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 23, 2017

USPS PRIORITY MAIL
SIGNATURE CONFIRMATION

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

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 2016. This report is made in accordance with the reporting requirements contained in License Condition 9.4 (E).

CBR's second renewal of its source material license was received November 5, 2014. 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 2016, the CBR SERP approved six 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.

IE48
NMSS20
NMSS

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- Highlighted versions of page changes made to the License Renewal Application (LRA) because of the SERP actions in 2016. These highlighted page changes use a strikethrough to denote deleted text and an underline to indicate new text.

- Page replacement versions of page changes for insertion in the updated NRC copy of the LRA. These pages have a revision date in the footer.

There were four SERP Evaluation conducted during calendar 2016 that required a page change to the license renewal issued November 5, 2014.

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. (A request for an alternate decommissioning schedule for mine unit 6 was submitted on December 21, 2010). 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 June 22, 2016 (received June 27, 2016), the U.S. Nuclear Regulatory Commission (NRC) staff indicated that they had reviewed information previously submitted by CBO in support of an alternate decommissioning (groundwater restoration) schedule for MUs 2-6 by letters dated October 26, 2012 (ML12313A517), and August 8, 2013 (ML13226A353). The NRC staff had no further questions on these submittals.

As a separate matter, NRC staff indicated that CBO's current estimates for groundwater restoration (ML15279A139) were not in compliance with approved schedules (refer to LC 10.6 of ML13324A101). In addition, CBO's groundwater restoration schedule reflected in its 2016 surety estimate indicated that a formal request to remove (MUs) 2 and 3 from restoration was to occur in the fourth quarter of 2015. As this date had passed, the NRC staff found that the groundwater restoration schedule reflected in the 2016 surety estimate was no longer valid and may not provide a sufficient amount of restoration time for the development of an alternate concentration limit (ACL) application or, alternatively, to reach concentration limits under 10 CFR 40, Appendix A Criterion 5B(5).

In accordance with 10 CFR 40.42 and 10 CFR 40.44, the NRC staff requested a license amendment request on NRC Form 313 for an alternate decommissioning (groundwater restoration) schedule for MUs 2-6 to update the schedule reflected in the 2016 surety estimate (ML15279A139) with sufficient amount of restoration time for the development of an ACL application, or alternatively, to reach concentration limits under 10 CFR 40, Appendix A, Criterion 5B(5).

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The following is a summary of the license amendment requesting an alternate decommissioning schedule for MUs 2-6.

Summary of License Amendment Request for Alternate Decommissioning Schedule for Mine Units 2 through 6

Mine Unit	Current Status of Ground Water Restoration	Requested Alternate Decommissioning Date	Status
2	Stability Monitoring	June 1, 2022	Under NRC Review
3	Stability Monitoring	June 1, 2022	Under NRC Review
4	IX / RO Treatment	July 1, 2023	Under NRC Review
5	IX / RO Treatment	October 1, 2025	Under NRC Review
6	IX Treatment	January 1, 2025	Under NRC Review

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

Sincerely,
CAMECO RESOURCES
CROW BUTTE OPERATION

Larry Teahon

Larry Teahon
SHEQ Manager

Enclosures: As Stated

cc: Deputy Director, Division of Decommissioning
Uranium Recovery and Waste Programs
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop T-8F5
11545 Rockville Pike
Two White Flint North
Rockville, MD 20852-2738

CBO – File

ec: CR – Electronic File

2016 SERP Evaluation Index

Safety and Environmental Review Panel

2016 SERP Index

SERP Evaluation Number	Date	Action Taken	Modifications to Previous SERP Actions
SERP 16-01	13 January 2016	Approve Replacement of Mine Unit 5 Baseline Restoration Well P684 with I1126	Closed
SERP 16-02	26 February 2016	Approve Revisions to Figures 1, 2, and 5 Evaporation Pond Onsite Inspection Program	Closed
SERP 16-03	9 June 2016	Organizational Structure	Closed
SERP 16-03 Revised	3 October 2016	Revised Organizational Structure from SERP 16-03	Closed
SERP 16-04	29 June 2016	Six Minor Figure and Table Changes to LRA November 2014	Closed
SERP 16-05	29 June 2016	Revised Organization Structure in the Security Plan	Closed

SERP 16-01 Evaluation

Crow Butte Resources, Inc.

Safety and Environmental Review Panel

Evaluation Report – SERP #16-01

Replacement of Mine Unit 5 Baseline Restoration Well

January 13, 2016

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
Bob Tiensvold	Mine Manager	Management
Larry Teahon	SHEQ Manager	Regulatory Environment
Tami Dyer	Radiation Safety Officer	Radiation Safety
Tate Hagman	Administrative Supervisor	Instrumentation
Wade Beins	Senior Geologist	Well Construction
Steven Boeselager	Restoration Supervisor	Wellfield Operations

Mr. Tiensvold 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 5 with a nearby well. Specifically; P-684 is a Mine Unit 5 baseline restoration well that failed a Mechanical Integrity Test (MIT) and was subsequently abandoned. Therefore, CBR would like to replace P-684 with I-1126. I-1126 is completed and screened in the same zones of the Chadron Formation as P-684. Additionally, I-1126 is located approximately 63 feet southwest of P-684.

Mine Unit 5 was previously approved by License Amendment #31 dated December 20, 1995 (Original License – December 1989). At that time; CBR was required to submit baseline sampling data and calculation of the monitor wells upper control limits to the NRC for approval. (The CBR SERP is now responsible for approving these requirements for new Mine Units under the Performance-Based License Condition). As required by License Condition 10.3 of the December 1989 license and the Nebraska Department of Environmental Quality (NDEQ) Class III UIC Permit, Part II.(C), CBR was required to submit baseline sampling on one well per four acres. This designation is made in the Notice of Intent submitted to NDEQ before placing a Mine Unit into operation.

In the request for approval submitted to NRC for Mine Unit 5 in December 1995, CBR identified P-684 as one of the thirty three (33) 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 November 4, 2014, while pulling the pump and piping from P-684 to do routine 5-year Mechanical Integrity Testing (MIT), the downhole equipment (pump, piping and wire) became stuck in the casing. On December 9, 2014, a drill rig was used to provide a greater pulling force on the stuck equipment. Approximately 60 feet of HDPE pipe and wire were successfully removed from the well before the pump once again became wedged inside the casing. The HDPE pipe stretched, and then failed as it was pulled apart. The failed pipe went back down the well casing. Downhole video showed the failed pipe at approximately 18 feet. Three unsuccessful attempts to retrieve the pipe resulted in further stretching and failure of the HDPE pipe as the pump remained wedged in place. Downhole video analysis showed damage to the HDPE pipe that precluded further attempts to retrieve the materials from the well.

On December 16, 2014, CBR submitted an abandonment plan for well P-684 to NDEQ. In the plan, CBR indicated intentions to drill away the stuck HDPE pipe to a depth of 400 feet and abandon the well with cement.

Initial rig work to retrieve the downhole pump, piping and wire commenced on February 27, 2015. Over the next three days, attempts to retrieve the equipment were unsuccessful. Active drilling away of the HDPE began on March 12, 2015. On March 13, 2015, approximately 500 feet of the downhole electrical wire was retrieved from the well. On March 16, 2015, the drill bit broke through the side of the well casing at a depth of 120 feet. Attempts to re-insert the drill string inside the casing to continue the drilling process were hindered by the remaining HDPE pipe blocking the well bore.

CBR contacted NDEQ personnel, and determined that insertion of a small diameter tremie pipe beside the HDPE would be an acceptable method to facilitate abandonment of the well. On March 18, 2015, with the use of the downhole video equipment, 480 feet of 1½ inch galvanized pipe was placed into the well beside the remaining HDPE. Abandonment fluid was mixed and circulated through the well. On March 19, 2015, the tremie pipe was placed at 140 feet, and a neat cement slurry was pumped into the well bore to the surface.

This cement plug extended approximately 20 feet below the casing breach. The tremie pipe was removed from the well, and the fluid level in the well was observed for subsidence. The well was then topped off with approximately five feet of bentonite chips (Abandonment letter dated March 20, 2015).

As a designated restoration well, CBR is required to collect samples from P-684 following the completion of groundwater restoration activities in Mine Unit 5 that is now in progress. In accordance with the restoration requirements in the Class III UIC Permit and CBR's Restoration Plan for Mine Unit 5, restoration wells must be sampled for the restoration parameters during the stabilization phase of restoration. The data that results from the sampling is used to determine the effectiveness of restoration.

CBR proposes replacing P-684 with well I-1126 as a replacement restoration well for Mine Unit 5. CBR believes that I-1126 is an acceptable replacement for P-684 for this purpose based on the following:

- Physical Proximity: Well I-1126 is located approximately 63 feet southwest of P-684. 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. A map of the location is attached.

- Screened Interval: Well I-1126 is completed in the same zones of the Chadron Formation as P-684 where baseline sampling was performed. Well I-1126 was originally installed as an injection well in Mine Unit 5.

  P-684 Completion Information (January 1995):
  Telescope screen hung on K Packer
  K Packer depth: 606 ft.
  Blank: 10 ft.
  Screen: 10 ft. (616 ft. to 626 ft.)

  I-1126 Completion Information (April 1996)
  Telescope screen hung on K Packer
  K Packer depth: 602 ft.
  Blank: 10 ft.
  Screen: 20 ft. (612 ft. to 632 ft.)

- Baseline Water Quality: As noted above, well P-684 was originally installed as a baseline monitor well for Mine Unit 5. The well had baseline sampling performed with 3 samples obtained during May and June of 1995.

  Well I-1126 was installed as a Mine Unit 5 injection well in April 1996. 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.

The following is the data from P-684:

Parameter	Well P-684	
	Mean	Standard Deviation
Ammonia (mg/l)	0.35	0.14
Arsenic (mg/l)	<0.001	0
Barium (mg/l)	<0.10	0
Cadmium (mg/l)	<0.01	0
Chloride (mg/l)	187	3.8
Copper (mg/l)	<0.01	0
Fluoride (mg/l)	0.59	0.01
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)	<0.10	0
Lead (mg/l)	<0.05	0
Radium-226 (pCi/l)	308	45
Selenium (mg/l)	<0.001	0
Sulfate (mg/l)	356	5.3
Uranium (mg/l)	0.0547	.0051
Vanadium (mg/l)	<0.10	0
Zinc (mg/l)	0.02	0.01
pH (S.U.)	8.24	0.08
Calcium (mg/l)	15.2	.10
Total Carbonate (mg/l)	380	4.9
Potassium (mg/l)	9.7	.20
Magnesium (mg/l)	3.7	0.10
Sodium (mg/l)	383	1.7
Total Dissolved Solids (mg/l)	1164	15.5

Because P-684 and I-1126 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 5.

AUTHORITY OF SERP

License Condition 9.4. *Change, Test and Experiment License Condition*

A) The licensee may, without obtaining a license amendment pursuant to 10 CFR 40.44, and subject to conditions specified in (B) of this condition:

i. Make changes in the facility as described in the license application (as updated);
ii. Make changes in the procedures as described in the license application (as updated); and
iii. Conduct tests of experiments not described in the license application (as updated).

B) The licensee shall obtain a license amendment pursuant to 10 CFR 40.44 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:

i. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a facility structure, equipment, or monitoring system (SEMS) important to safety previously evaluated in the license application (as updated);
iii. Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in more than a minimal increase in the consequences of a malfunction of an SEMS 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 SEMS 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), environmental impact statement (EIS), environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.
viii. For the purposes of SERP evaluations, SEMS means any SEMS that has been referenced in a staff SER, TER, EA, or EIS and supplements and amendments thereof.

C) Additionally, the licensee must obtain a license amendment unless the change, test, or experiment is consistent with NRC's previous conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site or facility SER, TER, and EIS or EA. This would include all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

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, Renewal dated November 5, 2014;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. November 2007;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC October 2014;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC August 2014;
- 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

License Condition 10.3(A) (December 1989) specifically stated 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 I-1126 has not had three baseline samples collected, CBO feels, due to the proximity of I-1126 to P-684 (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 October 2014 to determine whether the proposed change could cause substantive safety or environmental impacts.

Section 4.6.2.3 of the EA addresses aquifer restoration impacts on groundwater. The purpose of aquifer restoration is to return the groundwater in the production zone to

compliance with the groundwater protection standards in 10 CFR Part 40, Appendix A, Criterion 5B(5). The proposed change will not impact the requirements of this standard.

Financial Surety

The proposed change to the Mine Unit 5 baseline restoration wells will have no effect on the NRC-approved financial surety maintained by CBR and approved by Amendment 27 (February 1998 License) to SUA-1534 in the amount of $43,223,280.

Safety Evaluation Report

The SERP reviewed the contents of the Safety Evaluation Report (SER) prepared by NRC in August 2014 to determine whether the proposed change could cause substantive safety or environmental impacts.

Section 6.1.3.2 of the SER addresses baseline water quality and sampling requirements for baseline wells. The number of samples (3) collected from P-684 were the licensing and permitting requirements at the time the samples were collected. The SERP noted that the number of required baseline water quality samples has gone from three to four in the current license and is addressed in License Condition 11.3. It was determined that additional sampling from I-1126 was not feasible due to the impacts from using this well during mining and restoration. Replacing P-684 with I-1126 meets the establishment of background water quality requirements of License Condition 11.3 with the exception of collecting a fourth sample.

Although I-1126 has not had three baseline samples collected, CBO feels, due to the proximity of I-1126 to P-684 (within the one acre boundary) the baseline values would be very similar.

Because P-684 and I-1126 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 5.

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 5 baseline restoration wells. There will be no reduction in the number of wells or amount of sampling required during restoration of Mine Unit 5.

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 January 5, 2016, NDEQ approved the proposal to replace P-684 with I-1126. 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 P-684 with I-1126.

Approved this 13th day of January 2016.

Bob Tiensvold, Mine Manager
SERP Chairman

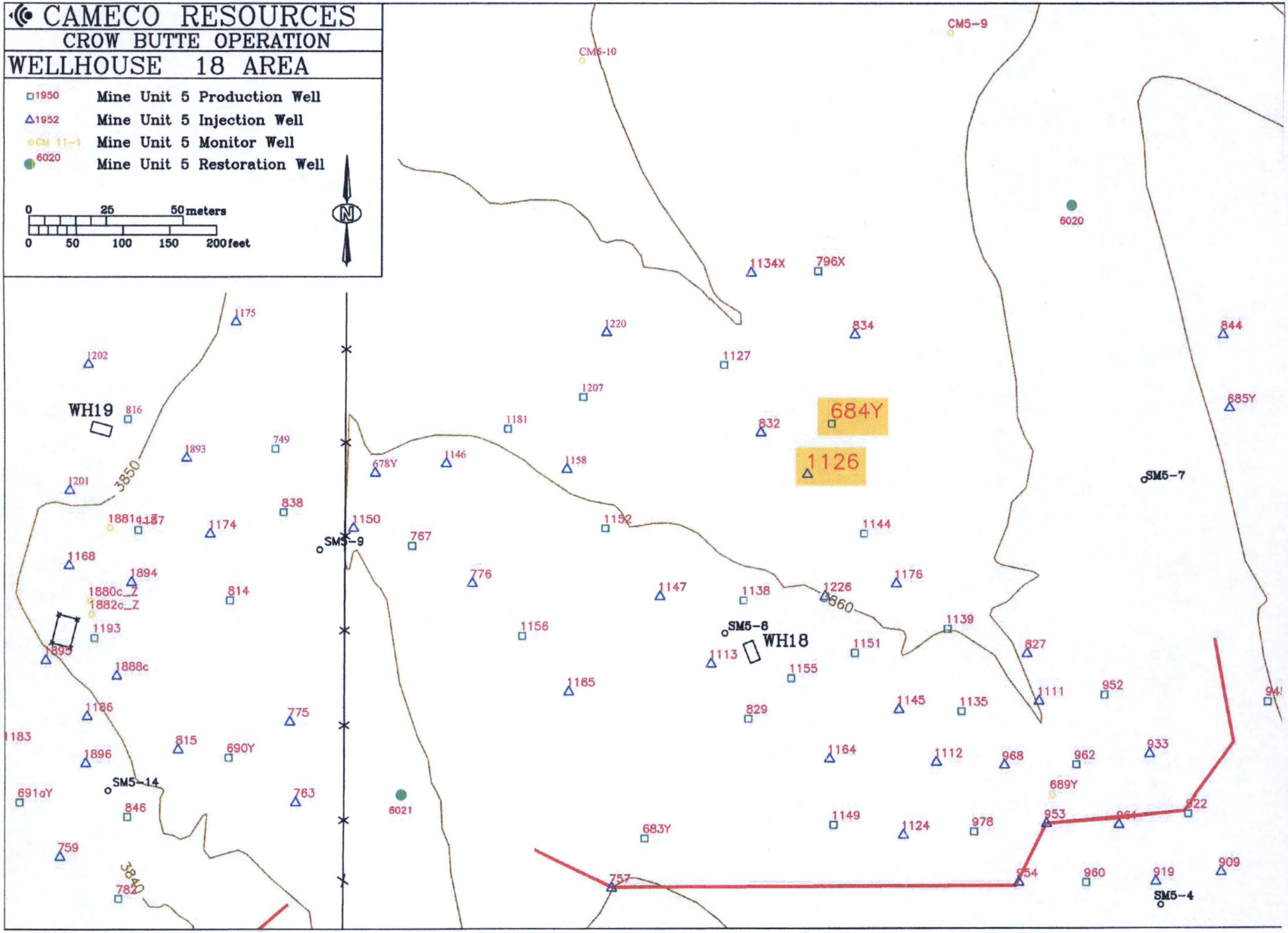
Larry Teahon, SHEQ Manager
SERP Secretary

Wade Beins, Senior Geologist

Tami Dyer, Radiation Safety Officer

Steven Boeselager, Restoration Supervisor

Tate Hagman, Administrative Supervisor


CAMECO RESOURCES
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WELLHOUSE 18 AREA
1950 Mine Unit 5 Production Well
1952 Mine Unit 5 Injection Well
CM 11-1 Mine Unit 5 Monitor Well
6020 Mine Unit 5 Restoration Well
0 25 50 meters
0 50 100 150 200 feet
N
CM5-9
CM5-10
6020
1134X
796X
1220
834
844
1127
1207
685Y
684Y
1126
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1181
1146
678Y
1158
SM5-7
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1881c_Z
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1882c_Z
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1139
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SM5-8
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846
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1149
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STATE OF NEBRASKA

Pete Ricketts
Governor

DEPARTMENT OF ENVIRONMENTAL QUALITY
Jim Macy
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: http://deq.ne.gov

Brent Berg, President
Crow Butte Resources, Inc.
Cameco Resources
550 N. Poplar St., Suite 100
Casper, Wyoming 82601

JAN 05 2016

Dear Mr. Berg:

On December 16, 2015, the Nebraska Department of Environmental Quality (NDEQ) received a request from Crow Butte Resources, Inc. (CBR) to replace Mine Unit 5 baseline restoration well P-684 with I-1126 . This request was made due to downhole equipment becoming stuck in P-684 while preparing the well for a routine 5-year mechanical integrity test. P-684 was abandoned on March 20, 2015. In this letter, CBR provided documentation that P-684 is completed and screened in the same zones of the Chadron Formation as I-1126. Additionally, I-1126 is located approximately 63 feet southwest of P-684.

