
Steven Boeselager	Restoration Supervisor	Wellfield Operations

Mr. Stokey is the SERP Chairman. Mr. Teahon was appointed SERP Secretary for this evaluation.

Purpose of SERP Evaluation

The purpose of this evaluation by the CBR SERP was to review a proposed replacement for a baseline restoration well in Mine Unit 4 with a nearby well. Specifically, well CM1-9 is a Mine Unit 4 baseline restoration well that failed a Mechanical Integrity Test (MIT) and was subsequently abandoned. Therefore, CBR would like to replace CM1-9 with P-456. P-456 is completed and screened in the same zones of the Chadron Formation as CM1-9. Additionally, P-456 is located approximately 55 feet southeast of CM1-9.

CBR is required by License Condition 10.3 and the Nebraska Department of Environmental Quality (NDEQ) UIC Permit, Part II.C to designate and baseline sample one injection or production well per acre. (Current NRC license and NDEQ permit require one baseline well per four acres). This designation is made in the Notice of Intent submitted to NDEQ before placing a Mine Unit in operation. In addition, at the time that Mine Unit 4 was placed in operation, CBR was required to submit baseline sampling data and calculations of the monitor wells upper control limits to NRC for approval. (The CBR SERP is now responsible for approving these requirements for new Mine Units under the Performance-Based License Condition).

In the request for approval submitted to NRC for Mine Unit 4 in March 2003, CBR identified CM1-9 as one of the forty-three baseline restoration wells for the Mine Unit. Baseline water quality data was submitted for these restoration wells and was used to calculate the proposed restoration criteria for the Mine Unit.

On August 5, 2009, the Wellfield Operations Foreman was replacing well boxes that had been blown over during a thunderstorm the previous evening. He found a cased well labeled I-619 to be without the protective cover. The well cover for I-619 was located approximately 150 feet away. When he moved the cover marked I-619, he found that the cover was over an abandon well thought to be I-619. Further investigation determined that the abandoned well was in fact CM1-9. Because of the misplaced well cover, CM1-9 had been mistaken for I-619, and as such had been Mechanical Integrity Tested (MIT) on July 14, 2009 and then subsequently abandoned on July 22, 2009. This event was reported to the NDEQ on August 5, 2009 and the Nuclear Regulatory Commission (NRC) on August 6, 2009.

A letter dated August 7, 2009 detailing the abandonment of CM1-9 (vs. I-619) was sent to NDEQ to replace the letter dated July 22, 2009.

Subsequent observation of the abandonment by well-sounding in early February 2010 indicated that the 2009 abandonment was not effective and the well was topped off with more Bentonite chips and plug gel on March 17, 2010.

As a designated restoration well, CBR will be required to collect samples from CM1-9 following the completion of groundwater restoration activities in Mine Unit 4 that are currently in progress. In accordance with the restoration requirements in the UIC permit and CBR's Mine Unit 4 Restoration Plan, restoration wells must be sampled for the restoration parameters during the stabilization phase of restoration. The data that results from this sampling is used to determine the effectiveness of restoration.

CBR proposes replacing CM1-9 with well P-456 as a replacement restoration well for Mine Unit 4. CBR believes that P-456 is an acceptable replacement for CM1-9 for this purpose based on the following:

- Physical Proximity: Well P-456 is located approximately 55 feet southeast of CM1-9. A scale map depicting the location of both wells is attached. It is also selected to adequately sample the mine unit due to the extent of the screened interval.

- Screened Interval: Well P-456 is completed in the same zones of the Chadron Formation as CM1-9 when baseline sampling was performed. Well P-456 was originally installed as a production well in Mine Unit 4.

  CM1-9 Completion Information (September 1990):

Telescope screen hung on K Packer	
K Packer depth:	666 ft.
Blank:	10 ft.
Screen:	10 ft. (676 ft. to 686 ft.)
Blank:	10 ft.
Screen:	10 ft. (696 ft. to 706 ft.)
Blank:	10 ft.
Screen:	10 ft. (716 ft. to 726 ft.)

  P-456 Completion Information (May 1994)

Telescope screen hung on K Packer	
K Packer depth:	670 ft.
Blank:	10 ft.
Screen:	35 ft. (680 ft. to 715 ft.)

- Baseline Water Quality: As noted above, well CM1-9 was originally installed as a baseline monitor well for Mine Unit 4. The well had baseline sampling performed with 3 samples obtained in1990.

  Well P-456 was installed as a Mine Unit 4 production well in 1994. Based on the physical proximity and similar screened interval, as discussed above, the baseline analytical data for the two wells is projected to very similar.

The following is the data from CM1-9:

Parameter	Well CM1-9	
	Mean	Standard Deviation
Ammonia (mg/l)	0.32	0.02
Arsenic (mg/l)	<0.001	0
Barium (mg/l)	<0.10	0
Cadmium (mg/l)	<0.01	0
Chloride (mg/l)	183.67	6.81
Copper (mg/l)	<0.01	0
Fluoride (mg/l)	0.67	0.10
Iron (mg/l)	<0.05	0
Mercury (mg/l)	<0.001	0
Manganese (mg/l)	<0.01	0
Molybdenum (mg/l)	<0.10	0
Nickel (mg/l)	<0.05	0
Nitrate (mg/l)	0.02	0.02
Lead (mg/l)	<0.05	0
Radium-226 (pCi/l)	198.63	18.15
Selenium (mg/l)	<0.001	0
Sulfate (mg/l)	357.00	7.00
Uranium (mg/l)	0.0241	.0025
Vanadium (mg/l)	<0.10	0
Zinc (mg/l)	0.02	0.01
pH (S.U.)	8.37	0.21
Calcium (mg/l)	17.83	.76
Total Carbonate (mg/l)	300.67	4.04
Potassium (mg/l)	3.40	3.00
Magnesium (mg/l)	4.73	0.42
Sodium (mg/l)	392.67	6.43
Total Dissolved Solids (mg/l)	1162.67	19.14

Because P-456 and CM1-9 intersect the same hydrologic zones and meet the permit criteria, CBR does not propose to the change the restoration goals previously approved by NDEQ for Mine Unit 4.

Summary of SERP Evaluation

License Condition 9.4 allows CBR to make changes in the facility or procedures or conduct tests or experiments that are not presented in the approved application if such changes do not:

i. Result in any appreciable increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in any appreciable increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated);
iii. Result in any appreciable increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in any appreciable increase in the consequences of a malfunction of an SSC previously evaluated in the license application (as updated);
v. Create a possibility for an accident of a different type that any previously evaluated in the license application (as updated);
vi. Create a possibility for a malfunction of an SSC with a different result than previously evaluated in the license application (as updated);
vii. Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER) or the environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.
viii. For the purposes of SERP evaluations, SSC means any SSC which has been referenced in a staff SER, TER, EA, or environmental impact statement (EIS) and supplements and amendments.

The SERP evaluation was conducted in accordance with the instructions contained in the Safety, Health, Environment, and Quality Management System (SHEQMS) Volume II, *Management Procedures*, SHEQ-6, *Managing Change*. The SERP reviewed the supporting documentation and evaluated this information as compared with the requirements of the licensing basis, including the following documents:

- Title 10, Code of Federal Regulations;
- Source Materials License SUA-1534, Amendment No. 25 dated April 20, 2010;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. December 1995;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed change will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

Amendment 25 to SUA-1534 dated April 20, 2010 was reviewed for specific requirements related to the proposed change.

License Condition 10.3(A) specifically states the requirements for designation of baseline restoration wells at the Crow Butte project:

"Three samples shall be collected from production and injection wells at a minimum density of one production or injection well per 4 acres. These samples shall be collected at least 14 days apart."

Although P-456 has not had three baseline samples collected, CBO feels, due to the proximity of CM1-9 to P-456 (within the one acre boundary) the baseline values would be very similar.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in February 1998 to determine whether the proposed change could cause substantive safety or environmental impacts.

Section 3.3.2 of the EA addresses preoperational groundwater sampling and bases its conclusions on the designation of one restoration well per 4 acres. The proposed change will continue to implement this licensing basis.

Financial Surety

The proposed change to the Mine Unit 4 baseline restoration wells will have no affect on the NRC-approved financial surety maintained by CBR and approved by Amendment 25 to SUA-1534 in the amount of $28,902,051.

Safety Evaluation Report

The Safety Evaluation Report (SER) principally provides the basis for worker safety at Crow Butte and does not specifically address the issues related to approval of the proposed change.

Degradation of Essential Safety or Environmental Commitment

SUA-1534 allows CBR to make changes as long as they do not degrade the essential safety or environmental commitments made in the application. The SERP determined that environmental commitments made in the LRA and discussed in the EA would continue to be met with the proposed changes to the Mine Unit 4 baseline restoration wells. There will be no reduction in the number of wells or amount of sampling required during restoration of Mine Unit 4.

Underground Injection Control Permit NE0122611

As noted in the Purpose section above, the Class III Underground Injection Control (UIC) permit issued by the NDEQ specifies similar requirements for designation and sampling of baseline restoration wells. On November 15, 2010, NDEQ approved the proposal to replace CM1-9 with P-456. A copy of the NDEQ approval letter is included as an attachment.

Based upon this evaluation of the licensing basis, the CBR SERP hereby approves the proposed replacement of CM1-9 with P-456.

Approved this 29th day of April 2011.

Jim Stokey, General Manager
SERP Chairman

Larry Teahon, SHEQ Manager
SERP Secretary

Wade Beins, Senior Geologist

Rhonda Grantham, Radiation Safety Officer

Steven Boeselager, Restoration Supervisor

STATE OF NEBRASKA

Dave Heineman
Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY
Michael J. Linder
Director
Suite 400, The Atrium
1200 'N' Street
P.O. Box 98922
Lincoln, Nebraska 68509-8922
Phone (402) 471-2186
FAX (402) 471-2909
website: www.deq.state.ne.us

Paul Goranson, President
Crow Butte Resources, Inc.
2020 Carey Ave, Suite 600
Cheyenne, Wyoming 82001

NOV 15 2010

Dear Mr. Goranson:

On October 25, the Nebraska Department of Environmental Quality (NDEQ) received a request from Crow Butte Resources, Inc. (CBR) to replace Mine Unit 4 baseline restoration well CM1-9 with P456 because CM1-9 was inadvertently abandoned due to a misplaced well box. In this letter, CBR provided documentation that P456 is completed and screened in the same zones of the Chadron Formation as CM1-9. Additionally, P456 is located approximately 55 feet south of CM1-9.

NDEQ has reviewed the baseline water quality data submitted for Mine Unit 4 in 1994, and concurs with CBR's assertion that the baseline water quality data gathered in 1990 from CM1-9 can be applied to P456. Part II.C. of CBR's Class III injection permit (NE0122611) requires at least one baseline restoration well per four acres within the mine unit. This requirement continues to be met if P456 is used as a baseline well. No changes to the restoration goals previously approved by NDEQ for Mine Unit 4 are proposed.

The Department has reviewed the well completion reports for both wells and the preoperational ground water quality data associated with all baseline monitoring wells in Mine Unit 4. The Department has determined that P456 will make an adequate replacement for CM1-9 based on physical proximity and similar screen intervals of the two wells. The Department will now consider P456 as a baseline restoration well for Mine Unit 4.

Please contact Jenny Coughlin of my staff at (402) 471-4290 if you have any additional requests or questions concerning the contents of this letter. Thank you for your cooperation.

Sincerely,

Michael Linder
Director

ML/jlc
CBR/letter/replacement_BL5.doc

Cc: Jim Stokey, CBR
Dave Carlson, NDEQ
Ron Burrows, NRC

Cameco

CAMECO RESOURCES
Crow Butte Operation
86 Crow Butte Road
P.O. Box 169
Crawford, NE
69339 USA

Tel: (308) 665-2215
Fax: (308) 665-2341
www.cameco.com

October 21, 2010

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Michael Linder, Director
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-89

Subject: Request to Replace Baseline Restoration Well
Class III Underground Injection Control UIC Permit NE0122611

Dear Mr. Linder:

Crow Butte Resources, Inc. (CBR) is submitting this request for approval to replace a baseline restoration well at the Crow Butte Uranium Project. Specifically, Well CM1-9 is a Mine Unit 4 baseline restoration well and is unusable for its intended purpose. Therefore, CBR is intending to replace CM1-9 with P456. This following information supports the proposed change.