NDEQ has reviewed the baseline water quality data submitted for Mine Unit 4 in 1995, and concurs with CBR's assertion that the baseline water quality data gathered in 1995 from P-684 can be applied to I-1126. 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 I-1126 is used as a baseline well. No changes to the restoration goals previously approved by NDEQ for Mine Unit 5 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 5. The Department has determined that I-1126 will make an adequate replacement for P-684 based on physical proximity and similar screen intervals of the two wells. The Department will now consider I-1126 as a baseline restoration well for Mine Unit 5.

Please contact Nancy Harris 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,

Marty Link
Associate Director

Cc: Larry Teahon, CBR
Lena Vishni, NDEQ
Ron Burrows, NRC

Crow Butte Resources, Inc.

Safety and Environmental Review Panel

Evaluation Report – SERP #16-02

Revise Figures 1, 2, and 5 in the Evaporation Pond Onsite Inspection Program
Approved December, 1992
Revised February, 1996

February 26, 2016

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met to review revisions made to Figures 1, 2, and 5 in the Evaporation Pond Onsite Inspection Program which are used as forms when conducting the pond inspections.

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

Name	Title	Area of Expertise
Bob Tiensvold	Mine Manager	Management
Larry Teahon	SHEQ Manager	Regulatory Environment
Tami Dyer	Radiation Safety Officer	Radiation
Steven Boeselager	Restoration Supervisor	Wellfield Operations
Walt Nelson	Environmental Leadership Coordinator	Environment
Kevin Vogl	Plant Foreman	Plant Operations

Mr. Tiensvold 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 revisions made to Figures 1, 2, and 5 in the Evaporation Pond Onsite Inspection Program which are used as forms when conducting the pond inspections.

SERP #16-02

The Evaporation Pond Onsite Inspection Program was approved by the U.S. Nuclear Regulatory Commission in December 1992. On October 5, 1995, Crow Butte requested an amendment to revise the plan which would change the frequency of inspection of the pond underdrain system from daily to weekly. The request was approved and the plan was revised on February 5, 1996.

Figure 1 in the revise plan is titled "*Commercial Pond Inspection Form*", and is the form used when conducting the daily, weekly, and monthly inspections requirements for the commercial evaporation ponds. Minor changes have been made to this figure making it easier to use when conducting the daily commercial evaporation pond inspections.

Figure 2 in the revise plan is titled "*R & D Pond Inspection Form*", and is the form used when conducting the daily, weekly, and monthly inspection requirements for the R & D ponds. Minor changes have been made to this figure making it easier to use when conducting the daily R & D evaporation pond inspections.

Figure 5 in the revise plan is titled "*Weekly Evaporation Pond Underdrain Analysis*", and is the form used when conducting the weekly underdrain analysis of the commercial evaporation ponds and the R & D evaporation ponds. The figure has been revised to include all five evaporation ponds and shows the depth and freeboard of each pond. Conductivity of the underdrains is taken with a meter that doesn't require a "temperature correction", therefore these two columns have been removed from the figure.

Headers and footers on the actual forms may vary from time to time depending on the sites management system requirements. These changes do not affect the functionality of the form itself and therefore are not shown on the revised figures.

Redline copies and final copies of each figure are attached.

AUTHORITY OF SERP

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iv. Result in more than a minimal increase in the consequences of a malfunction of an SEMS 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);
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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), environmental impact statement (EIS), environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.
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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;
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- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. November 2007;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC October 2014;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC August 2014;
- 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

License Condition 11.9 (November 2014) specifically states that the licensee shall perform and document inspections in accordance with the February 5, 1996, revised Evaporation Pond Onsite Inspection Program.

Revisions to the three figures will have no impact on the requirements in the Evaporation Pond Onsite Inspection Program.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in October 2014 to determine whether the proposed change could cause substantive safety or environmental impacts.

Section 2.2.2.2 describes the evaporation ponds used for liquid waste management. The proposed changes do not affect this assessment.

Financial Surety

The proposed change to the figures in the Evaporation Pond Onsite Inspection Program will have no effect on the NRC-approved financial surety maintained by CBR and

approved by Amendment 27 (February 1998 License) to SUA-1534 in the amount of $43,223,280.

Safety Evaluation Report

The SERP reviewed the contents of the Safety Evaluation Report (SER) prepared by NRC in August 2014 to determine whether the proposed change could cause substantive safety or environmental impacts.

Section 4.2.3.1.4 of the SER addresses the monitoring requirements of the onsite evaporation ponds.

The proposed changes do not affect the monitoring requirements identified in the SER.

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.

Based upon this evaluation of the licensing basis, the CBR SERP hereby approves the proposed revisions to Figures 1, 2, and 5 in the Evaporation Pond Onsite Inspection Program.

Approved this 26th day of February 2016.

Bob Tiensvold, Mine Manager
SERP Chairman

Larry Teahon, SHEQ Manager
SERP Secretary

Tami Dyer, Radiation Safety Officer

Steven Boeselager, Restoration Supervisor

Walt Nelson, Environmental Leadership Coordinator

SERP #16-02

Kevin Vogl, Plant Foreman

SERP 16-02 Evaluation

SERP 16-03 Evaluation

CROW BUTTE RESOURCES, INC.

SAFETY AND ENVIRONMENTAL REVIEW PANEL

Evaluation Report – SERP 16-03

Revisions to the Approved License Renewal (November 2014)

June 9, 2016

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met in accordance with USNRC Source Materials License SUA-1534 to review proposed changes to the approved License Renewal (November 2014). This change reflects a recent organizational change that indirectly affects the radiation safety department.

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

Name	Title	Area of Expertise
Bob Tiensvold	Restoration Manager	Management
Larry Teahon	Manager of SHEQ	Environment and Safety
Tami Dyer	Radiation Safety Officer	Radiation Safety
Tate Hagman	Plant Supervisor	Plant Operations
Sabrina Fox	SHEQ Specialist	Permitting and Document Control

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

PURPOSE OF SERP EVALUATION

The purpose of the SERP evaluation was to review a change made to the Cameco Divisional organizational structure. The evaluation adds the position of Director of Safety, Health, Environment, and Quality (SHEQ) and changes the title of Mine Manager at the

site level to Restoration Manager. These changes affect the direct and indirect reporting requirements for the Radiation Safety Officer.

An organizational change has been made that directly and indirectly affects the reporting responsibilities of the radiation safety staff. The direct reporting of the Radiation Safety Officer (RSO) has been changed as shown in the revised Figure 5.1-1 from the approved License Renewal (November 2014). The RSO currently reports to the Mine Manager, with the organizational change, the RSO will report directly to the Director of SHEQ. The indirect reporting for the RSO has been changed as shown in the revised Figure 5.1-1 from the approved License Renewal (November 2014). The RSO currently reports indirectly to the General Manager of U.S. Operations. With the organizational change, the RSO will have an indirect reporting requirement to the President.

AUTHORITY OF SERP

License Condition 9.4. Change, Test and Experiment License Condition

A) The licensee may, without obtaining a license amendment pursuant to 10 CFR 40.44, and subject to conditions specified in (B) of this condition:

i. Make changes in the facility as described in the license application (as updated);
ii. Make changes in the procedures as described in the license application (as updated); and
iii. Conduct tests of experiments not described in the license application (as updated).

B) The licensee shall obtain a license amendment pursuant to 10 CFR 40.44 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:

i. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a facility structure, equipment, or monitoring system (SEMS) important to safety previously evaluated in the license application (as updated);
iii. Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in more than a minimal increase in the consequences of a malfunction of an SEMS 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 SEMS 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), environmental impact statement (EIS), environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.

viii. For the purposes of SERP evaluations, SEMS means any SEMS that has been referenced in a staff SER, TER, EA, or EIS and supplements and amendments thereof.

C) Additionally, the licensee must obtain a license amendment unless the change, test, or experiment is consistent with NRC's previous conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site or facility SER, TER, and EIS or EA. This would include all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

SERP EVALUATION

The SERP evaluation was conducted in accordance with SHEQMS Volume II, *Management Procedures Manual;* Chapter 6, *Managing Change.* The SERP reviewed the proposed change 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, Renewal dated November 5, 2014;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534,* Crow Butte Resources, Inc. November 2007;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534,* USNRC October 2014;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534,* USNRC August 2014;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed changes to the License Renewal will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

The SERP reviewed the requirements contained in Source Materials License SUA-1534, renewal, dated November 5, 2014. The proposed changes will have no impact on CBR's ability to meet NRC License Conditions.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in October 2014 to determine whether the proposed change caused substantive safety or environmental impacts. The proposed changes to the License Renewal do not conflict with the EA.

Financial Surety

The proposed changes will have no effect on the level of financial surety maintained by CBR.

Safety Evaluation Report

The Safety Evaluation Report (SER) prepared by NRC in August 2014 principally provides the basis for worker safety at Crow Butte. The proposed change applies to the following sections of the SER:

Section 5.1, Corporate Organization and Administrative Procedures, discusses the relationships of the organizational components responsible for operations, radiation safety, and environmental protection at the Crow Butte site. The proposed change does not alter the organizational position of the RSO, in accordance with organizational changes previously approved by the CBR SERP. Therefore, there is no change to the intent of Section 5.1 of the SER.

The SERP determined that the management structure and responsibilities are consistent with recommendations in Regulatory Guide 8.31, Section 2.1, *Health Physics Authorities and Responsibilities.*

Based on this review, the proposed changes to the Renewed License (November 2014) will have no impact on CBR's ability to continue to meet the commitments cited in the SER.

Technical Evaluation Reports

There have been no Technical Evaluation Reports (TERs) prepared by NRC staff since renewal of SUA-1534 on November 5, 2014.

License Renewal Application (LRA) Approved November 5, 2014

The proposed changes revise Section 5.1, Corporate Organization and Administrative Procedures, in the LRA.

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 and the SER are not affected by this review and will not degrade the safety and environmental commitments.

Conclusion

It was the conclusion of the SERP that the proposed change is allowed by License SUA-1534 and should be approved. The revised pages of the license application required in accordance with License Condition 9.4 were reviewed and approved and are attached to this evaluation.

Approved this 9th day of June 2016:

Bob Tiensvold, Restoration Manager
SERP Chairman

Larry Teahon, Manager of Safety, Health, Environment and Quality
SERP Secretary

Tami Dyer, Radiation Safety Officer

Tate Hagman, Plant Supervisor

Sabrina Fox, SHEQ Specialist

SERP 16-03 Revised Evaluation

CROW BUTTE RESOURCES, INC.

SAFETY AND ENVIRONMENTAL REVIEW PANEL

Evaluation Report – SERP 16-03 (Revised)

Revisions to the Approved License Renewal (November 2014)

October 3, 2016

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met in accordance with USNRC Source Materials License SUA-1534 to review proposed changes to the approved License Renewal (November 2014). This change reflects a revision to SERP 16-03 performed on June 9, 2016, which made changes to the recent organizational structure that indirectly affects the radiation safety department.

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

Name	Title	Area of Expertise
Bob Tiensvold	Restoration Manager	Management
Larry Teahon	Manager of SHEQ	Environment and Safety
Tami Dyer	Radiation Safety Officer	Radiation Safety
Tate Hagman	Plant Supervisor	Plant Operations
Sabrina Fox	SHEQ Specialist	Permitting and Document Control

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

PURPOSE OF SERP EVALUATION

The purpose of the SERP evaluation was to review a change made to the Cameco Divisional organizational structure. The June 9, 2016 evaluation added the position of Director of Safety, Health, Environment, and Quality (SHEQ) and changed the title of

Mine Manager at the site level to Restoration Manager. These changes affected the direct and indirect reporting requirements for the Radiation Safety Officer.

An organizational change was made that directly and indirectly affected the reporting responsibilities of the radiation safety staff. The direct reporting of the Radiation Safety Officer (RSO) has been changed as shown in the revised Figure 5.1-1 from the approved License Renewal (November 2014). The RSO currently reported to the Mine Manager, with the organizational change, the RSO now reports directly to the Director of SHEQ. The indirect reporting for the RSO has been changed as shown in the revised Figure 5.1-1 from the approved License Renewal (November 2014). The RSO currently reports indirectly to the General Manager of U.S. Operations. With the organizational change, the RSO will have an indirect reporting requirement to the President.

A follow-up to this SERP is being conducted to include the title "Designated Operator" in the organizational chart (Figure 5.1-1). Employee's that meet the training qualifications to be classified as a "Designated Operator", will report to the Plant Supervisor.

AUTHORITY OF SERP

License Condition 9.4. Change, Test and Experiment License Condition

A) The licensee may, without obtaining a license amendment pursuant to 10 CFR 40.44, and subject to conditions specified in (B) of this condition:

i. Make changes in the facility as described in the license application (as updated);
ii. Make changes in the procedures as described in the license application (as updated); and
iii. Conduct tests of experiments not described in the license application (as updated).

B) The licensee shall obtain a license amendment pursuant to 10 CFR 40.44 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:

i. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a facility structure, equipment, or monitoring system (SEMS) important to safety previously evaluated in the license application (as updated);
iii. Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in more than a minimal increase in the consequences of a malfunction of an SEMS 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 SEMS 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), environmental impact statement (EIS), environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.

viii. For the purposes of SERP evaluations, SEMS means any SEMS that has been referenced in a staff SER, TER, EA, or EIS and supplements and amendments thereof.

C) Additionally, the licensee must obtain a license amendment unless the change, test, or experiment is consistent with NRC's previous conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site or facility SER, TER, and EIS or EA. This would include all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

SERP EVALUATION

The SERP evaluation was conducted in accordance with SHEQMS Volume II, *Management Procedures Manual;* Chapter 6, *Managing Change.* The SERP reviewed the proposed change 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, Renewal dated November 5, 2014;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. November 2007;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC October 2014;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC August 2014;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed changes to the License Renewal will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

The SERP reviewed the requirements contained in Source Materials License SUA-1534, renewal, dated November 5, 2014. The proposed changes will have no impact on CBR's ability to meet NRC License Conditions.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in October 2014 to determine whether the proposed change caused substantive safety or environmental impacts. The proposed changes to the License Renewal do not conflict with the EA.

Financial Surety

The proposed changes will have no effect on the level of financial surety maintained by CBR.

Safety Evaluation Report

The Safety Evaluation Report (SER) prepared by NRC in August 2014 principally provides the basis for worker safety at Crow Butte. The proposed change applies to the following sections of the SER:

Section 5.1, Corporate Organization and Administrative Procedures, discusses the relationships of the organizational components responsible for operations, radiation safety, and environmental protection at the Crow Butte site. The change did not alter the organizational position of the RSO, in accordance with organizational changes previously approved by the CBR SERP. Adding the title "Designated Operator" to the organizational chart does not change the requirements described in License Condition 9.7. Therefore, there is no change to the intent of Section 5.1 of the SER.

The SERP determined that the management structure and responsibilities are consistent with recommendations in Regulatory Guide 8.31, Section 2.1, *Health Physics Authorities and Responsibilities.*

Based on this review, the proposed changes to the Renewed License (November 2014) will have no impact on CBR's ability to continue to meet the commitments cited in the SER.

Technical Evaluation Reports

There have been no Technical Evaluation Reports (TERs) prepared by NRC staff since renewal of SUA-1534 on November 5, 2014.

License Renewal Application (LRA) Approved November 5, 2014

The proposed changes revise Section 5.1, Corporate Organization and Administrative Procedures, in the LRA.

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 and the SER are not affected by this review and will not degrade the safety and environmental commitments.

Conclusion

It was the conclusion of the SERP that the proposed change is allowed by License SUA-1534 and should be approved. The revised pages of the license application required in accordance with License Condition 9.4 were reviewed and approved and are attached to this evaluation.

Approved this 3rd day of October 2016:

Bob Tiensvold, Restoration Manager
SERP Chairman

Larry Teahon, Manager of Safety, Health, Environment and Quality
SERP Secretary

Tami Dyer, Radiation Safety Officer

Tate Hagman, Plant Supervisor

Sabrina Fox, SHEQ Specialist

SERP 16-04 Evaluation

CROW BUTTE RESOURCES, INC.

SAFETY AND ENVIRONMENTAL REVIEW PANEL

Evaluation Report – SERP 16-04

Revisions to the Approved License Renewal (November 2014)

June 29, 2016

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met in accordance with USNRC Source Materials License SUA-1534 to review proposed changes to the approved License Renewal (November 2014).