CBR is required by the UIC Permit, Part II.C to designate and sample one well per acre as a restoration well. In the Notice of Intent submitted for Mine Unit 4 on February 4, 1994, CBR identified injection well CM1-9 as one of the forty-three wells for Mine Unit 4. Baseline water quality data was submitted for these restoration wells and was used to calculate the proposed restoration criteria for the mine unit.

On August 5, 2009, the Wellfield Operations Foreman was replacing well boxes that had been blown over during a thunderstorm the previous evening. He found a cased well labeled I-619 to be without the protective well box covering. The well box for I-619 was located approximately 150 feet away. When he went to move the box marked I-619, he found that the box was covering an abandoned well thought to be I-619. Further investigation determined that the abandoned well was in fact CM1-9. Because of the misplaced well box, CM1-9 had been mistaken for I-619, and as such had been Mechanical Integrity Tested (MIT) on July 14, 2009 and then subsequently abandoned on July 22, 2009.

This event was reported to Dave Carlson and Jenny Abrahamson of NDEQ on August 5, 2009 and to the Nuclear Regulatory Commission on August 6, 2009.

A letter dated August 7, 2009 detailing the abandonment of CM1-9 (vs. I-619) was sent to NDEQ to replace the letter dated July 22, 2009.

Subsequent observation of the abandonment by well-sounding in early February 2010 indicated that the 2009 abandonment was ineffective and the well was later topped off with more Bentonite chips and plug gel on March 17, 2010.

As a designated restoration well, CBR was required to collect samples from CM1-9 following the completion of groundwater restoration activities in Mine Unit 4 that are now in progress. In accordance with the restoration requirements in the UIC permit and CBR's Restoration Plan for Mine Unit 4, restoration wells must be sampled for the restoration parameters during the stabilization phase of restoration. The data that results from sampling is used to determine the effectiveness of restoration.

CBR proposes replacing CM1-9 with well P456 as a replacement restoration well for Mine Unit 4. CBR believes that P456 is an acceptable replacement for CM1-9 based on the following reasons.

- Physical Proximity: Well P456 is located approximately 55 feet southeast of CM1-9. A scale map depicting the location of both wells is attached as Enclosure 1. It is selected to adequately sample the mine unit due to the extent of the screened interval.

- Screened Interval: Well P456 is completed in the same zones of the Chadron Formation as CM1-9 when baseline sampling was performed. Well P456 was originally installed as a production well for the Mine Unit 4 operation. The completion information for both wells is listed below:

  Well CM1-9 Completion Information:

  Telescope screen hung on K Packer

K Packer depth:	666 ft.
Blank:	10 ft.
Screen:	30 ft. (~~703 ft. to 723 ft.~~; 676 to 686 ft.; 696 to 706 ft.; 716 to 726 ft.)

Well P456 was completed as a production well for Mine Unit 4.

Well P456 Completion Information:

Telescope screen hung on K Packer

K Packer depth:	670 ft.
Blank:	10 ft.
Screen:	35 ft. (680 ft. to 715 ft.)

- Baseline Water Quality: As noted above, well CM1-9 was originally installed as a baseline monitor well. The well had baseline sampling performed with 3 samples obtained in 1990.

Well P456 was installed as a Mine Unit 4 production well in 1994. Based on the physical proximity and similar screened interval, as discussed above, the baseline analytical data for these two wells is projected to be very similar.

CBR does not propose to change restoration goals previously approved by NDEQ for Mine Unit 4. A copy of the Baseline Water Analysis Report for Well CM1-9 is attached as Enclosure 2, and a copy of the Restoration Standards is attached as Enclosure 3.

Because P456 and CM1-9 intersect the same hydrologic zones and meet the required permit criteria, CBR requests that NDEQ approve this change to Mine Unit 4 and allow restoration sampling in well P456.

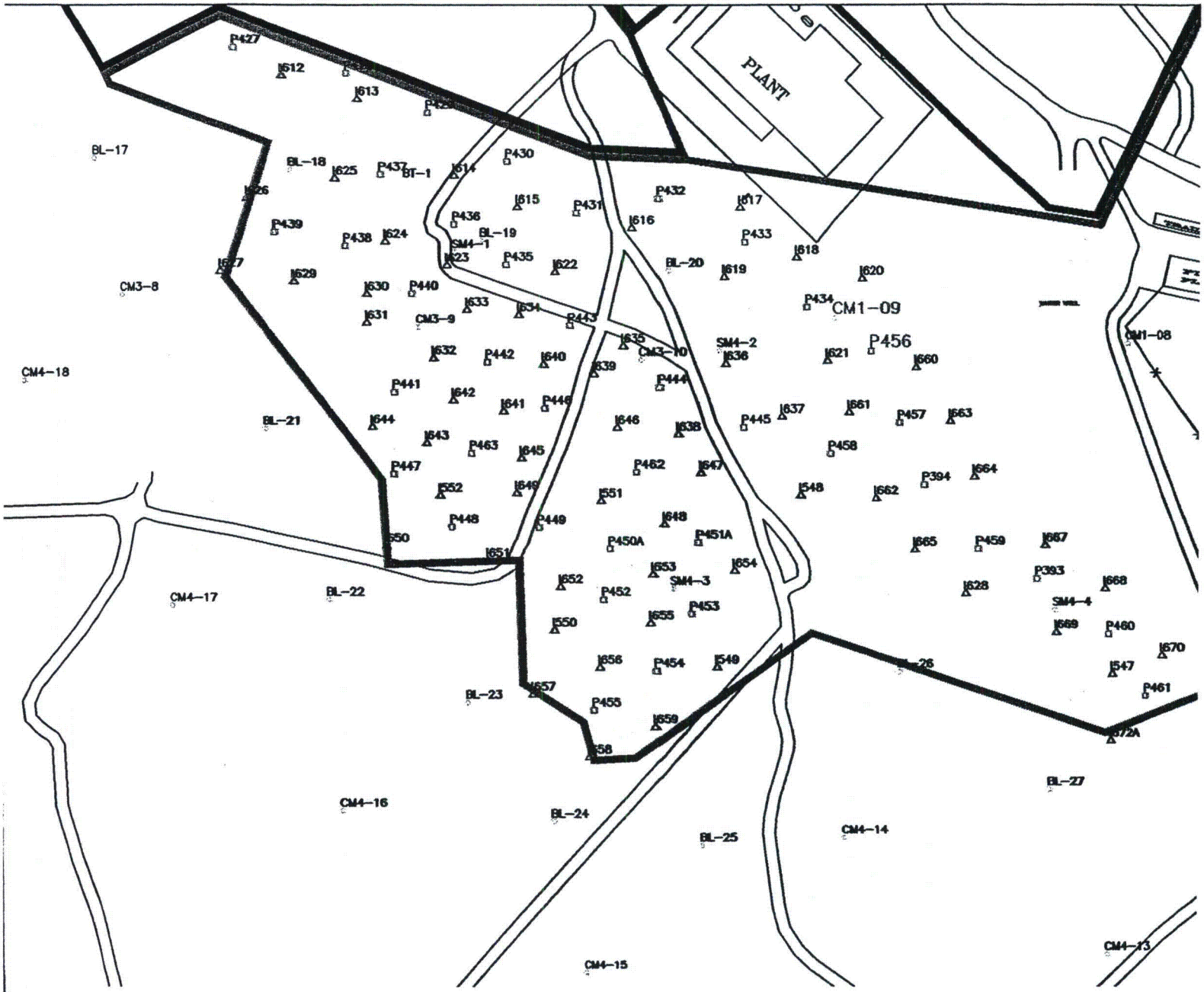
If you have any questions, please feel free to call me at (307) 316-7595.