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

Name	Title	Area of Expertise
Bob Tiensvold	Restoration Manager	Management
Larry Teahon	Manager of SHEQ	Environment and Safety
Tami Dyer	Radiation Safety Officer	Radiation Safety
Tate Hagman	Plant Supervisor	Plant Operations
Sabrina Fox	SHEQ Specialist	Permitting and Document Control

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

PURPOSE OF SERP EVALUATION

The purpose of the SERP evaluation was to review changes made to the License Renewal Application (LRA) submitted November 2007. Numerous revisions were made to this submittal between November 2007 and November 2014. The SERP reviewed six minor changes that were not included in the final LRA approved in November 2014.

AUTHORITY OF SERP

License Condition 9.4. Change, Test and Experiment License Condition

A) The licensee may, without obtaining a license amendment pursuant to 10 CFR 40.44, and subject to conditions specified in (B) of this condition:

i. Make changes in the facility as described in the license application (as updated);
ii. Make changes in the procedures as described in the license application (as updated); and
iii. Conduct tests of experiments not described in the license application (as updated).

B) The licensee shall obtain a license amendment pursuant to 10 CFR 40.44 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:

i. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a facility structure, equipment, or monitoring system (SEMS) important to safety previously evaluated in the license application (as updated);
iii. Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in more than a minimal increase in the consequences of a malfunction of an SEMS 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 SEMS 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), environmental impact statement (EIS), environmental assessment (EA) or the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.
viii. For the purposes of SERP evaluations, SEMS means any SEMS that has been referenced in a staff SER, TER, EA, or EIS and supplements and amendments thereof.

C) Additionally, the licensee must obtain a license amendment unless the change, test, or experiment is consistent with NRC's previous conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site or facility SER, TER, and EIS or EA. This would include all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

SERP EVALUATION

The SERP evaluation was conducted in accordance with SHEQMS Volume II, *Management Procedures Manual;* Chapter 6, *Managing Change.* The SERP reviewed the proposed change 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, Renewal dated November 5, 2014;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. November 2007;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC October 2014;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC August 2014;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed changes to the License Renewal will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

The SERP reviewed the requirements contained in Source Materials License SUA-1534, renewal, dated November 5, 2014. The proposed changes will have no impact on CBR's ability to meet NRC License Conditions.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in October 2014 to determine whether the proposed change caused substantive safety or environmental impacts. The proposed changes to the License Renewal Application do not conflict with the EA.

Financial Surety

The proposed changes will have no effect on the level of financial surety maintained by CBR.

Safety Evaluation Report

The Safety Evaluation Report (SER) prepared by NRC in August 2014 principally provides the basis for worker safety at Crow Butte. The proposed change applies to the following sections of the SER:

Section 2.6.1, Regional Setting - Revised Figure 2.6-1 to show the location of the license area. The revision to this figure does not change the intent of Section 2.6 of the SER.

Section 3.1.4, Process Description - Revised Figure 3.1-7 to add the other carbonate species that is used (bicarb) in the process. The use of bicarbonate is described in the NRC staff's review in Section 3.2.3 of the SER. The revision to this figure does not change the intent of the NRC staff's review.

Section 3.2.1, Process Plant Equipment – Revised Figure 3.2-1 to add the Pond Water Treatment circuit and the Downflow IX circuit. The Pond Water Treatment circuit and Downflow IX circuit are described in the NRC staff's review in Section 3.2.3 of the SER. The revision to this figure does not change the intent of the NRC staff's review.

Section 5.8.7, Airborne Effluent and Environmental Monitoring Program – Revised Table 5.8-5 to reflect the addition of a new air monitor station at the nearest residence per the requirements of Reg. Guide 4.14. The air particulate monitoring is described in the NRC staff's review in Section 5.7.8 of the SER. The addition of the new air monitor station does not change the intent of the NRC staff's review.

Section 7.12.1.3, Water Levels – Revised Table 7.12-2 to correct error in column #4 which referenced figure numbers 4.12-2 through 4.12-5 are incorrectly stated. The correct figure numbers are 7.12-2 through 7.12-5.

Section 10.1, Environmental Approvals for the Current Licensed Area – Revised Table 10.1-1 to reflect the current licenses and permits.

Based on this review, the proposed changes to the Renewed License (November 2014) will have no impact on CBR's ability to continue to meet the commitments cited in the SER.

Technical Evaluation Reports

There have been no Technical Evaluation Reports (TERs) prepared by NRC staff since renewal of SUA-1534 on November 5, 2014.

License Renewal Application (LRA) Approved November 5, 2014

The proposed changes revise Section 2.6.1, Section 3.1.4, Section 3.2.1, Section 5.8.7, Section 7.12.1.3, and Section 10.1 of the LRA.

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 and the SER are not affected by this review and will not degrade the safety and environmental commitments.

Conclusion

It was the conclusion of the SERP that the proposed change is allowed by License SUA-1534 and should be approved. The revised pages of the license application required in accordance with License Condition 9.4 were reviewed and approved and are attached to this evaluation.

Approved this 29th day of June 2016:

Bob Tiensvold, Restoration Manager
SERP Chairman

Larry Teahon, Manager of Safety, Health, Environment and Quality
SERP Secretary

Tami Dyer, Radiation Safety Officer

Tate Hagman, Plant Supervisor

Sabrina Fox, SHEQ Specialist

SERP 16-05 Evaluation

CROW BUTTE RESOURCES, INC.

SAFETY AND ENVIRONMENTAL REVIEW PANEL

Evaluation Report – SERP 16-05

Organizational Change to the Security Plan
License Condition 10.12

June 29, 2016

The Crow Butte Resources, Inc. (CBR) Safety and Environmental Review Panel (SERP) met in accordance with USNRC Source Materials License SUA-1534 to review proposed changes to the Security Plan approved by NRC Safety Evaluation Report dated May 27, 2015 (ML15131A475). The revised changes reflect recent organizational changes.

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

Name	Title	Area of Expertise
Bob Tiensvold	Restoration Manager	Management
Larry Teahon	Manager of SHEQ	Environment and Safety
Tami Dyer	Radiation Safety Officer	Radiation Safety
Tate Hagman	Plant Supervisor	Plant Operations
Sabrina Fox	SHEQ Specialist	Permitting and Document Control

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

PURPOSE OF SERP EVALUATION

By letter dated November 5, 2014, the U.S. Nuclear Regulatory Commission renewed Source Material License SUA-1534 issued to Crow Butte Resources, Inc., Crow Butte Uranium In-Situ Recovery Project, Dawes County, Nebraska (TAC J00555).

License Condition 10.12 indicated that the licensee shall provide for NRC written verification a security plan that describes the security measures for the mine units and header houses that address the requirements of 10 CFR Part 20, Subpart I.

Crow Butte's Security Plan was approved by the NRC staff's Safety Evaluation Report (ML15131A475) dated May 27, 2015.

The purpose of the SERP evaluation was to review changes made to the Crow Butte's Security Plan that occurred as a result of recent organizational changes. The evaluation changes the title of Mine Manager at the site level to Restoration Manager

AUTHORITY OF SERP

License Condition 9.4. Change, Test and Experiment License Condition

A) The licensee may, without obtaining a license amendment pursuant to 10 CFR 40.44, and subject to conditions specified in (B) of this condition:

i. Make changes in the facility as described in the license application (as updated);
ii. Make changes in the procedures as described in the license application (as updated); and
iii. Conduct tests of experiments not described in the license application (as updated).

B) The licensee shall obtain a license amendment pursuant to 10 CFR 40.44 prior to implementing a proposed change, test, or experiment if the change, test, or experiment would:

i. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated);
ii. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a facility structure, equipment, or monitoring system (SEMS) important to safety previously evaluated in the license application (as updated);
iii. Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated);
iv. Result in more than a minimal increase in the consequences of a malfunction of an SEMS 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 SEMS 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), environmental impact statement (EIS), environmental assessment (EA) or

the technical evaluation reports (TERs) or other analysis and evaluations for license amendments.

viii. For the purposes of SERP evaluations, SEMS means any SEMS that has been referenced in a staff SER, TER, EA, or EIS and supplements and amendments thereof.

C) Additionally, the licensee must obtain a license amendment unless the change, test, or experiment is consistent with NRC's previous conclusions, or the basis of, or analysis leading to, the conclusions of actions, designs, or design configurations analyzed and selected in the site or facility SER, TER, and EIS or EA. This would include all supplements and amendments, and TERs, EAs, EISs issued with amendments to this license.

SERP EVALUATION

The SERP evaluation was conducted in accordance with SHEQMS Volume II, *Management Procedures Manual;* Chapter 6, *Managing Change.* The SERP reviewed the proposed change 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, Renewal dated November 5, 2014;
- *Application for Renewal of USNRC Radioactive Source Materials License SUA-1534*, Crow Butte Resources, Inc. November 2007;
- *Environmental Assessment for Renewal of Source Materials License No. SUA-1534*, USNRC October 2014;
- *Safety Evaluation Report for Renewal of Source Materials License No. SUA-1534*, USNRC August 2014;
- Technical Evaluation Reports issued in support of amendments to SUA-1534.

Title 10 Code of Federal Regulations

The proposed changes to the Security Plan will have no impact on CBR's ability to meet all applicable NRC regulations.

Source Materials License SUA-1534 Requirements

The SERP reviewed the requirements contained in Source Materials License SUA-1534, renewal, dated November 5, 2014. The proposed changes will have no impact on CBR's ability to meet NRC License Condition 10.12.

Environmental Assessment

The SERP reviewed the contents of the Environmental Assessment (EA) prepared by NRC in October 2014 to determine whether the proposed change caused substantive safety or environmental impacts. The proposed changes to the Security Plan do not conflict with the EA.

Financial Surety

The proposed changes will have no effect on the level of financial surety maintained by CBR.

Safety Evaluation Report

The Safety Evaluation Report (SER) prepared by NRC in August 2014 principally provides the basis for worker safety at Crow Butte. The proposed changes to the Security Plan do not conflict with the SER.

Technical Evaluation Reports

There have been no Technical Evaluation Reports (TERs) prepared by NRC staff since renewal of SUA-1534 on November 5, 2014.

License Renewal Application (LRA) Approved November 5, 2014

The proposed changes revise the Security Plan submitted under License Condition 10.12.

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 and the SER are not affected by this review and will not degrade the safety and environmental commitments.

Conclusion

It was the conclusion of the SERP that the proposed change is allowed by License SUA-1534 and should be approved. The revised Security Plan was reviewed and approved and is attached to this evaluation.

Approved this 29th day of June 2016:

Bob Tiensvold, Restoration Manager
SERP Chairman

Larry Teahon, Manager of Safety, Health, Environment and Quality
SERP Secretary

Tami Dyer, Radiation Safety Officer

Tate Hagman, Plant Supervisor

Sabrina Fox, SHEQ Specialist

License Renewal Application

Affected Pages (highlighted version)

2016 SERP Actions

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Page Changes

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FIGURE 1

CROW BUTTE MINE COMMERCIAL POND INSPECTION FORM

FOR THE WEEK OF _____ THROUGH _____

HECK ACCORDINGLY: √=OK X=NEEDS ATTENTION OR REPAIRS

~~FOR THE MONTH OF:~~		WEEK 1	WEEK 2	WEEK 3	WEEK 4		WEEK 5	
	~~ENTER DATES ▸~~							
LOCATION	FREQUENCY	MON	TUE	WED	THU	FRI	SAT	SUN
POND 1-DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
N.E. UNDERDRAIN (in.)	Weekly							
N.M. UNDERDRAIN (in.)	Weekly							
N.W. UNDERDRAIN (in.)	Weekly							
S.E. UNDERDRAIN (in.)	Weekly							
S.M. UNDERDRAIN (in.)	Weekly							
S.W. UNDERDRAIN (in.)	Weekly							
POND 3-DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
N.E. UNDERDRAIN (in.)	Weekly							
N.M. UNDERDRAIN (in.)	Weekly							
N.W. UNDERDRAIN (in.)	Weekly							
S.E. UNDERDRAIN (in.)	Weekly							
S.M. UNDERDRAIN (in.)	Weekly							
S.W. UNDERDRAIN (in.)	Weekly							
POND 4-DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
N.E. UNDERDRAIN (in.)	Weekly							
N.M. UNDERDRAIN (in.)	Weekly							
N.W. UNDERDRAIN (in.)	Weekly							
S.E. UNDERDRAIN (in.)	Weekly							
S.M. UNDERDRAIN (in.)	Weekly							
S.W. UNDERDRAIN (in.)	Weekly							
INSPECTED INLET PIPING	Weekly							
PERIMETER FENCE	Weekly							
OTHER (EXPLAIN ON BACK)								
~~LEAK DETECTION ANALYSES~~	~~Weekly~~							
INSPECTED LINERS	Weekly							
INSPECTED DIVERSION DITCHES	Monthly							
NSPECTED WASTE PIPELINE	Monthly							
INSPECTOR INITIAL ~~HERE ▸~~								

move

~~Add 3 inches to the reading of each pond underdrain measurement device to obtain correct water level of the underdrain~~

COMMENTS: ~~COMMENTS ON BACK~~

FIGURE 2

CAMECO RESOURCES
CROW BUTTE OPERATION

~~CROW BUTTE PROJECT~~

R & D POND INSPECTION FORM

For The ~~Month~~ WEEK of _____ THROUGH _____

CHECK ACCORDINGLY: ✓ = OK
X = NEEDS ATTENTION OR REPAIRS

		~~WEEK 1~~	~~WEEK 2~~	~~WEEK 3~~	~~WEEK 4~~	~~WEEK 5~~
	~~ENTER DATE~~ ▶	SUN	MON	TUE	WED THU	FRI SAT
LOCATION	FREQUENCY					
CELL 1 (WEST)						
DEPTH (ft.)	Daily					
EMBANKMENTS	Daily					
UNDERDRAIN (<6") (in.)	Weekly					
CELL 2 (EAST)						
DEPTH (ft.)	Daily					
EMBANKMENTS	Daily					
UNDERDRAIN (<6") (in.)	Weekly					
INSPECTED INLET PIPING	Weekly					
PERIMETER FENCE	Weekly					
OTHER (EXPLAIN BELOW)						
INSPECTED LINERS	Weekly					
INSPECTED DIVERSION DITCHES	Monthly					
INSPECTED WASTE PIPELINE	Monthly					
INSPECTOR INITIAL ~~HERE~~ ▶						

move

OTHER:

FIGURE 5

~~CRAIG BUTTE PROJECT~~

WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS

COMMERCIAL PONDS	~~INSTRUMENT READING~~ Depth/Inches	TEMPERATURE °C	~~TEMPERATURE CORRECTION~~	CONDUCTIVITY umhos/cm	RESULTS LAB/FIELD ~~MEASUREMENT~~ umhos/cm
NORTH POND 3 — POND #1 — DEPTH = 17 FEET					
POND ~~CONTENTS~~ LEVEL					
* FREEBOARD					
N.E. UNDERDRAIN					
N.M. UNDERDRAIN					
N.W. UNDERDRAIN					
S.E. UNDERDRAIN					
S.M. UNDERDRAIN					
S.W. UNDERDRAIN					
SOUTH POND 4 — POND #3 — DEPTH = 17.5 FEET					
POND ~~CONTENTS~~ LEVEL					
* FREEBOARD					
N.E. UNDERDRAIN					
N.M. UNDERDRAIN					
N.W. UNDERDRAIN					
S.E. UNDERDRAIN					
S.M. UNDERDRAIN					
S.W. UNDERDRAIN					
POND NUMBER 1 — POND #4 — DEPTH = 17.5 FEET					
POND ~~CONTENTS~~ LEVEL					
* FREEBOARD					
N.E. UNDERDRAIN					
N.M. UNDERDRAIN					
N.W. UNDERDRAIN					
S.E. UNDERDRAIN					
S.M. UNDERDRAIN					
S.W. UNDERDRAIN					

~~DATE:~~

~~ACTION~~

~~SAMPLE~~

R & D POND LEVELS (Depth = 15 ft)

EAST LEVEL:

****EAST FREEBOARD:**

EAST UNDERDRAIN:

WEST LEVEL:

****WEST FREEBOARD:**

WEST UNDERDRAIN:

REMARKS:

***COMMERCIAL POND FREEBOARD = 5 FT ~~MAX~~ MIN**

**** R&D POND FREEBOARD = 3 FT ~~MAX~~ MIN**

SAMPLER:

DATE:

FIGURE 5

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5 OPERATIONS

CBR operates a commercial-scale in-situ leach uranium mine (the Crow Butte Project) near Crawford, Nebraska. CBR maintains a headquarters in Casper, Wyoming, where site-licensing actions originate. All CBR operations, including the Crow Butte Project operations, are conducted in conformance with applicable laws, regulations, and requirements of the various regulatory agencies. The responsibilities described below have been designed to both ensure compliance and further implement CBR's policy for providing a safe working environment with cost-effective incorporation of the philosophy of maintaining radiation exposures as low as is reasonably achievable (ALARA).

5.1 CORPORATE ORGANIZATION/ADMINISTRATIVE PROCEDURES

CBR will maintain a performance-based approach to the management of the environment and employee health and safety including radiation safety. The Safety, Health, Environment, and Quality Management System (SHEQMS) encompasses licensing, compliance, environmental monitoring, industrial hygiene, and health physics programs under one umbrella, and it includes involvement for all employees from the individual worker to senior management. This SHEQMS will allow CBR to operate efficiently and maintain an effective environment, health, and safety program.

Figure 5.1-1 is a partial organization chart for CBR with respect to the operation of the Crow Butte Uranium Project and associated operations and represents the management levels that play a key part in the SHEQMS Program. The personnel identified are responsible for the development, review, approval, implementation, and adherence to operating procedures, radiation safety programs, environmental and groundwater monitoring programs, as well as routine and non-routine maintenance activities. These individuals may also serve a functional part of the Safety and Environmental Review Panel (SERP) described under **Section 5.3.3**.

Specific responsibilities of the organization are provided below.

5.1.1 Board of Directors

The CBR Board of Directors has the ultimate responsibility and authority for radiation safety and environmental compliance for CBR. The Board of Directors sets corporate policy and provides procedural guidance in these areas. The Board of Directors provides operational direction to the President of CBR.

5.1.2 President

The President is responsible for interpreting and acting upon the Board of Directors' policy and procedural decisions. The President directly supervises the General Manager of US Operations. The President is empowered by the Board of Directors to have the

responsibility and authority for the radiation safety and environmental compliance programs. The President is responsible for ensuring that the operations staff is complying with all applicable regulations and permit/license conditions through direct supervision of the General Manager of US Operations.

5.1.3 General Manager of US Operations

The General Manager of US Operations is responsible for managing all US Operations. The General Manager of US Operations is responsible for ensuring that Crow Butte personnel comply with Industrial Safety, Radiation Safety, Environmental Protection Programs, and all relevant state and federal regulations. The General Manager of US Operations has the responsibility and the authority to suspend, postpone or modify, immediately if necessary, any activity that is determined to be a threat to employees, public health, the environment, or potentially a violation of state or federal regulations. The General Manager of US Operations reports directly to the President.

5.1.4 Director of Safety, Health, Environment and Quality

The Director of Safety, Health, Environment and Quality reports directly to the President and is responsible for ensuring the corporate personnel comply with industrial safety, radiation safety, and environmental protection programs as stated in the SHEQ Management System. The Director of Safety, Health, Environment and Quality is also responsible for company compliance with all regulatory license conditions/stipulations, regulations and reporting requirements. The Director of Safety, Health, Environment and Quality has the responsibility and authority to terminate immediately any activity that is determined to be a threat to employees or public health, the environment, or potentially a violation of state or federal regulations as indicated in reports from the Manager of Safety, Health, Environment and Quality or the RSO.

~~5.1.4~~5.1.5 ~~Mine~~ Restoration Manager

The Restoration~~Mine~~ Manager is responsible for all uranium production and restoration activities~~y~~ at the project site. The Restoration~~Mine~~ Manager is also responsible for implementing any industrial and radiation safety and environmental protection programs associated with operations and restoration. The Restoration~~Mine~~ Manager is authorized to immediately implement any action to correct or prevent hazards. The Restoration~~Mine~~ Manager has the responsibility and the authority to suspend, postpone, or modify, immediately if necessary, any activity that is determined to be a threat to employees, public health, the environment, or potentially a violation of state or federal regulations. The Restoration~~Mine~~ Manager cannot unilaterally override a decision for suspension, postponement, or modification if that decision is made by the Manager of Safety, Health,

Environment and Quality, or the RSO. The RestorationMine Manager reports directly to the General Manager of US Operations.

5.1.55.1.6 Manager of Safety Health Environment and Quality

The Manager of Safety, Health, Environment and Quality is responsible for all health and safety, and environmental programs as stated in the SHEQMS Program and for ensuring that CBR complies with all applicable regulatory requirements. The Manager of Safety, Health, Environment and Quality reports directly to the Director of SHEQMine Manager. This position assists in the development and review of radiological and environmental sampling and analysis procedures and is responsible for routine auditing of the programs. The Manager of Safety, Health, Environment and Quality has no production-related responsibilities. The Manager of Safety, Health, Environment and Quality also has the responsibility and authority to suspend, postpone, or modify any activity that is determined to be a threat to employees, public health, the environment or potentially a violation of state or federal regulations.

5.1.7 Plant Supervisor

The Plant Supervisor supervises plant operations, including the safe and efficient recovery and processing of uranium oxide while staying within regulatory and technical constraints. The Plant Supervisor is responsible for carrying out any procedures or actions implemented by the Restoration Manager, Manager of SHEQ, or the RSO to correct or prevent radiation safety hazards in the plant. The RSO and the Plant Supervisor are responsible for conducting weekly inspections of all facility areas to observe general radiation control practices and review required changes in procedures and equipment. The Plant Supervisor reports directly to the Restoration Manager.

5.1.65.1.8 Radiation Safety Officer

The RSO is responsible for the development, administration, and enforcement of all radiation safety programs. The RSO is authorized to conduct inspections and to immediately order any change necessary to preclude or eliminate radiation safety hazards and/or maintain regulatory compliance. The RSO is responsible for the implementation of all on-site environmental programs including emergency procedures. The RSO inspects facilities to verify compliance with all applicable requirements in the areas of radiological health and safety. The RSO works closely with all supervisory personnel to ensure that established programs are maintained. The RSO is also responsible for the collection and interpretation of employee exposure-related monitoring including data from radiological safety. The RSO makes recommendations to improvement any and all radiological safety-related controls. The RSO has no production-related responsibilities. The RSO reports directly to the Mine ManagerDirector of SHEQ. As such, the RSO has a secondary reporting requirement to the General Manager of U.S. OperationsPresident.

~~5.1.7~~5.1.9 Health Physics Technician

The Health Physics Technician (HPT) assists the RSO with the implementation of the radiological and industrial safety programs. The HPT is responsible for the orderly collection and interpretation of all monitoring data, to include data from radiological safety and environmental programs. The HPT reports directly to the RSO.

5.1.10 SHEQ Specialist

The SHEQ Specialist assists in the development and submittal of regulatory permits and license applications. Provides analysis and guidance in the areas of Safety, Health, Environment and Quality and is responsible for assisting site management with coordination of the corrective and preventative action process. The SHEQ Specialist maintains and updates documents associated with the activities relating to the SHEQ system. The SHEQ Specialist reports directly to the SHEQ Manager.

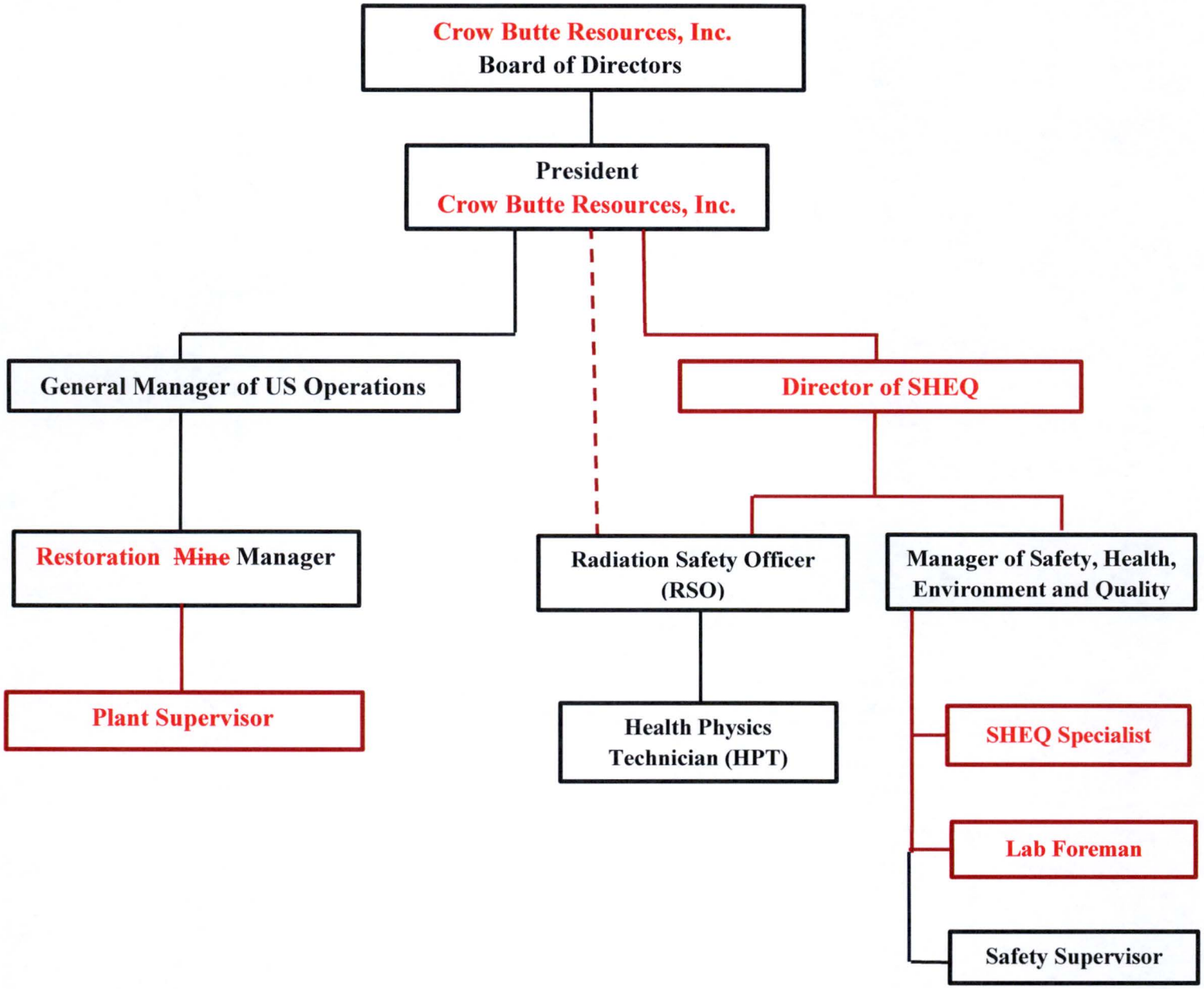
5.1.11 Lab Foreman

The Lab Foreman has direct oversight of the on-site analytical laboratory including implementing laboratory quality assurance procedures. The Lab Foreman is responsible for carrying out any procedures or actions implemented by the Restoration Manager, Manager of SHEQ, or the RSO to correct or prevent radiation safety hazards in the laboratory. The Lab Foreman reports directly to the SHEQ Manager.

~~5.1.8~~5.1.12 Safety Supervisor

The Safety Supervisor is responsible for the non-radiation-related health and safety programs. The Safety Supervisor is authorized to conduct inspections and to immediately order any change necessary to preclude or eliminate safety hazards and/or maintain regulatory compliance. Responsibilities include the development and implementation of health and safety programs in compliance with Occupational Safety and Health Administration (OSHA) regulations. Responsibilities of the Safety Supervisor include development of industrial safety and health programs and procedures, coordination with the RSO where industrial and radiological safety concerns are interrelated, safety and health training of new and existing employees, and the maintenance of appropriate records to document compliance with regulations. The Safety Supervisor may be a qualified HPT and may function in that capacity when needed. The Safety Supervisor reports directly to the Manager of Safety, Heath, Environment and Quality.

Figure 5.1-1: Crow Butte Resources Organizational Chart



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5.1.9 Health Physics Technician

The Health Physics Technician (HPT) assists the RSO with the implementation of the radiological and industrial safety programs. The HPT is responsible for the orderly collection and interpretation of all monitoring data, to include data from radiological safety and environmental programs. The HPT reports directly to the RSO.

5.1.10 SHEQ Specialist

The SHEQ Specialist assists in the development and submittal of regulatory permits and license applications. Provides analysis and guidance in the areas of Safety, Health, Environment and Quality and is responsible for assisting site management with coordination of the corrective and preventative action process. The SHEQ Specialist maintains and updates documents associated with the activities relating to the SHEQ system. The SHEQ Specialist reports directly to the SHEQ Manager.

5.1.11 Lab Foreman

The Lab Foreman has direct oversight of the on-site analytical laboratory including implementing laboratory quality assurance procedures. The Lab Foreman is responsible for carrying out any procedures or actions implemented by the Restoration Manager, Manager of SHEQ, or the RSO to correct or prevent radiation safety hazards in the laboratory. The Lab Foreman reports directly to the SHEQ Manager.

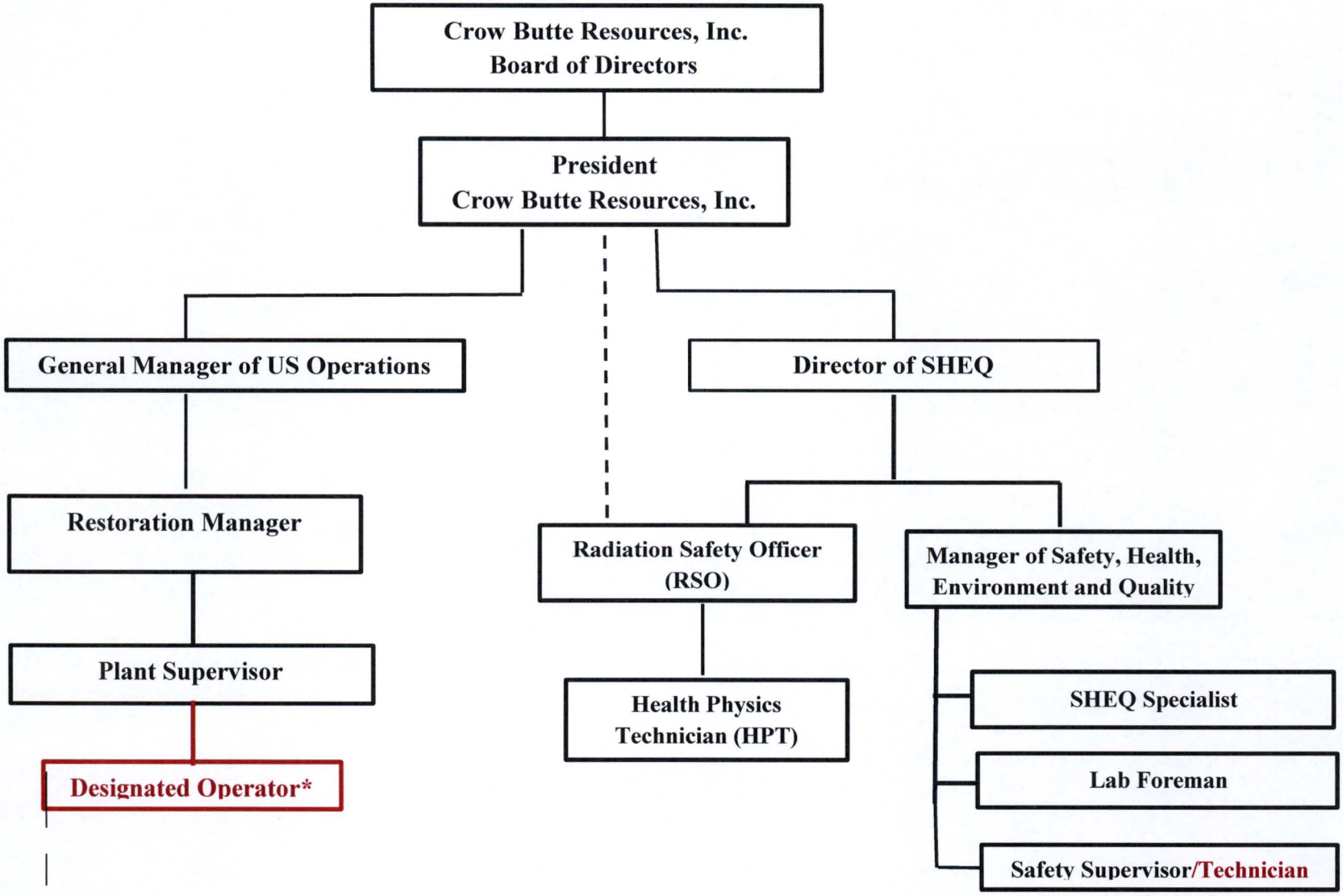
5.1.12 Safety Supervisor/Technician

The Safety Supervisor/Technician is responsible for the non-radiation-related health and safety programs. The Safety Supervisor/Technician is authorized to conduct inspections and to immediately order any change necessary to preclude or eliminate safety hazards and/or maintain regulatory compliance. Responsibilities include the development and implementation of health and safety programs in compliance with Occupational Safety and Health Administration (OSHA) regulations. Responsibilities of the Safety Supervisor/Technician include development of industrial safety and health programs and procedures, coordination with the RSO where industrial and radiological safety concerns are interrelated, safety and health training of new and existing employees, and the maintenance of appropriate records to document compliance with regulations. The Safety Supervisor/Technician may be a qualified HPT and may function in that capacity when needed. The Safety Supervisor/Technician reports directly to the Manager of Safety, Heath, Environment and Quality.

5.1.13 Qualified Designated Operator

The qualified Designated Operator is responsible for performing daily inspection in the occasional absence of the RSO and the HPT. A qualified Designated Operator will meet the minimum qualifications and perform only those duties as outline in Section 5.6.6.

Figure 5.1-1: Crow Butte Resources Organizational Chart



*Qualifications for Designated Operator described in SUA-1534, Section 5.6.6 (Nov. 2014)

5.4 MANAGEMENT AUDIT AND INSPECTION PROGRAM

The following internal inspections, audits, and reports are performed for the Crow Butte Project operations:

5.4.1 Radiation Safety Inspections

5.4.1.1 Daily Inspections

The RSO, HPT or a qualified designated operator conducts a daily walkthrough inspection of the plant. The inspection entails a visual examination of compliance or other problems, which are reviewed with the ~~Operations~~ Restoration Manager.

5.4.1.2 Weekly RSO Inspections

The RSO and ~~Operations~~ Restoration Manager (or designees in their absence) will conduct a weekly inspection of all facility areas to observe general radiation control practices and review required changes in procedures and equipment.

5.4.1.3 Monthly RSO Reports

The RSO provides a written summary of the month's radiological activities at the Crow Butte Uranium Project facilities. The report includes a review of all monitoring and exposure data for the month, a summary of worker protection activities, a summary of all pertinent radiation survey records, a discussion of any trends in the ALARA program, and a review of adequacy of the implementation of the USNRC license conditions. Recommendations are made for any corrective actions or improvements in the process or safety programs.

5.4.2 Evaporation Pond Inspections

The inspection program developed by CBR for use on the ponds in the current production area is contained in SHEQMS Program Volume VI, *Environmental Manual* and is based on the guidance in USNRC Regulatory Guide 3.11.1. The inspection program is summarized below.