Sincerely,

CROW BUTTE RESOURCES, INC

Thomas P. Young
Vice President Operations

C: Dave Carlson – NDEQ
Joe Brister – Cheyenne Office
CBO - File



A Portion of Mine Unit 4 Restoration Area

N 1/2 Sec 19 T31N R51W

P433 — Mine Unit 4 Production Well

I505 — Mine Unit 4 Injection Well

CM4-3 — Mine Unit 4 Monitor Well

P456 — Wells Discussed in 10/21/10 Letter

0 25 50 100 150 meters

0 50 100 150 200 250 500 feet

Last Updated By: JGH 10/15/10

ENCLOSURE 2

ENERGY LABORATORIES, INC.
P. O. BOX 3258 • CASPER, WY 82602 • PHONE (307) 235-0515
254 NORTH CENTER, SUITE 100 • CASPER, WY 82601 • FAX (307) 234-1639

FERRET EXPLORATION COMPANY OF NEBRASKA, INC. - CROW BUTTE PROJECT
BASELINE WATER ANALYSIS REPORT

Sample I.D.:	CM1-9	CM1-9	CM1-9		
Sample Date:	10-16-90	10-31-90	11-16-90		
Report Date:	11-30-90	11-23-90	11-30-90	Mean	Standard Deviation
Laboratory I.D. #:	90-25993	90-29549	90-29848		
MAJOR IONS mg/l:					
Ca	18.0	17.0	18.5	17.83	± 0.76
Mg	4.6	4.4	5.2	4.73	± 0.42
Na	390	400	388	392.67	± 6.43
K	12.0	12.0	11.8	11.93	± 0.12
CO3	0	4.5	5.7	3.40	± 3.00
HCO3	372	353	354	359.67	± 10.69
SO4	365	354	352	357.00	± 7.00
Cl	176	189	186	183.67	± 6.81
NH4	0.31	0.34	0.30	0.32	± 0.02
NO2	<0.01	<0.01	<0.01	<0.01	± 0.00
NO3	0.05	<0.01	<0.01	≤0.02	± 0.02
F	0.62	0.60	0.78	0.67	± 0.10
SiO2	17.3	18.4	15.2	16.97	± 1.63
TDS @ 180 C	1160	1183	1145	1162.67	± 19.14
Cond (umho/cm)	1946	1994	2023	1987.67	± 38.89
Dilute Cond (umho/cm)	2129	2158	2135	2140.67	± 15.31
Alk - CaCO3	305	297	300	300.67	± 4.04
pH (std units)	8.14	8.44	8.54	8.37	± 0.21
TRACE METALS mg/l:					
Al	<0.10	<0.10	<0.10	<0.10	± 0.00
As	0.001	0.001	<0.001	≤0.001	± 0.000
Ba	<0.10	<0.10	<0.10	<0.10	± 0.00
B	0.93	0.92	0.81	0.89	± 0.07
Cd	<0.01	<0.01	<0.01	<0.01	± 0.00
Cr	<0.05	<0.05	<0.05	<0.05	± 0.00
Cu	<0.01	<0.01	<0.01	<0.01	± 0.00
Fe	<0.05	<0.05	<0.05	<0.05	± 0.00
Pb	<0.05	<0.05	<0.05	<0.05	± 0.00
Mn	<0.01	<0.01	0.01	≤0.01	± 0.00
Hg	<0.001	<0.001	<0.001	<0.001	± 0.000
Mo	<0.10	<0.10	<0.10	<0.10	± 0.00
Ni	<0.05	<0.05	<0.05	<0.05	± 0.00
Se	<0.001	<0.001	<0.001	<0.001	± 0.000
V	<0.10	<0.10	<0.10	<0.10	± 0.00
Zn	0.02	0.02	0.01	0.02	± 0.01
RADIOMETRIC:					
U (mg/l)	0.0213	0.0249	0.0260	0.0241	± 0.0025
Ra226 (pCi/l)	218	182	196	198.63	± 18.15
Ra Prec. ±	5.5	5.7	4.6	5.27	± 0.59
QUALITY ASSURANCE DATA:					
Anion meq:	18.70	18.67	18.61		
Cation meq:	18.59	18.96	18.57		
A/C Balance:	1.006	0.985	1.002		
Calc TDS mg/l:	1170	1177	1161		
TDS A/C Bal:	0.991	1.005	0.986		
Calc Dil. Cond.:	2122	2150	2125		
Dil. Cond. Bal:	1.003	1.004	1.005		

ENCLOSURE 3

Restoration Table

Mine Unit 4

PROPOSED RESTORATION TABLE
MINE UNIT 4

All parameters are in mg/l unless noted.

Parameter	Groundwater Standard	Wellfield Average	Standard Deviation	Restoration Value
Ammonia	10			10
Arsenic	0.05			0.05
Barium	1.00			1.00
Cadmium	0.01			0.01
Chloride	250			250
Copper	1.00			1.0
Fluoride	4.00			4.0
Iron	0.30			0.30
Mercury	0.002			0.002
Manganese	0.05			0.05
Molybdenum	1.00			1.00
Nickel	0.15			0.15
Nitrate	10.0			10.0
Lead	0.05			0.05
Radium (pCi/l)	5.0	154	171	496
Selenium	0.01			0.01
Sulfate	250	337	19	375
Uranium	5.00			5.00
Vanadium	0.20			0.20
Zinc	5.00			5.00
pH (std. units)	6.5-8.5	8.68	0.30	9.28
Calcium	--	11.2		112
Total Carbonate	--	374		610
Potassium	--	16.7		167
Magnesium	--	2.8		28
TDS	--	1221		1221

SERP 11-04 Evaluation

Crow Butte Resources, Inc.

Safety and Environmental Review Panel

Evaluation Report – SERP 11-04

Approval to Operate Well 3945 in Wellhouse 40

May 17, 2011

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met to review and approve in Mine Unit 8 the operation of well 3945 in Wellhouse 40 at the Crow Butte Uranium Project.

The SERP appointed for this evaluation consisted of the following members:

Name	Title	Area of Expertise
Jim Stokey	General Manager	Management
Larry Teahon	SHEQ Manager	Environment
Doug Pavlick	Operations Manager	Operations
Wade Beins	Senior Geologist	Well Construction
Steven Boeselager	Restoration Supervisor	Wellfield Operations
Tate Hagman	Administrative Supervisor	Instrumentation Radiation Safety

Dr. Stokey is the SERP Chairman. Mr. Teahon was appointed SERP Secretary for this evaluation.

Purpose of SERP Evaluation

The purpose of this evaluation by the CBR SERP was to review and approve well 3945 for operation in Wellhouse 40 in Mine Unit 8. The well is added to Mine Unit 8 to assist in excursion control at monitoring well CM8-8.

License Condition 9.4 allows CBR to make changes in the facility or procedures or conduct tests or experiments that are not presented in the approved application if such changes do not:

i. Result in any appreciable increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in any appreciable increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated);
iii. Result in any appreciable increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in any appreciable increase in the consequences of a malfunction of an SSC previously evaluated in the license application (as updated);
v. Create a possibility for an accident of a different type that any previously evaluated in the license application (as updated);
vi. Create a possibility for a malfunction of an SSC with a different result than previously evaluated in the license application (as updated);
vii. Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER) or the environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.
viii. For the purposes of SERP evaluations, SSC means any SSC which has been referenced in a staff SER, TER, EA, or environmental impact statement (EIS) and supplements and amendments.

The SERP evaluation was conducted in accordance with the instructions contained in the Safety, Health, Environment, and Quality Management System (SHEQMS) Volume II, *Management Procedures*, SHEQ-6, *Managing Change*. The SERP reviewed the Wellhouse startup checklists and supporting documentation and evaluated this information as compared with the requirements of the licensing basis, including the following documents:

- Title 10, Code of Federal Regulations;
- Source Materials License SUA-1534, Amendment No. 25 dated April 20, 2010;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. December 1995;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC February 1998;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed change will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

Amendment 25 to SUA-1534 dated April 20, 2010 was reviewed for specific requirements related to approval and operation of a wellhouse.

Mine Unit 8 was previously approved by a CBR SERP (see SERP 02-05 dated July 10, 2002). Therefore, no review of monitor well location, installation or baseline sampling and Upper Control Limit determination is required for approval of well 3945. The start up of Wellhouse 40 was approved by SERP 05-01 dated May 31, 2005.

License Condition 10.2: This License Condition requires that CBR construct all wells in accordance with the methods contained in the Section 3.1.2 of the approved License Renewal Application (LRA). License Condition 10.2 also requires that CBR perform mechanical integrity tests (MIT) for all injection and production wells.

The well construction methods in use for Wellhouse 40 are the same as those described in the LRA and contained in SHEQMS Volume III, *Operations Manual*, Procedure P-25, *Well Installation*. MITs were performed in accordance with SHEQMS Volume III, *Operations Manual*, Procedure P-23, *Mechanical Integrity Test (MIT)*. The MIT data sheet was contained in the Notice of Intent to Operate well 3945 that was submitted to the NDEQ. These MIT data sheet was provided by the Senior Geologist and reviewed by the SERP. The records indicate that the MIT performed on well 3945 in Wellhouse 40 met the requirements.

License Condition 9.3: This License Condition requires that CBR conduct operations in accordance with the representations contained in the LRA. Section 3.1.3 of the LRA discusses construction materials, instrumentation, and monitoring requirements. Section 3.3 also discusses instrumentation, including wellhouse injection and production instrumentation and wet building alarms for wellhouses. Section 7.2.3 of the LRA requires that leak tests be performed on all wellfield piping before placing the system into production operations.

The SERP reviewed the Final Inspection of Piping Wellhead to Plant and Pressure Testing sheets. This checklist was developed by the Wellfield Construction staff to document completion of all required actions before initiating operations of this well.

Some of these actions are required by regulatory and licensing requirements, while some were developed over the course of mining experience at Crow Butte. Construction activities are governed by SHEQMS Volume III, *Operations Manual*, Procedure P-15, *Installation of Wellfield Pipelines*. The Restoration Supervisor reviewed these items and stated that all had been completed and the appropriate controls were in place.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in February 1998 to determine whether the proposed change could cause substantive safety or environmental impacts.

Well construction and testing as described in the EA has been completed for well 3945.

Section 3.3.1 discusses leak testing of wellfield piping. The SERP reviewed the completion of pressure testing for piping systems associated with well 3945 and found that they meet the intent of the EA.