5.4.2.1 Daily Inspections

- Pond Depth - The depth of water in each pond is measured and recorded.
- Pond Embankments - The pond embankments are visually inspected for signs of cracking, slumping, movement, or a concentration of seepage.

5.4.2.2 Weekly Inspections

- Perimeter Fence - The game-proof perimeter fence is inspected for holes that would allow animals to enter the pond area.

- Inlet Pipes – The pond inlet piping is inspected to verify that it is not clogged with ice, dirt, etc.
- Underdrain Measurements - The underdrains are measured, and the vertical depth of fluid in the standpipe is recorded.
- Pond Sprays - When in use, the enhanced evaporation systems should be checked at regular intervals.
- Pond Liner - The liner is visually inspected weekly for holes or other signs of distress.
- Leak Detection System - The leak detection pipes for all ponds are measured for fluid in the standpipes, and the vertical depth of the fluid shall be recorded on the Pond Inspection Forms.

5.4.2.3 Quarterly Inspections

- Embankment Settlement - The tops of the embankments and downstream toe area are examined for settlement or depressions.
- Embankment Slopes - Embankment slopes are examined for irregularities in alignment and variances from originally constructed slopes (sloughing, toe movement, surface cracking, or erosion).
- Seepage - Evidence of seepage in any areas surrounding the ponds (especially the downstream toes) is investigated and documented.
- Slope Protection - Vegetation on the outslopes of the pond is examined. Any evidence of rills or gullies forming is noted.
- Post-Construction Changes - Any changes to the upstream watershed areas that could affect runoff to the ponds is noted.
- Emergency lines are inspected to ensure that the rope has not deteriorated and the ropes reach to the pond water level.

5.4.2.4 Annual Inspection

A technical evaluation of the pond system which addresses the hydraulic and hydrologic capacities of the ponds and ditches and the structural stability of the embankments will be conducted annually. A survey of the pond embankments will be conducted annually and the survey results documented and incorporated into the annual inspection report. The

CROW BUTTE RESOURCES, INC.

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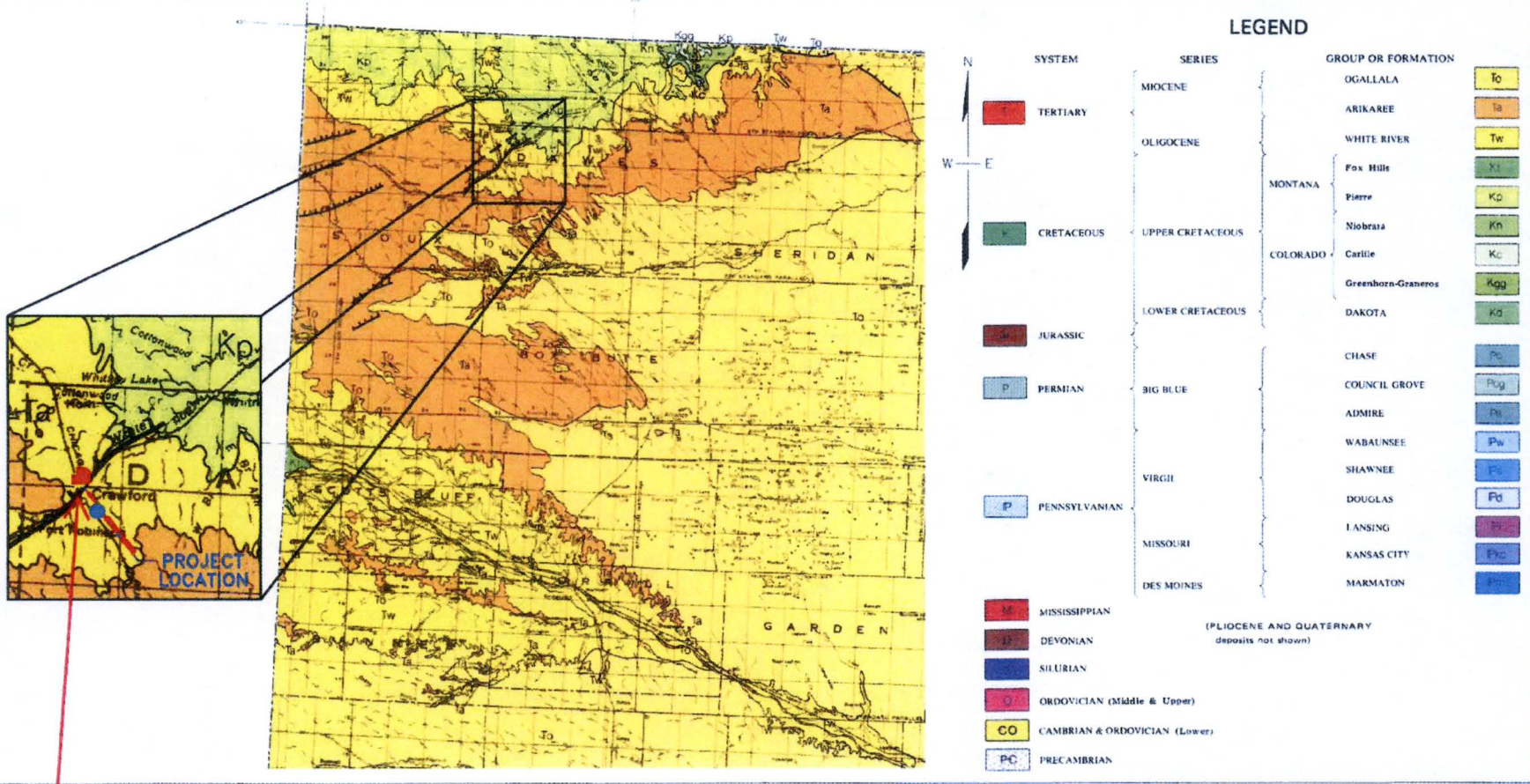


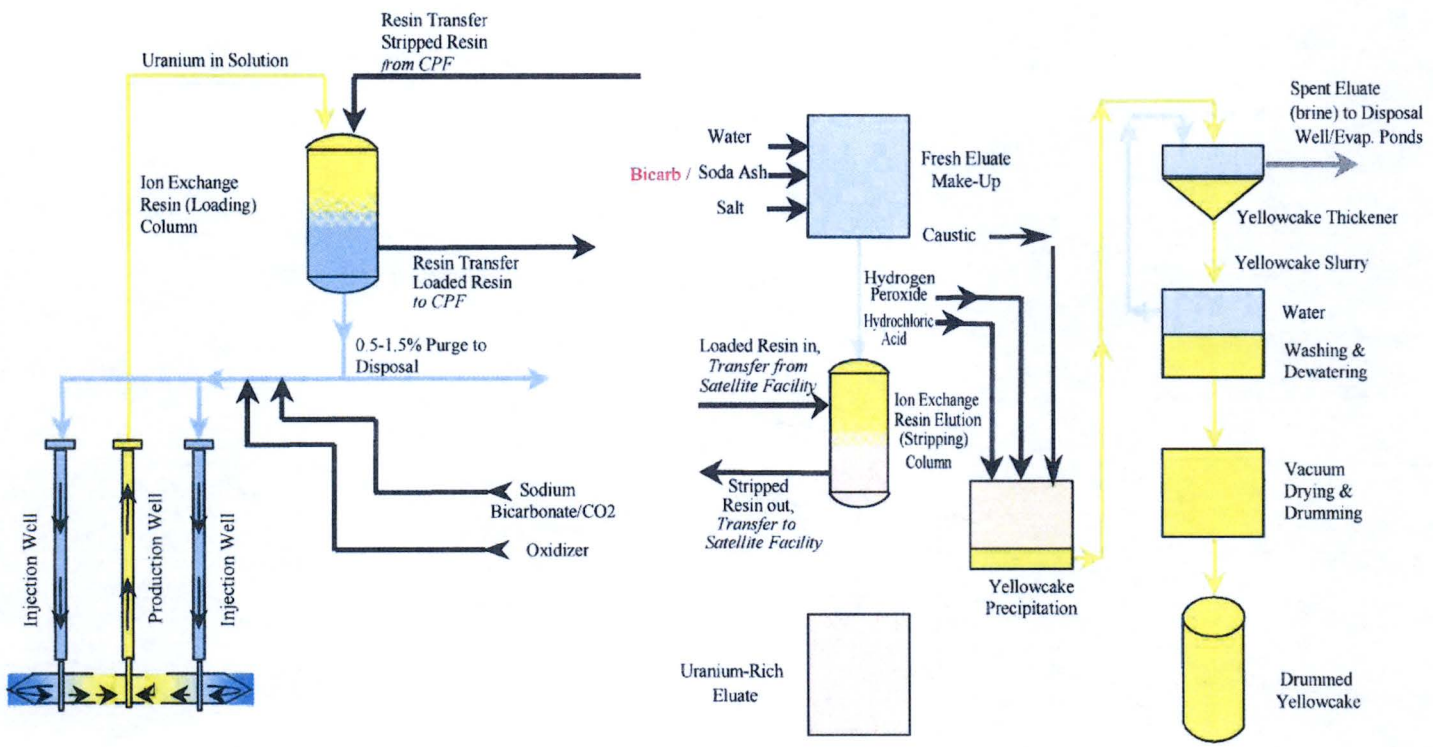
CROW BUTTE RESOURCES, INC.

Figure 2.6-1

BEDROCK GEOLOGY MAP
DAWES COUNTY, NE

June 2016

Source: Nebraska Geological Survey



CROW BUTTE RESOURCES, INC.

FIGURE 3.1-7
PROCESS FLOW SHEET
FOR CENTRAL PLANT AND/OR
SATELLITE FACILITY

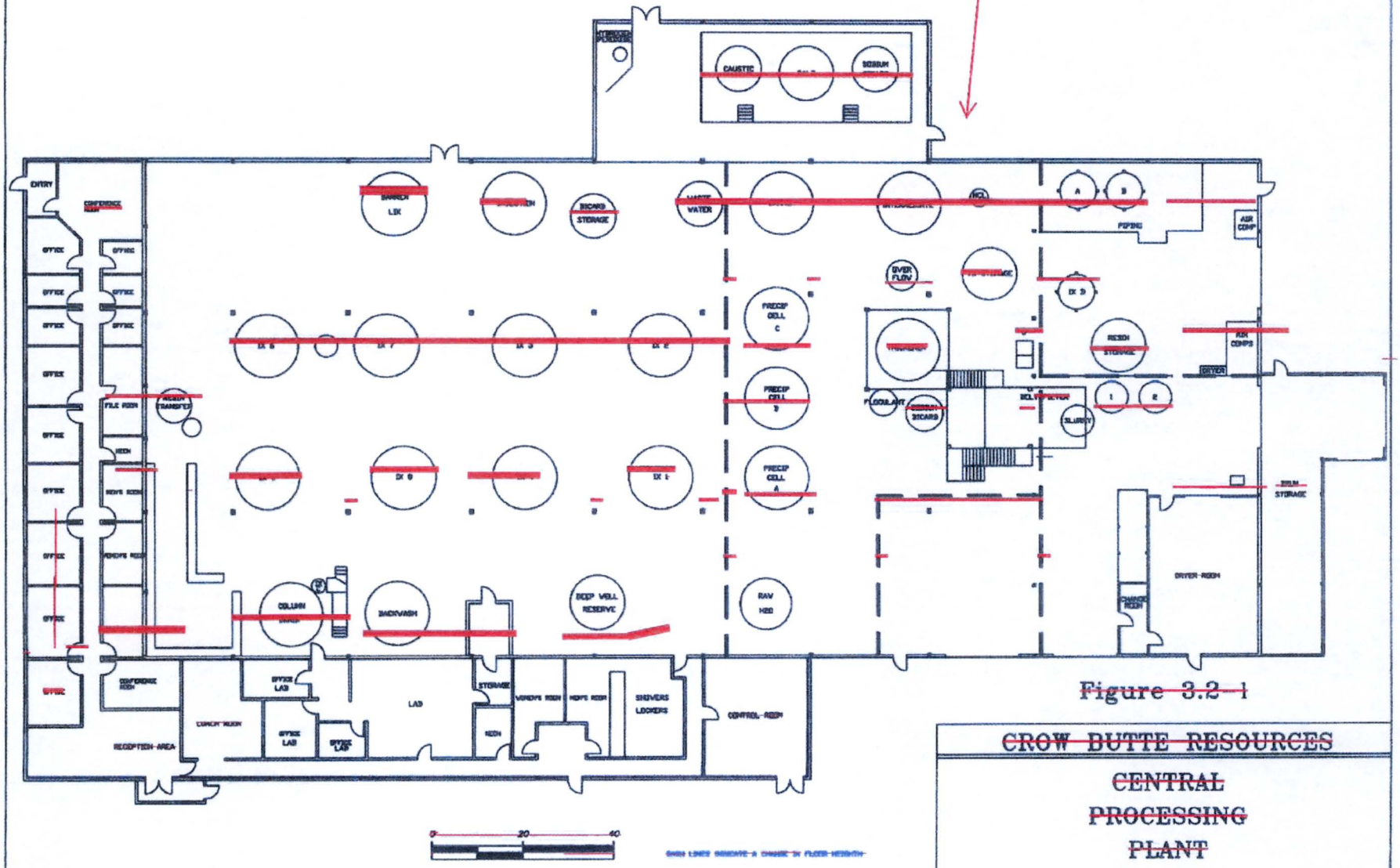
PROJECT: CO001636.00001 MAPPED BY: JC CHECKED BY: JEC

June 2016

ARCADIS
630 Plaza Drive, Ste. 100
Highlands Ranch, CO 80129
P: 720-344-3500 F: 720-344-3535
www.arcadis-us.com

K:\CBR_Projects\CBR LRA\3_IMAGES\Illustrator\LRA_Figure 3_1-7 Process Flow Diagram.ai @ 11/18/2014 BY: J.CHEN @ Boulder, CO

Figure 3.2-1 removed and replaced per SERP 16-04



~~Figure 3.2-1~~

~~CROW BUTTE RESOURCES~~

~~CENTRAL PROCESSING PLANT~~

Table 5.8-5: Operational Environmental and Effluent Monitoring Program

Sample Type	Location	Type	Number	Frequency	Analyses
Air (Radon)	Nearest residences and in the prevalent wind direction Environmental control station near Crawford, NE.	Continuous	~~7~~6 1	Semiannual	Rn-222
Air (particulate)	Same locations as radon air monitoring	Continuous	7	A minimum of 2 weeks per month when dryer is in use	U-nat Ra-226 Pb-210
Surface Soil (top 5 cm)	Plant site before topsoil removal	Grab	2	Once	U-nat Ra-226
	Plant site after topsoil removal	Grab	2	Once	U-nat Ra-226
	Evaporation ponds before excavation	Grab	2	Once	U-nat Ra-226
	Air sampling stations	Grab	7	Once	U-nat Ra-226
Subsurface soil	Plant site	1/3 meter composites to one meter	1	Once	U-nat Ra-226
Groundwater	Water supply wells within 1 km of area wellfield	Grab	1	Quarterly	U-nat Ra-226
Surface water	Each stream passing through wellfield area (one upstream and one downstream)	Grab	2	Quarterly	U-nat Ra-226
	Each water impoundment in wellfield area	Grab	1	Quarterly	U-nat Ra-226
Direct Radiation	Air sampling stations	Continuous	7	Quarterly exchange of dosimeters	External gamma
Sediment	Each body of water where surface water sampling is performed	Grab upstream and downstream of wellfields	1 or 2	Annually	U-nat Ra-226 Pb-210

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Table 7.12-2: Estimated Percent Reduction in Available Drawdown in Chadron Aquifer Water Wells as a Result of the Crow Butte ISL Operations

Water Well Number	Static Water Level (feet)[1]	Total Depth of Well (feet)	Figure Number: Drawdown vs. Time	Projected Maximum Drawdown (feet)	Maximum Available Drawdown (feet)[2]	Reduction of Available Drawdown (percent)
2	-60 est.	650	~~4.12-~~ 27.12-2	-23.4	530	-4.4
22	-70 est.	400	~~4.12-~~ 27.12-2	-23.2	270	-8.6
33	-20 est.	212	~~4.12-~~ 27.12-2	-22.1	132	-16.7
124	-50 est.	520	~~4.12-~~ 27.12-2	-22.8	410	-5.6
32	-39.8	400	7.12-~~34.12-3~~	-26.2	300	-8.7
51	-30 est.	300	7.12-~~34.12-3~~	-26.8	210	-12.8
72	-82.2	450	7.12-~~34.12-3~~	.25.5	308	-8.3
52	4.62[3]	420	7.12-~~44.12-4~~	-24.7	365	-6.8
55	-6.25[3]	320	7.12-~~44.12-4~~	-26.8	254	-10.5
60	20 est.	312	7.12-~~44.12-4~~	-25.9	272	-9.5
61	19.64[3]	280	7.12-~~44.12-4~~	-26.4	240	-11.0

65	22.52[3]	260	7.12-~~44.12-4~~	-25.6	223	-11.5
97	57.75[3]	380	7.12-~~54.12-5~~	-22.2	378	-5.9
114	60 est.	470	7.12-~~54.12-5~~	-21.9	470	-4.7
123	21.37[3]	280	7.12-~~54.12-5~~	-23.0	241	-9.5
					Average =	-9.0

[1] + = Above Ground Level; - = Below Ground Level

[2] To the Top of the Chadron Sandstone; assumes 60 feet sand thickness

[3] Measured 11/83

10 ENVIRONMENTAL APPROVALS AND CONSULTATIONS

10.1 ENVIRONMENTAL APPROVALS FOR THE CURRENT LICENSED AREA

As discussed previously, this is an LRA for Radioactive Source Materials License SUA-1534, originally submitted in September of 1987 and renewed in 1997. All other required permits for the existing Crow Butte Project have been obtained and maintained since that time. A summary of the relevant permits and authorizations for the current License Area is given in **Table 10.1-1**.