Financial Surety

The proposed change is covered in the NRC-approved financial surety maintained by CBR and approved by Amendment 25 to SUA-1534 in the amount of $28,902,051.

Safety Evaluation Report

The Safety Evaluation Report (SER) principally provides the basis for worker safety at Crow Butte and does not specifically address the issues related to approval of operation of a well.

Technical Evaluation Reports

The SERP reviewed the Technical Evaluation Reports (TERs) prepared by NRC staff to support amendments made to SUA-1534 since renewal in 1998. None of the TERs prepared since license renewal directly address issues related to approval of a new well for operation.

Degradation of Essential Safety or Environmental Commitment

SUA-1534 allows CBR to make changes as long as they do not degrade the essential safety or environmental commitments made in the application. The SERP determined that safety commitments made in the LRA and discussed in the EA have been met and

that startup of well 3945 in Wellhouse 40 in Mine Unit 8 will not degrade the safety and environmental commitments.

Based upon this evaluation of the licensing basis, the CBR SERP hereby approves startup and operation of well 3945 in Wellhouse 40 in Mine Unit 8.

Approved this 17th day of May, 2011.

Jim Stokey, General Manager
SERP Chairman

Larry Teahon, SHEQ Manager
SERP Secretary

Doug Pavlick, Operations Manager

Steven Boeselager, Restoration Supervisor

Wade Beins, Senior Geologist

Tate Hagman, Administrative Supervisor

Dave Heineman
Governor

STATE OF NEBRASKA

DEPARTMENT OF ENVIRONMENTAL QUALITY
Michael J. Linder
Director
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1200 'N' Street
P.O. Box 98922
Lincoln, Nebraska 68509-8922
Phone (402) 471-2186
FAX (402) 471-2909
website: www.deq.state.ne.us

MAY 1 8 2011

Mr. Paul Goranson
Crow Butte Resources, Inc.
2020 Carey Ave. Ste. 600
Cheyenne, Wyoming 82001

Dear Mr. Goranson:

On May 16, 2011, the Nebraska Department of Environmental Quality received a submittal of information from Crow Butte Resources, Inc. The submittal serves as a Notice of Intent to Operate and contains a Well Completion Report and a Casing Integrity Test Report for the recently installed well (3945) in Mine Unit 8, Well House 40.

The Department has reviewed the information submitted and determined that it is adequate and complete. Upper Control Limits and Restoration Values established for Mine Unit 8 have already been submitted and approved. Approval of the additional well in Well House 40 of Mine Unit 8 will not alter those values. The Department hereby approves the Notice of Intent to Operate the additional well in Mine Unit 8.

If you have any questions concerning this matter, please contact Jenny Coughlin of my staff at (402) 471-4290.

Sincerely,

Michael J. Linder
Director

ML/jlc
word/CBR/letter/NOI_MU8_WH401_3945.doc

Cc: Dave Carlson, NDEQ
Jim Stokey, CBR

Well House Start-Up Checklist

Well House # 40 - P3945

Item	Description	Person	Comments	Date Completed	Initial
1	Permit To Operate	Beins / Stokey		5-18-11	WB
2	Complete Pressure Testing (Trunkline and House)	McDowell / Tiensvold / Stokey	NA		
3	Pipelines checked for leaks	McDowell / Tiensvold / Stokey	KM	5-17-11	KM
4	Pipelines buried	McDowell / Tiensvold / Stokey	KM	5-17-11	KM
5	Pressure gauges manifolds	McDowell / Tiensvold / Stokey	NA		
6	Injection lines equipped with totalizing flow meters	McDowell / Tiensvold / Stokey	NA		
7	Injection and Production total flows can be measured	McDowell / Tiensvold / Stokey	NA		
8	Unused trunkline locked out by two separate means	McDowell / Tiensvold / Stokey	NA		
9	Isolation valves are closed and chained	McDowell / Tiensvold / Stokey	NA		
10	Map of 2" lines in house	McDowell / Beins / Tiensvold / Stokey		5-18-11	WB
11	Well-field Layout map in house	McDowell / Beins / Tiensvold / Stokey		5-18-11	WB
12	Check berms	Teahon / Tiensvold / Stokey	NA		
13	Pressure check oxygen lines	Roberts / Tiensvold / Stokey	NA		
14	Continuity check on producers	Scoggan / Tiensvold / Stokey	NA	5-16-11	BT
15	Ground fault check	Scoggan / Tiensvold / Stokey	NA		
16	Communications wire check	Hagman / Tiensvold / Stokey		5-17-11	TH
17	Heater size check	Scoggan / Tiensvold / Stokey	NA	5-16-11	BT
18	Processor installed well house	Hagman / Tiensvold / Stokey	NA		
19	UPS installed and operational	Scoggan / Tiensvold / Stokey	NA		
20	Wet house alarm installed	Scoggan / Tiensvold / Stokey	NA		
21	Wet house alarm checked	Scoggan / Tiensvold / Stokey	NA		
22	Oxygen solenoid checked	Hagman / Tiensvold / Stokey	NA		
23	Check fuses in control panel	Scoggan / Tiensvold / Stokey	NA		
24	Program MMI	Hagman / Tiensvold / Stokey	NA		
25	Program PLC	Hagman / Tiensvold / Stokey	NA		
26	Set Scalar Card 'K' Factors	K. Forbes/P. Dunn / Tiensvold / Stokey		5-17	KF
27	Off tags and lockouts	K. Forbes/P. Dunn / Tiensvold / Stokey	NA		
28	Contaminated and uncontaminated cans	K. Forbes/P. Dunn / Tiensvold / Stokey	NA		
29	Complete 2" lateral inspection	McDowell / Tiensvold / Stokey		5-17	KM
30	Visually inspect entire system to plant	McDowell / Tiensvold / Stokey	NA		
31	Labels on Monitor Wells	McDowell / Tiensvold / Stokey	NA		
32	Valve Station Covers and Stairs Built	Roberts / Tiensvold / Stokey	NA		
33	Manifold Pressure Switches Installed	Scoggan / Tiensvold / Stokey	NA		
34	Injection Filter Installed	McDowell / Tiensvold / Stokey	NA		
35	Filter instrumentation and gauges installed	McDowell / Tiensvold / Stokey	NA		
36	Electric door lock installed	Scoggan / Tiensvold / Stokey	NA		
37	Update Daily Walk Through Inspection form EHS 4-1	Teahon / Tiensvold / Stokey	NA		