Table 10.1-1 Environmental Approvals for the Current License Area

Issuing Agency	Permit Description
	Crow Butte Project
Nebraska Department of Environmental Quality PO Box 98922 Lincoln, Nebraska 68509-8922	Underground Injection Control Class III Authorization NE0122611 Approved: April 24, 1990 Modified: June 12, 2014
	Aquifer Exemption CBO Site Approval Effective: March 23, 1984
	Underground Injection Control Class I Deep Disposal Well #1 Authorization NE0211670 Replaces: NE0210457 Approved: June 12, 2014 Expires: June 11, 2024
	Underground Injection Control Class I Deep Disposal Well #2 Authorization NE0210825 Approved: November 24, 2010 Expires: November 30, 2020
	National Pollutant Discharge Elimination System Permit NE0130613 Approved: September 27, 2011 Expires: September 30, 2016 (Replaced NE0206369 approved July 2, 2004)
	Construction Stormwater NPDES General Permit NER 100000 Authorization No. NER104581 Approved: January 19, 2006
	Authorization for Class V Well Underground Injection Authorization NE0210917 Approved: May 14, 2010 (Replaced NE0207888 11/6/2000) Expires: May 13, 2020
	Evaporation Pond Design Approved: July 21, 1988

	North Trend Expansion Area
	Aquifer Exemption North Trend Expansion Approval Effective: April 18, 2011
	Underground Injection Control Class III North Trend Expansion Area Authorization NE0210740 Approved: August 10, 2011
	Mineral Exploration
	Mineral Exploration Permit NE0210824 Panhandle of Nebraska Exploration 2000 Holes Approved: January 28, 2013 Expires: August 18, 2014 (Replaced NE0209317)
	Mineral Exploration Permit NE0211334 Crawford Exploration 300 Holes Approved: July 16, 2012 Expires: July 27, 2017 (Replaced NE0210679)
Nebraska Department of Natural Resources **301 Centennial Mall South** **Lincoln, Nebraska 68509-4676**	Industrial Ground Water Permit (I-2A) Approved: August 7, 1991 Amended: October 30, 2014
Nebraska Department of Health and Human Services Regulation and Licensure **PO Box 95007** **Lincoln, Nebraska 68509-5007**	Class IV Public Water Supply Permit NE3121024 Approved: April 12, 2002
U.S. Nuclear Regulatory CommissionWashington, DC 20555	Source Materials LicenseSUA-1534Issued: December 29, 19891st Renewal: February 28, 19982nd Renewal: November 5, 2014
U.S. Environmental Protection Agency **1200 Pennsylvania Ave, NW,** **Washington, DC 20460**	Aquifer Exemption – Crow Butte Project Approval Effective: March 23, 1984 Aquifer Exemption – North Trend Expansion Area Approval Effective: April 18, 2011
Federal Communications Commission	Radio Station Authorization Approved: July 20, 2012 Expires: July 20, 2022

Source: Crow Butte Resources, Inc.

Table 10.1-1: Environmental Approvals for the Current License Area

Issuing Agency	Permit Description
Nebraska Department of Environmental Quality PO Box 98922 Lincoln, Nebraska 68509-8922	Underground Injection Control Class III Authorization NE0122611 Approved: April 24, 1990
	Aquifer Exemption Approval Effective: March 23, 1984
	Underground Injection Control Class I Authorization NE0206369 Approved: September 9, 1994 Replaced: July 2, 2004
	Underground Injection Control Class I Authorization NE0210457 Approved: July 2, 2004
	National Pollutant Discharge Elimination System Permit NE0130613 Approved: September 30, 1994 Renewed: October 1, 2006
	Mineral Exploration Permit NE0209317 Approved: June 3, 2003 Replaced: July 16, 2007
	Mineral Exploration Permit NE0210679 Approved: July 16, 2007
	Evaporation Pond Design Approved: July 21, 1988
	Construction Stormwater NPDES General Permit NER100000 Authorization # NER105203 Approved: December 19, 2006
Nebraska Department of Natural Resources 301 Centennial Mall South Lincoln, Nebraska 68509-4676	Industrial Ground Water Permit I-2 Approved: August 7, 1991
Nebraska Department of Health and Human Services Regulation and Licensure PO Box 95007 Lincoln, Nebraska 68509-5007	Class IV Public Water Supply Permit NE3121024 Approved: April 12, 2002
U.S. Nuclear Regulatory Commission Washington, DC 20555	Source Materials License SUA-1534 Issued: December 29, 1989 Renewed: February 28, 1998
U.S. Environmental Protection Agency 1200 Pennsylvania Ave, NW Washington, DC 20460	Aquifer Exemption Approval Effective: June 22, 1990

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Crow Butte Resources, Inc.
d/b/a Cameco Resources
Crow Butte Operation

SECURITY PLAN

~~April 2, 2015~~June 29, 2016
Revision #3

SECURITY PLAN

Purpose and Scope

Crow Butte Operation (CBO) is committed to:

- Providing employees with a safe, healthful, and secure working environment;
- Maintaining control and security of NRC licensed material;
- Ensuring the safe and secure handling and transporting of hazardous materials;
- Managing records and documents that may contain sensitive and confidential information;

The purpose of this Security Plan is to ensure that CBO operations are conducted in such a manner that these objectives are met.

This plan applies to CBO operations at the Crow Butte Uranium Project and other CBO properties, as appropriate. This plan also applies to the transport of licensed or hazardous materials by CBO employees over public highways.

Regulatory Requirements

Security and Control of NRC Licensed Material

CBO is authorized by a license issued by the U.S. Nuclear Regulatory Commission (NRC) to receive, acquire, possess, and transfer natural uranium ("source material") and byproduct material defined in 10 CFR §40.4 as follows:

Source Material: (1) Uranium in any physical or chemical form or (2) ores that contain by weight greater than one twentieth of one percent (0.05%) uranium. Common examples would include uranium in solution, loaded on ion exchange resins, in slurry form, or as dry product.

Byproduct Material: The tailings or wastes produced by the extraction or concentration of uranium from any ore processed primarily for its source material content, including surface wastes resulting from uranium solution extraction processes. Common examples would include contaminated equipment, materials, and wastes produced during facility operations.

The NRC requires licensees to maintain control over such licensed material. 10 CFR 20, Subpart I, *Storage and Control of Licensed Material*, requires the following:

§20.1801 Security of Stored Material

The licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.

§20.1802 Control of Material not in Storage

The licensee shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.

Stored material would include uranium packaged for shipment from the facility or byproduct materials awaiting disposal. Examples of material not in storage would include yellowcake slurry or loaded ion exchange resin removed from the restricted area for transfer to other areas.

Security Requirements for DOT Hazardous Materials

CBO routinely receives, stores, uses, and ships hazardous materials as defined by the U.S. Department of Transportation (DOT). In addition to the packaging and shipping requirements contained in the DOT Hazardous Materials Regulations (HMR), 49 CFR 172, Subpart I, *Security Plans*, requires that persons that offer for transportation or transport certain hazardous materials develop a Security Plan. Shipments may qualify for this DOT requirement under the following categories:

§172.800(b)(4) A shipment of a quantity of hazardous materials in a bulk package having a capacity equal to or greater than 13,248 L (3,500 gallons) for liquids or gases or more than 13.24 cubic meters (468 cubic feet) for solids;

§172.800(b)(5) A shipment in other than a bulk packaging of 2,268 kg (5,000 pounds) gross weight or more of one class of hazardous material for which placarding of a vehicle, rail car, or freight container is required for that class under the provisions of subpart F of this part;

§172.800(b)(7) A quantity of hazardous material that requires placarding under the provisions of subpart F of this part.

DOT requires that Security Plans assess the possible transportation security risks and evaluate appropriate measures to address those risks. All hazardous materials shippers and transporters subject to these standards must take measures to provide personnel security by screening applicable job applicants, prevent unauthorized access to the hazardous materials or vehicles being prepared for shipment, and provide for en route security. Companies must also train appropriate personnel in the elements of the Security Plan.

Responsibilities

Responsibilities of personnel have been designed to both ensure compliance and further implement CBR's policy for providing a safe working environment with cost-effective incorporation of the philosophy of maintaining radiation exposures as low and reasonably achievable (ALARA). The specific responsibilities of security plan personnel including managerial and operational personnel are described in Section 5 of the Source Material License Renewal, SUA-1534. The Crow Butte Resources Organizational Chart, is shown in Section 5, Figure 5.1-1 of the Source Material License Renewal, SUA-1534. Organizational changes will be maintained through the Safety Environmental Review Panel (SERP) process.

~~Mine~~Restoration Manger

The ~~Mine~~Restoration Manger will ensure that the individuals responsible for implementing this Security Plan have the appropriate training and resources required.

SHEQ Manager

The SHEQ Manager has overall responsibility for the implementation of the Security Plan. The SHEQ Manager will periodically review this plan for improvements. In addition, the SHEQ Manager will be responsible for reviewing Security Plans submitted by carriers that are contracted to transport materials covered by this plan.

Individual

Individuals whose job functions involve maintaining control of licensed material or shipping and transporting radioactive materials are responsible for ensuring that the security requirements of this plan are implemented.

Permit Area and Facility Security

CBO provides adequate measures to ensure the safety and security of employees, contractors, visitors and CBO equipment and facilities. This section was developed to explain the general security procedures and guidelines that apply to the physical structures and facilities within the permit area. Following are the guidelines and procedures that apply to security issues related to CBO physical facilities:

Central Processing and Restoration Facility Areas

All Central Processing and Restoration facility areas where source or byproduct material is handled are fenced. The main access road is equipped with a locking gate. The access road and areas around the Central

Processing facility are monitored by strategically placed surveillance cameras. A 24-hour per day 7-day per week staff is on duty at these facilities.

Plant Operators perform an inspection to ensure the proper storage and security of licensed material at the beginning of each shift. The inspection determines whether all licensed material is properly stored in a restricted area or, if in controlled or unrestricted areas, is properly secured. In particular, Operators will ensure that loaded ion exchange resin, slurry, drummed yellowcake, and byproduct material is properly secured. If licensed material is found outside a restricted area, the Operator ensures that it is secured, locked, moved to a restricted area, or kept under constant surveillance by direct observation or surveillance cameras. The results of this inspection are documented in the Control Room Log Book.

Mine Units and Wellhouses

Lixiviant is found in injection piping in the wellfields, wellhouses and trunklines to the Central Processing Plant and Restoration Building. All mine units and wellfields are fenced and all entry gates have signs posted restricting public access. Each wellhouse is locked with an electronic keypad. The mine site is staffed 24-hours a day, 7-days per week. During each shift an inspection is performed to ensure each wellhouse is secure, free of leaks, and to verify correct pressures and settings are maintained. During the shift inspection, wellfields (Mine Units) are monitored for trunkline leaks and to monitor for unauthorized access. Inspections are documented on the Shift Wellfield Inspection sheet and the Control Room Log Book. Nonconformities are reported to appropriate supervisors and site management for further evaluation and corrective actions if necessary.

Office Building

There is a reception area located at the main entrance into the office building. All other entrances are locked during off-shift hours. There are a limited number of traceable keys to the office and they are given out to select employees. The main door and the door to the Central Plant facility entrance are also locked with an electronic keypad.

Visitors entering the office are greeted ~~by the receptionist~~ and announced to the receiving person. All visitors are required to sign the access log and indicate the purpose of their visit and the employee to be visited. The person being visited is responsible to supervise the visitors at all times when they are on site. Visitors are only allowed at the facility during regular working hours unless prior approval is obtained from the ~~Mine~~Restoration Manager or the SHEQ Manager.

Driver, Cargo and Equipment Security

Transport of licensed/hazardous material by CBO employees is generally restricted to moving ion exchange resin from a Satellite facility to the Central Processing Plant or transferring contaminated equipment between company facilities. This transport generally occurs over short distances through remote areas. Therefore, the potential for a security threat during transport by CBO vehicle is minimal. The goal of the driver, cargo, and equipment security measures is to ensure the safety of the driver and the security and integrity of the cargo from the point of origin to the final destination by:

- Clearly communicating general point-to-point security procedures and guidelines to all drivers and non-driving personnel;
- Providing the means and methods of protecting the drivers, vehicles, and customer's cargo while on the road; and
- Establishing consistent security guidelines and procedures that shall be observed by all personnel.

Locked and Secured Equipment

For the security of all tractors and trailers, the following must be adhered to:

- If material is stored in the vehicle, access must be secured at all openings with locks and/or tamper indicators;
- Off-site tractors will always be secured when left unattended with windows closed, doors locked, the engine shut off, and no keys or spare keys in or on the vehicle;
- The unit is to be kept visible by an employee at all times when left unattended outside a restricted area.

The security guidelines and procedures apply to all transport assignments. All drivers and non-driving personnel are expected to be knowledgeable of, and adhere to, these guidelines and procedures when performing any load-related activity.

Training

All drivers and employees are required to attend training upon employment in accordance with the training requirements specified in SHEQMS Program Volume VII, *Training Manual*. The training includes (but is not limited to):

- The need for awareness;
- Security requirements in this plan;
- Employee, material, and equipment security;
- Specialized "Hazardous Material" training required under the DOT HMR;
- Workplace violence

Hazardous Material Control and Training

Hazardous materials and specialized radioactive shipments (Class 7) training sessions are conducted for all employees involved in handling, packaging, shipping, and transporting hazardous materials as defined by DOT.

The training includes all regulatory requirements of the following:

Emergency Preparedness procedures prepared for use in the event of an emergency involving a radioactive materials shipment and are contained in SHEQMS Program Volume VIII, *Emergency Manual*~~.~~, CBR-

EPRP-008 These procedures contain the emergency contact and product information necessary to respond in an emergency. Copies of this material are provided in the transportation packages for use by drivers, CBR-EPRP-011.

All key management personnel are trained in Emergency Response. Periodic meetings are held to review and modify procedures, as required. Key management personnel are available for emergency response through the Emergency Notification procedures in SHEQMS Program Volume VIII, *Emergency Manual*, CBR-EPRP-010.

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CAMECO RESOURCES
CROW BUTTE OPERATION

Figure 1

COMMERCIAL POND INSPECTION FORM

FOR THE WEEK OF _____ THROUGH _____

CHECK ACCORDINGLY: √ = OK X = NEEDS ATTENTION OR REPAIRS

LOCATION	FREQUENCY	SUN	MON	TUE	WED	THU	FRI	SAT
POND 1-DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
N.E. UNDERDRAIN	Weekly							
N.M. UNDERDRAIN (in.)	Weekly							
N.W. UNDERDRAIN (in.)	Weekly							
S.E. UNDERDRAIN (in.)	Weekly							
S.M. UNDERDRAIN (in.)	Weekly							
S.W. UNDERDRAIN (in.)	Weekly							
POND 3-DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
N.E. UNDERDRAIN (in.)	Weekly							
N.M. UNDERDRAIN (in.)	Weekly							
N.W. UNDERDRAIN (in.)	Weekly							
S.E. UNDERDRAIN (in.)	Weekly							
S.M. UNDERDRAIN (in.)	Weekly							
S.W. UNDERDRAIN (in.)	Weekly							
POND 4-DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
N.E. UNDERDRAIN (in.)	Weekly							
N.M. UNDERDRAIN (in.)	Weekly							
N.W. UNDERDRAIN (in.)	Weekly							
S.E. UNDERDRAIN (in.)	Weekly							
S.M. UNDERDRAIN (in.)	Weekly							
S.W. UNDERDRAIN (in.)	Weekly							
INSPECTED INLET PIPING	Weekly							
PERIMETER FENCE	Weekly							
INSPECTED LINERS	Weekly							
INSPECTED DIVERSION DITCHES	Monthly							
INSPECTED WASTE PIPELINE	Monthly							
OTHER (EXPLAIN BELOW)								
INSPECTOR INITIALS								

COMMENTS:

CAMECO RESOURCES
CROW BUTTE OPERATION

Figure 2
R & D POND INSPECTION FORM

FOR THE WEEK OF _____ THROUGH _____

CHECK ACCORDINGLY: √ = OK
X = NEEDS ATTENTION OR REPAIRS

LOCATION	FREQUENCY	SUN	MON	TUE	WED	THU	FRI	SAT
CELL 1 (WEST)								
DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
UNDERDRAIN (<6") (in.)	Weekly							
CELL 2 (EAST)								
DEPTH (ft.)	Daily							
EMBANKMENTS	Daily							
UNDERDRAIN (<6") (in.)	Weekly							
INSPECTED INLET PIPING	Weekly							
PERIMETER FENCE	Weekly							
INSPECTED LINERS	Weekly							
INSPECTED DIVERSION DITCHES	Monthly							
INSPECTED WASTE PIPELINE	Monthly							
OTHER (EXPLAIN BELOW)								
INSPECTOR INITIALS								

OTHER:

Figure 5

CAMECO RESOURCES/CROW BUTTE OPERATION
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS

COMMERCIAL PONDS		UNDERDRAIN WATER DEPTH / INCHES	METER READING	TEMP °C	CONDUCTIVITY µmhos/cm	LAB RESULTS µmhos/cm
POND # 1 Depth = 17 feet	POND LEVEL					
	*FREEBOARD					
	NE UNDERDRAIN					
	NM UNDERDRAIN					
	NW UNDERDRAIN					
	SE UNDERDRAIN					
	SM UNDERDRAIN					
	SW UNDERDRAIN					
POND # 3 Depth = 17.5 feet	POND LEVEL					
	*FREEBOARD					
	NE UNDERDRAIN					
	NM UNDERDRAIN					
	NW UNDERDRAIN					
	SE UNDERDRAIN					
	SM UNDERDRAIN					
	SW UNDERDRAIN					
POND # 4 Depth = 17.5 feet	POND LEVEL					
	*FREEBOARD					
	NE UNDERDRAIN					
	NM UNDERDRAIN					
	NW UNDERDRAIN					
	SE UNDERDRAIN					
	SM UNDERDRAIN					
	SW UNDERDRAIN					

R & D POND LEVELS (Depth = 15 ft)
EAST LEVEL:
**EAST FREEBOARD:
EAST UNDERDRAIN:
WEST LEVEL:
**WEST FREEBOARD:
WEST UNDERDRAIN:

REMARKS:
*COMMERCIAL POND FREEBOARD = 5 FT MIN
** R&D POND FREEBOARD = 3 FT MIN
SAMPLER:
DATE:

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5 OPERATIONS

CBR operates a commercial-scale in-situ leach uranium mine (the Crow Butte Project) near Crawford, Nebraska. CBR maintains a headquarters in Casper, Wyoming, where site-licensing actions originate. All CBR operations, including the Crow Butte Project operations, are conducted in conformance with applicable laws, regulations, and requirements of the various regulatory agencies. The responsibilities described below have been designed to both ensure compliance and further implement CBR's policy for providing a safe working environment with cost-effective incorporation of the philosophy of maintaining radiation exposures as low as is reasonably achievable (ALARA).

5.1 CORPORATE ORGANIZATION/ADMINISTRATIVE PROCEDURES

CBR will maintain a performance-based approach to the management of the environment and employee health and safety including radiation safety. The Safety, Health, Environment, and Quality Management System (SHEQMS) encompasses licensing, compliance, environmental monitoring, industrial hygiene, and health physics programs under one umbrella, and it includes involvement for all employees from the individual worker to senior management. This SHEQMS will allow CBR to operate efficiently and maintain an effective environment, health, and safety program.

Figure 5.1-1 is a partial organization chart for CBR with respect to the operation of the Crow Butte Uranium Project and associated operations and represents the management levels that play a key part in the SHEQMS Program. The personnel identified are responsible for the development, review, approval, implementation, and adherence to operating procedures, radiation safety programs, environmental and groundwater monitoring programs, as well as routine and non-routine maintenance activities. These individuals may also serve a functional part of the Safety and Environmental Review Panel (SERP) described under **Section 5.3.3**.

Specific responsibilities of the organization are provided below.

5.1.1 Board of Directors

The CBR Board of Directors has the ultimate responsibility and authority for radiation safety and environmental compliance for CBR. The Board of Directors sets corporate policy and provides procedural guidance in these areas. The Board of Directors provides operational direction to the President of CBR.

5.1.2 President

The President is responsible for interpreting and acting upon the Board of Directors' policy and procedural decisions. The President directly supervises the General Manager of US Operations. The President is empowered by the Board of Directors to have the

responsibility and authority for the radiation safety and environmental compliance programs. The President is responsible for ensuring that the operations staff is complying with all applicable regulations and permit/license conditions through direct supervision of the General Manager of US Operations.

5.1.3 General Manager of US Operations

The General Manager of US Operations is responsible for managing all US Operations. The General Manager of US Operations is responsible for ensuring that Crow Butte personnel comply with Industrial Safety, Radiation Safety, Environmental Protection Programs, and all relevant state and federal regulations. The General Manager of US Operations has the responsibility and the authority to suspend, postpone or modify, immediately if necessary, any activity that is determined to be a threat to employees, public health, the environment, or potentially a violation of state or federal regulations. The General Manager of US Operations reports directly to the President.

5.1.4 Director of Safety, Health, Environment and Quality

The Director of Safety, Health, Environment and Quality reports directly to the President and is responsible for ensuring the corporate personnel comply with industrial safety, radiation safety, and environmental protection programs as stated in the SHEQ Management System. The Director of Safety, Health, Environment and Quality is also responsible for company compliance with all regulatory license conditions/stipulations, regulations and reporting requirements. The Director of Safety, Health, Environment and Quality has the responsibility and authority to terminate immediately any activity that is determined to be a threat to employees or public health, the environment, or potentially a violation of state or federal regulations as indicated in reports from the Manager of Safety, Health, Environment and Quality or the RSO.

5.1.5 Restoration Manager

The Restoration Manager is responsible for all uranium production and restoration activities at the project site. The Restoration Manager is also responsible for implementing any industrial and radiation safety and environmental protection programs associated with operations and restoration. The Restoration Manager is authorized to immediately implement any action to correct or prevent hazards. The Restoration Manager has the responsibility and the authority to suspend, postpone, or modify, immediately if necessary, any activity that is determined to be a threat to employees, public health, the environment, or potentially a violation of state or federal regulations. The Restoration Manager cannot unilaterally override a decision for suspension, postponement, or modification if that decision is made by the Manager of Safety, Health, Environment and Quality, or the RSO. The Restoration Manager reports directly to the General Manager of US Operations.

5.1.6 Manager of Safety Health Environment and Quality

The Manager of Safety, Health, Environment and Quality is responsible for all health and safety, and environmental programs as stated in the SHEQMS Program and for ensuring that CBR complies with all applicable regulatory requirements. The Manager of Safety, Health, Environment and Quality reports directly to the Director of SHEQ. This position assists in the development and review of radiological and environmental sampling and analysis procedures and is responsible for routine auditing of the programs. The Manager of Safety, Health, Environment and Quality has no production-related responsibilities. The Manager of Safety, Health, Environment and Quality also has the responsibility and authority to suspend, postpone, or modify any activity that is determined to be a threat to employees, public health, the environment or potentially a violation of state or federal regulations.

5.1.7 Plant Supervisor

The Plant Supervisor supervises plant operations, including the safe and efficient recovery and processing of uranium oxide while staying within regulatory and technical constraints. The Plant Supervisor is responsible for carrying out any procedures or actions implemented by the Restoration Manager, Manager of SHEQ, or the RSO to correct or prevent radiation safety hazards in the plant. The RSO and the Plant Supervisor are responsible for conducting weekly inspections of all facility areas to observe general radiation control practices and review required changes in procedures and equipment. The Plant Supervisor reports directly to the Restoration Manager.

5.1.8 Radiation Safety Officer

The RSO is responsible for the development, administration, and enforcement of all radiation safety programs. The RSO is authorized to conduct inspections and to immediately order any change necessary to preclude or eliminate radiation safety hazards and/or maintain regulatory compliance. The RSO is responsible for the implementation of all on-site environmental programs including emergency procedures. The RSO inspects facilities to verify compliance with all applicable requirements in the areas of radiological health and safety. The RSO works closely with all supervisory personnel to ensure that established programs are maintained. The RSO is also responsible for the collection and interpretation of employee exposure-related monitoring including data from radiological safety. The RSO makes recommendations to improvement any and all radiological safety-related controls. The RSO has no production-related responsibilities. The RSO reports directly to the Director of SHEQ has a secondary reporting requirement to the President.

5.1.9 Health Physics Technician

The Health Physics Technician (HPT) assists the RSO with the implementation of the radiological and industrial safety programs. The HPT is responsible for the orderly collection and interpretation of all monitoring data, to include data from radiological safety and environmental programs. The HPT reports directly to the RSO.

5.1.10 SHEQ Specialist

The SHEQ Specialist assists in the development and submittal of regulatory permits and license applications. Provides analysis and guidance in the areas of Safety, Health, Environment and Quality and is responsible for assisting site management with coordination of the corrective and preventative action process. The SHEQ Specialist maintains and updates documents associated with the activities relating to the SHEQ system. The SHEQ Specialist reports directly to the SHEQ Manager.

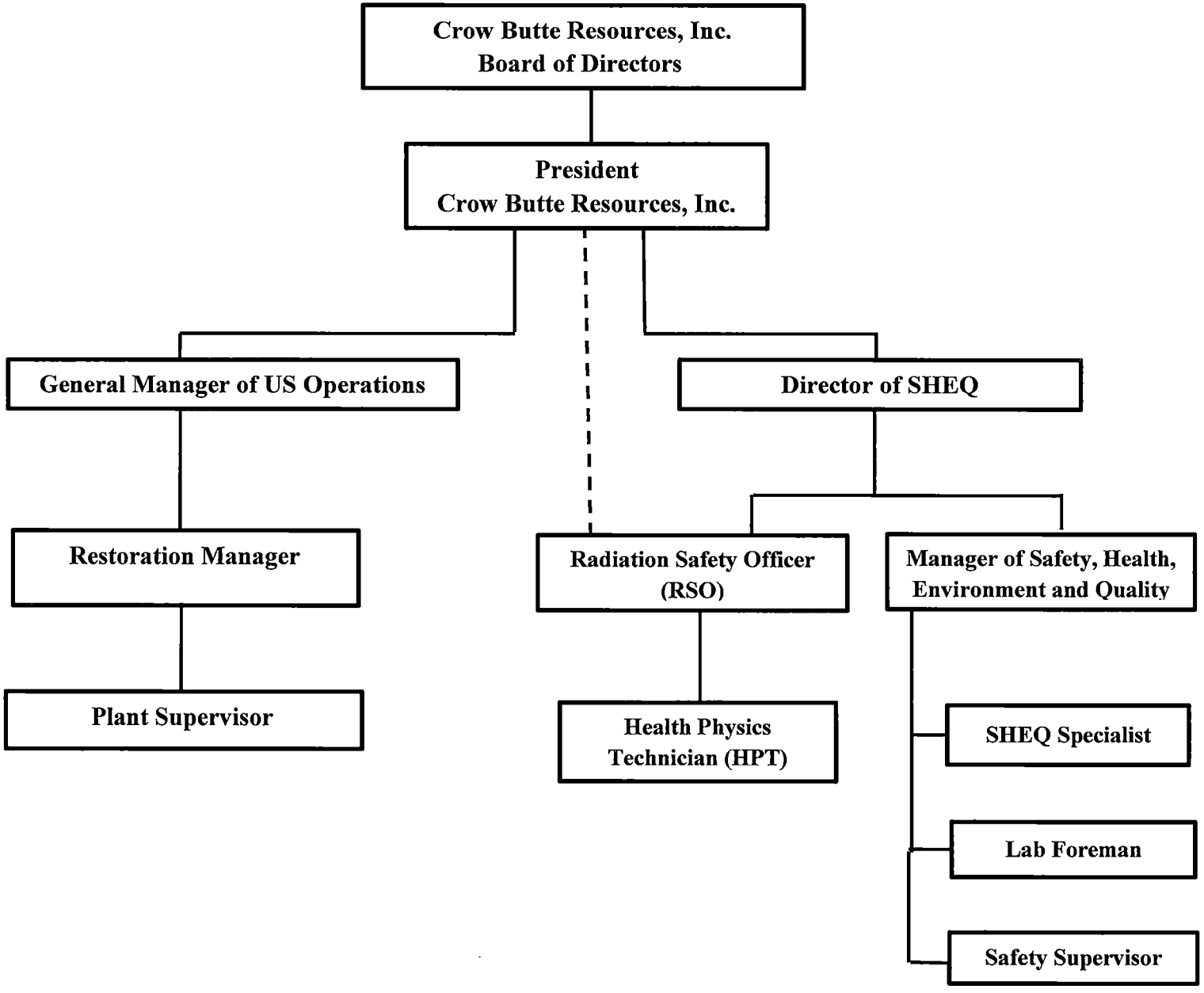
5.1.11 Lab Foreman

The Lab Foreman has direct oversight of the on-site analytical laboratory including implementing laboratory quality assurance procedures. The Lab Foreman is responsible for carrying out any procedures or actions implemented by the Restoration Manager, Manager of SHEQ, or the RSO to correct or prevent radiation safety hazards in the laboratory. The Lab Foreman reports directly to the SHEQ Manager.

5.1.12 Safety Supervisor

The Safety Supervisor is responsible for the non-radiation-related health and safety programs. The Safety Supervisor is authorized to conduct inspections and to immediately order any change necessary to preclude or eliminate safety hazards and/or maintain regulatory compliance. Responsibilities include the development and implementation of health and safety programs in compliance with Occupational Safety and Health Administration (OSHA) regulations. Responsibilities of the Safety Supervisor include development of industrial safety and health programs and procedures, coordination with the RSO where industrial and radiological safety concerns are interrelated, safety and health training of new and existing employees, and the maintenance of appropriate records to document compliance with regulations. The Safety Supervisor may be a qualified HPT and may function in that capacity when needed. The Safety Supervisor reports directly to the Manager of Safety, Heath, Environment and Quality.

Figure 5.1-1: Crow Butte Resources Organizational Chart



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5.1.9 Health Physics Technician

The Health Physics Technician (HPT) assists the RSO with the implementation of the radiological and industrial safety programs. The HPT is responsible for the orderly collection and interpretation of all monitoring data, to include data from radiological safety and environmental programs. The HPT reports directly to the RSO.

5.1.10 SHEQ Specialist

The SHEQ Specialist assists in the development and submittal of regulatory permits and license applications. Provides analysis and guidance in the areas of Safety, Health, Environment and Quality and is responsible for assisting site management with coordination of the corrective and preventative action process. The SHEQ Specialist maintains and updates documents associated with the activities relating to the SHEQ system. The SHEQ Specialist reports directly to the SHEQ Manager.

5.1.11 Lab Foreman

The Lab Foreman has direct oversight of the on-site analytical laboratory including implementing laboratory quality assurance procedures. The Lab Foreman is responsible for carrying out any procedures or actions implemented by the Restoration Manager, Manager of SHEQ, or the RSO to correct or prevent radiation safety hazards in the laboratory. The Lab Foreman reports directly to the SHEQ Manager.

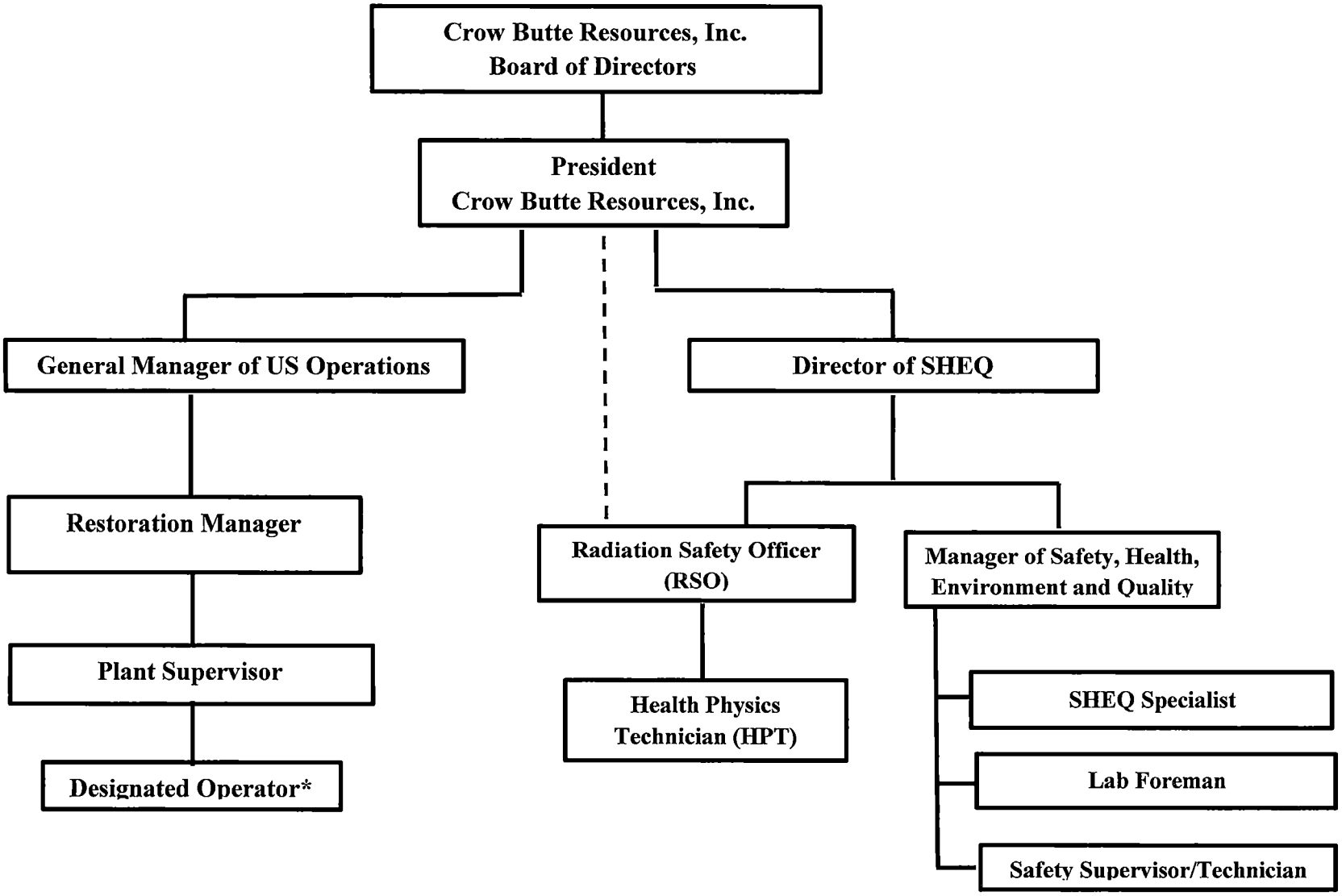
5.1.12 Safety Supervisor/Technician

The Safety Supervisor/Technician is responsible for the non-radiation-related health and safety programs. The Safety Supervisor/Technician is authorized to conduct inspections and to immediately order any change necessary to preclude or eliminate safety hazards and/or maintain regulatory compliance. Responsibilities include the development and implementation of health and safety programs in compliance with Occupational Safety and Health Administration (OSHA) regulations. Responsibilities of the Safety Supervisor/Technician include development of industrial safety and health programs and procedures, coordination with the RSO where industrial and radiological safety concerns are interrelated, safety and health training of new and existing employees, and the maintenance of appropriate records to document compliance with regulations. The Safety Supervisor/Technician may be a qualified HPT and may function in that capacity when needed. The Safety Supervisor/Technician reports directly to the Manager of Safety, Heath, Environment and Quality.

5.1.13 Qualified Designated Operator

The qualified Designated Operator is responsible for performing daily inspection in the occasional absence of the RSO and the HPT. A qualified Designated Operator will meet the minimum qualifications and perform only those duties as outline in Section 5.6.6.