Crow Butte Resources
Pump Continuity
Wellhouse 40

Date: 5-16-11
Technician: Bob Tiensvold
Non-Service Lines Locked-Out: (Yes) No

Item #	Well #	Initial	Meter Reading		Comments
1	P 3945	AS	2.3	Ohms	
2	P #REF!			Ohms	
3	P #REF!			Ohms	
4	P #REF!			Ohms	
5	P #REF!			Ohms	
6	P #REF!			Ohms	
7	P #REF!			Ohms	
8	P #REF!			Ohms	
9	P #REF!			Ohms	
10	P #REF!			Ohms	
11	P #REF!			Ohms	
12	P #REF!			Ohms	
13	P #REF!			Ohms	
14	P #REF!			Ohms	
15	P #REF!			Ohms	
16	P #REF!			Ohms	
17	P #REF!			Ohms	
18	P #REF!			Ohms	
19	P #REF!			Ohms	

Item #	Well #	Initial	Meter Reading		Comments
20	P #REF!			Ohms	
21	P #REF!			Ohms	
22	P #REF!			Ohms	
23	P #REF!			Ohms	
24	P #REF!			Ohms	
25	P #REF!			Ohms	
26	P #REF!			Ohms	
27	P #REF!			Ohms	
28	P #REF!			Ohms	
29	P #REF!			Ohms	
30	P #REF!			Ohms	
				Ohms	
				Ohms	
				Ohms	
				Ohms	
				Ohms	
				Ohms	
				Ohms	
				Ohms	

Crow Butte Resources

Final Inspection of Piping Wellhead to Plant

Wellhouse: 40

Review of Pressure Test Data Complete: 5-17-11

Date: 5-17-11

Mine Manager: [signature]

W.F.C. Foreman: [signature] - WFC Supervisor

Non-Service Lines Locked-Out: _____

Item #	Well #	Initialed by	Comments
1	P 3945	[signature]	OK
2	P #REF!		
3	P #REF!		
4	P #REF!		
5	P #REF!		
6	P #REF!		
7	P #REF!		
8	P #REF!		
9	P #REF!		
10	P #REF!		
11	P #REF!		
12	P #REF!		
13	P #REF!		
14	P #REF!		
15	P #REF!		
16	P #REF!		
17	P #REF!		
18	P #REF!		
19	P #REF!		

Item #	Well #	Initialed by	Comments
20	P #REF!		
21	P #REF!		
22	P #REF!		
23	P #REF!		
24	P #REF!		
25	P #REF!		
26	P #REF!		
27	P #REF!		
28	P #REF!		
29	P #REF!		
30	P #REF!		

Well House Pressure Check Verification

Pressure check for Well House 40.   Date: 5-16-11

Injection ☐ Production ☒
On P3945 the 2" laterals were pressured to 98 psi. This was done using injection manifold pressure and injection water. The time interval was as follows:

Start: 98 psi at 1048 AM/PM
Stop: 96 psi at 1103 AM/PM

Cal Ebmeier   5-16-11
Wellfield Operator performing test   Date

Injection ☐ Production ☐
On ______ the 2" laterals were pressured to ______ psi. This was done using injection manifold pressure and injection water. The time interval was as follows:

Start: ______ psi at ______ AM/PM
Stop: ______ psi at ______ AM/PM

______   ______
Wellfield Operator performing test   Date

Injection ☐ Production ☐
On ______ the 2" laterals were pressured to ______ psi. This was done using injection manifold pressure and injection water. The time interval was as follows:

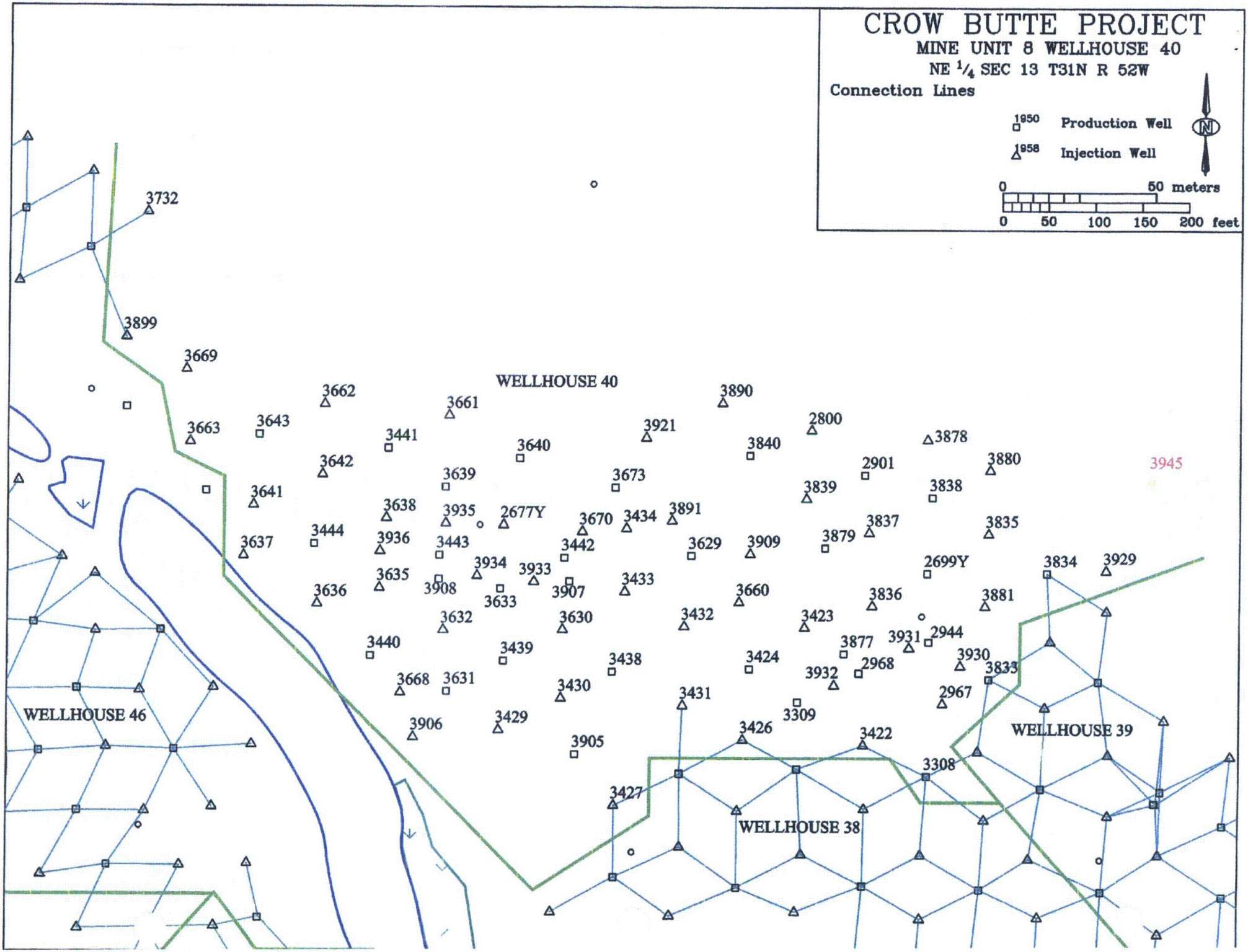
Start: ______ psi at ______ AM/PM
Stop: ______ psi at ______ AM/PM

______   ______
Wellfield Operator performing test   Date

Injection ☐ Production ☐
On ______ the 2" laterals were pressured to ______ psi. This was done using injection manifold pressure and injection water. The time interval was as follows:

Start: ______ psi at ______ AM/PM
Stop: ______ psi at ______ AM/PM

______   ______
Wellfield Operator performing test   Date


CROW BUTTE PROJECT
MINE UNIT 8 WELLHOUSE 40
NE 1/4 SEC 13 T31N R 52W
Connection Lines
1950 Production Well
1958 Injection Well
N
0 50 meters
0 50 100 150 200 feet
WELLHOUSE 40
WELLHOUSE 46
WELLHOUSE 38
WELLHOUSE 39
3732
3899
3669
3662
3661
3890
3663
3643
3441
3921
2800
3640
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3878
3642
3639
3673
2901
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2699Y
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3660
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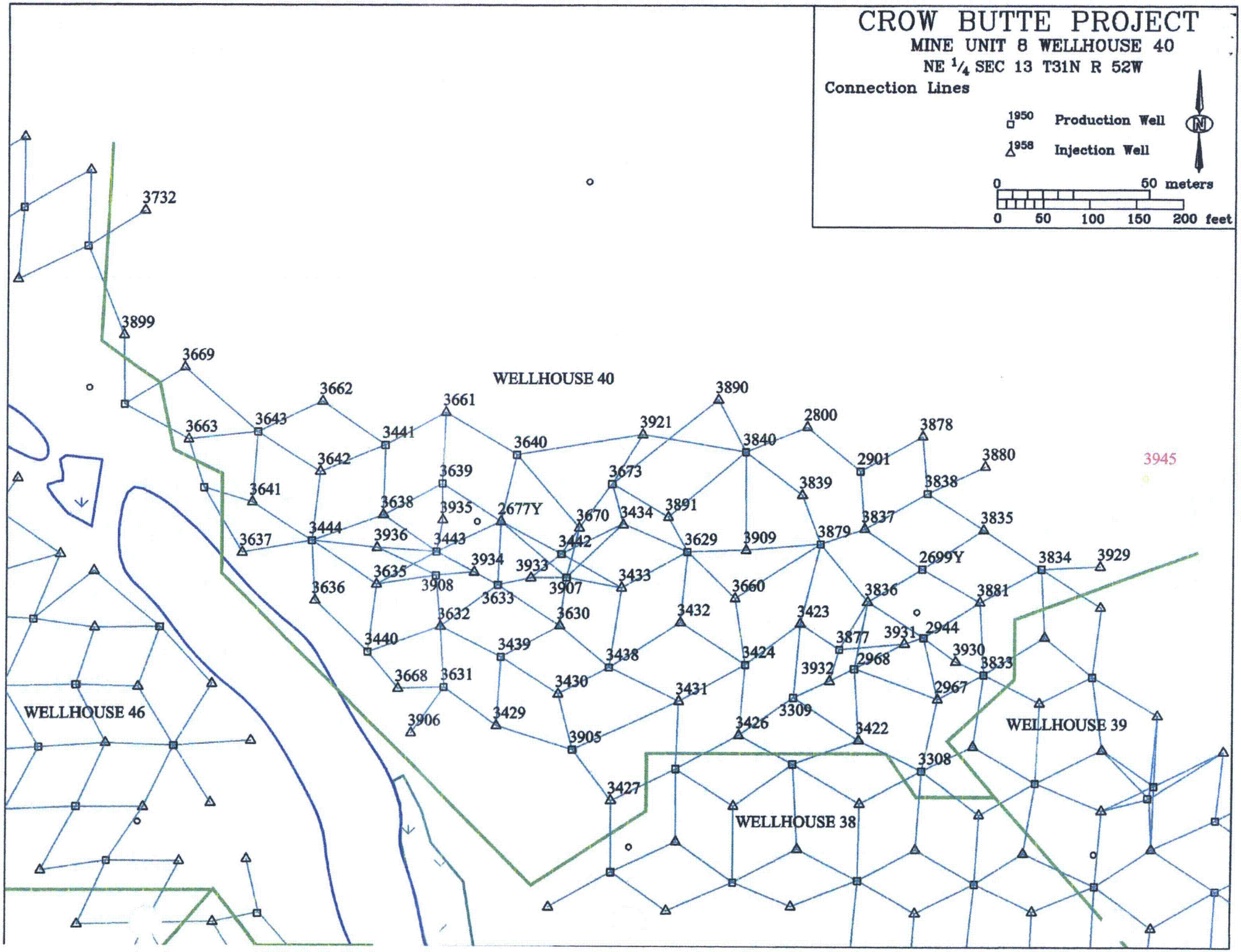
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3878
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3835
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2699Y
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