Figure 5.1-1: Crow Butte Resources Organizational Chart



*Qualifications for Designated Operator described in SUA-1534, Section 5.6.6 (Nov. 2014)

5.4 MANAGEMENT AUDIT AND INSPECTION PROGRAM

The following internal inspections, audits, and reports are performed for the Crow Butte Project operations:

5.4.1 Radiation Safety Inspections

5.4.1.1 Daily Inspections

The RSO, HPT or a qualified designated operator conducts a daily walkthrough inspection of the plant. The inspection entails a visual examination of compliance or other problems, which are reviewed with the Restoration Manager.

5.4.1.2 Weekly RSO Inspections

The RSO and Restoration Manager (or designees in their absence) will conduct a weekly inspection of all facility areas to observe general radiation control practices and review required changes in procedures and equipment.

5.4.1.3 Monthly RSO Reports

The RSO provides a written summary of the month's radiological activities at the Crow Butte Uranium Project facilities. The report includes a review of all monitoring and exposure data for the month, a summary of worker protection activities, a summary of all pertinent radiation survey records, a discussion of any trends in the ALARA program, and a review of adequacy of the implementation of the USNRC license conditions. Recommendations are made for any corrective actions or improvements in the process or safety programs.

5.4.2 Evaporation Pond Inspections

The inspection program developed by CBR for use on the ponds in the current production area is contained in SHEQMS Program Volume VI, *Environmental Manual* and is based on the guidance in USNRC Regulatory Guide 3.11.1. The inspection program is summarized below.

5.4.2.1 Daily Inspections

- Pond Depth - The depth of water in each pond is measured and recorded.
- Pond Embankments - The pond embankments are visually inspected for signs of cracking, slumping, movement, or a concentration of seepage.

5.4.2.2 Weekly Inspections

- Perimeter Fence - The game-proof perimeter fence is inspected for holes that would allow animals to enter the pond area.

- Inlet Pipes – The pond inlet piping is inspected to verify that it is not clogged with ice, dirt, etc.
- Underdrain Measurements - The underdrains are measured, and the vertical depth of fluid in the standpipe is recorded.
- Pond Sprays - When in use, the enhanced evaporation systems should be checked at regular intervals.
- Pond Liner - The liner is visually inspected weekly for holes or other signs of distress.
- Leak Detection System - The leak detection pipes for all ponds are measured for fluid in the standpipes, and the vertical depth of the fluid shall be recorded on the Pond Inspection Forms.

5.4.2.3 Quarterly Inspections

- Embankment Settlement - The tops of the embankments and downstream toe area are examined for settlement or depressions.
- Embankment Slopes - Embankment slopes are examined for irregularities in alignment and variances from originally constructed slopes (sloughing, toe movement, surface cracking, or erosion).
- Seepage - Evidence of seepage in any areas surrounding the ponds (especially the downstream toes) is investigated and documented.
- Slope Protection - Vegetation on the outslopes of the pond is examined. Any evidence of rills or gullies forming is noted.
- Post-Construction Changes - Any changes to the upstream watershed areas that could affect runoff to the ponds is noted.
- Emergency lines are inspected to ensure that the rope has not deteriorated and the ropes reach to the pond water level.

5.4.2.4 Annual Inspection

A technical evaluation of the pond system which addresses the hydraulic and hydrologic capacities of the ponds and ditches and the structural stability of the embankments will be conducted annually. A survey of the pond embankments will be conducted annually and the survey results documented and incorporated into the annual inspection report. The

CROW BUTTE RESOURCES, INC.

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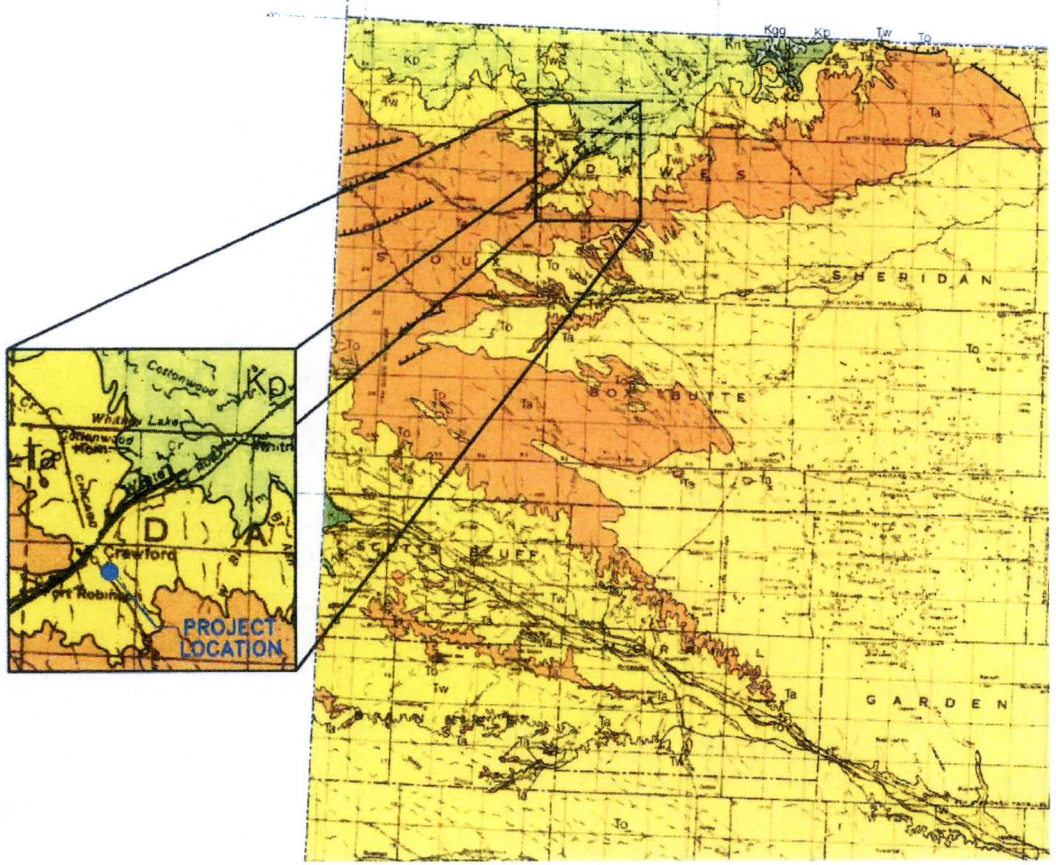


LEGEND

SYSTEM	SERIES	GROUP OR FORMATION		
TERTIARY	MIOCENE	OGALLALA		To
		ARIKAREE		Ta
	OLIGOCENE	WHITE RIVER		Tw
CRETACEOUS	UPPER CRETACEOUS	MONTANA	Fox Hills	Kf
			Pierre	Kp
			Niobrara	Kn
		COLORADO	Carlile	Kc
			Greenhorn-Graneros	Kgg
	LOWER CRETACEOUS	DAKOTA		Kd
JURASSIC				
PERMIAN	BIG BLUE	CHASE		Pc
		COUNCIL GROVE		Pcg
		ADMIRE		Pa
		WABAUNSEE		Pw
	VIRGIL	SHAWNEE		Ps
		DOUGLAS		Pd
PENNSYLVANIAN		LANSING		Pl
	MISSOURI	KANSAS CITY		Pkc
	DES MOINES	MARMATON		Pm
MISSISSIPPIAN				
DEVONIAN				
SILURIAN				
ORDOVICIAN (Middle & Upper)				
CAMBRIAN & ORDOVICIAN (Lower)				
PRECAMBRIAN				

(PLIOCENE AND QUATERNARY deposits not shown)

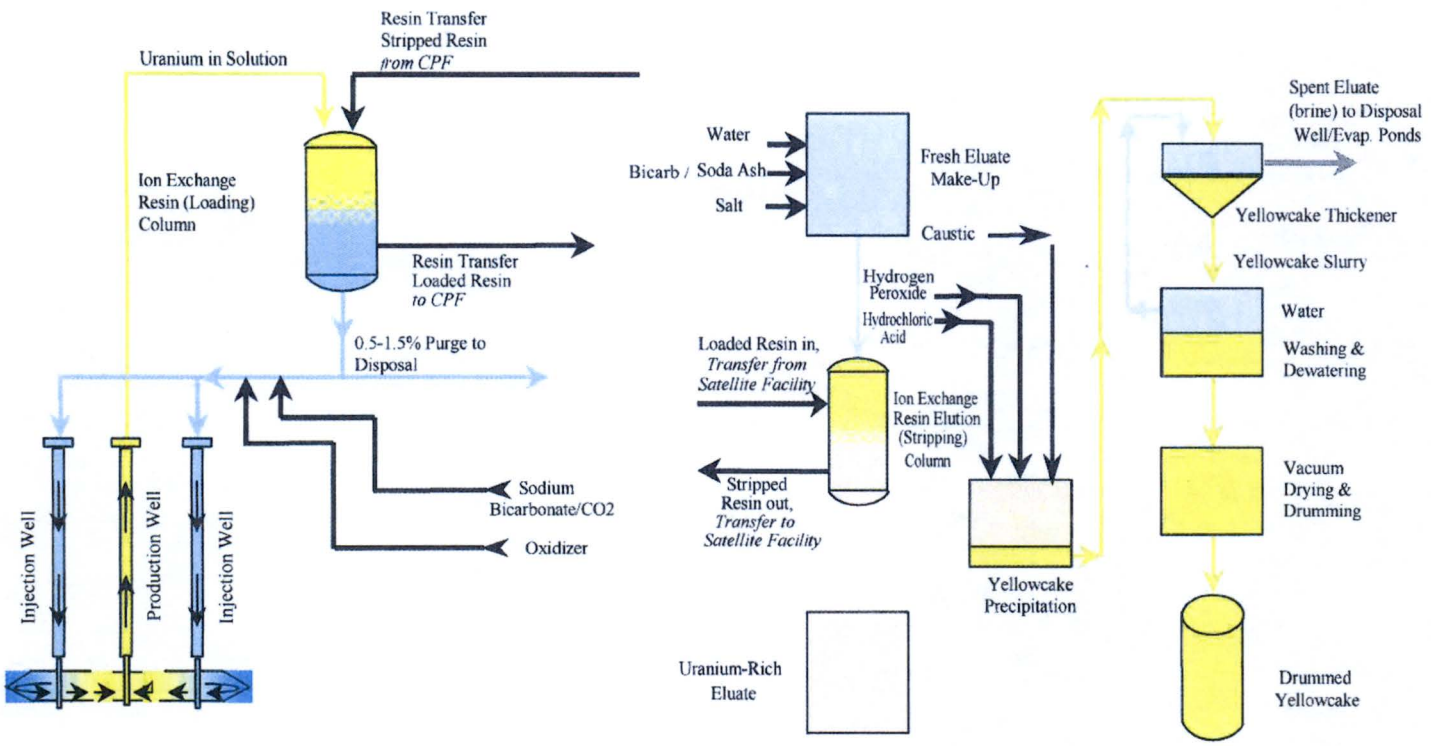
CROW BUTTE RESOURCES, INC.

Figure 2.6-1

BEDROCK GEOLOGY MAP
DAWES COUNTY, NE

June 2016

Source: Nebraska Geological Survey



CROW BUTTE RESOURCES, INC.

FIGURE 3.1-7
PROCESS FLOW SHEET
FOR CENTRAL PLANT AND/OR
SATELLITE FACILITY

PROJECT: CO001636.00001 MAPPED BY: JC CHECKED BY: JEC

June 2016

ARCADIS
630 Plaza Drive, Ste. 100
Highlands Ranch, CO 80129
P: 720-344-3500 F: 720-344-3535
www.arcadis-us.com

K:\CBR_Projects\CBR LRA\3_IMAGES\Illustrator\LRA_Figure 3_1-7 Process Flow Diagram.ai @ 11/18/2014 BY: J.CHEN @ Boulder, CO

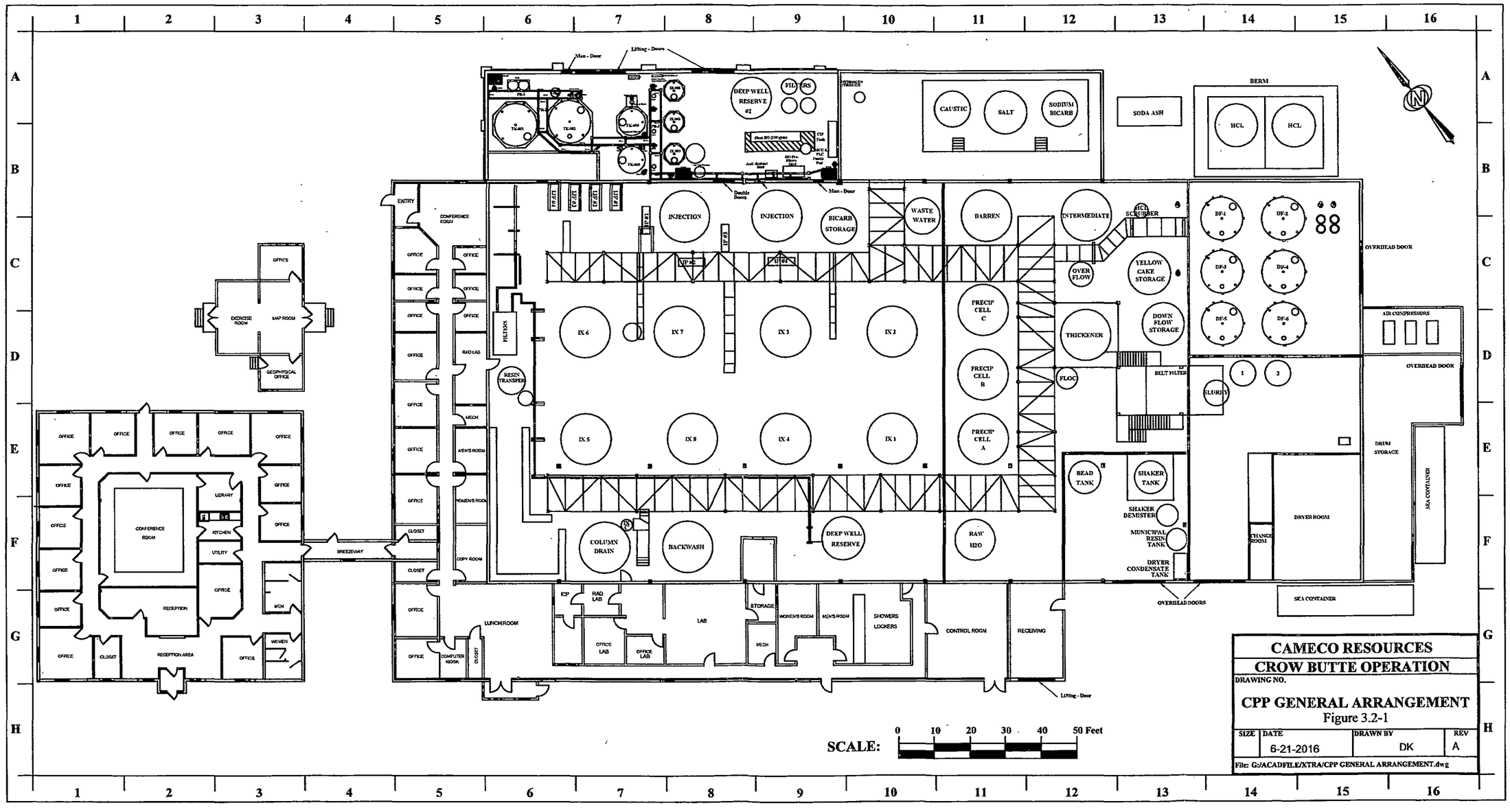

Man - Door
Lifting - Doors
DEEP WELL RESERVE #2
FILTERS
CAUSTIC
SALT
SODIUM BICARB
SODA ASH
BERM
HCL
HCL
ENTRY
CONFERENCE ROOM
OFFICE
INJECTION
INJECTION
BICARB STORAGE
WASTE WATER
BARREN
INTERMEDIATE
HCL SCRUBBER
OVER FLOW
YELLOW CAKE STORAGE
DOWN FLOW STORAGE
THICKENER
FLOC
BELT FILTER
DF-1
DF-2
DF-3
DF-4
DF-5
DF-6
88
OVERHEAD DOOR
AIR COMPRESSORS
OVERHEAD DOOR
SLURRY
1
2
FILTERS
RESIN TRANSFER
RAD LAB
MECH
MEN'S ROOM
WOMEN'S ROOM
COPY ROOM
IX 6
IX 7
IX 3
IX 2
IX 5
IX 8
IX 4
IX 1
PRECIP CELL C
PRECIP CELL B
PRECIP CELL A
RAW H2O
BEAD TANK
SHAKER TANK
SHAKER DEMISTER
MUNICIPAL RESIN TANK
DRYER CONDENSATE TANK
DRUM STORAGE
SEA CONTAINER
DRYER ROOM
CHANGE ROOM
SEA CONTAINER
OVERHEAD DOORS
OFFICE
EXERCISE ROOM
MAP ROOM
GEOPHYSICAL OFFICE
CONFERENCE ROOM
LIBRARY
KITCHEN
UTILITY
RECEPTION
RECEPTION AREA
MEN
WOMEN
BREEZEWAY
CLOSET
COLUMN DRAIN
BACKWASH
DEEP WELL RESERVE
LUNCH ROOM
COMPUTER ROOM
ICP
RAD LAB
OFFICE LAB
LAB
STORAGE
MECH
WOMEN'S ROOM
MEN'S ROOM
SHOWERS LOCKERS
CONTROL ROOM
RECEIVING
Lifting - Door
SCALE:
0 10 20 30 40 50 Feet
CAMECO RESOURCES
CROW BUTTE OPERATION
DRAWING NO.
CPP GENERAL ARRANGEMENT
Figure 3.2-1
SIZE
DATE
6-21-2016
DRAWN BY
DK
REV
A
File: G:/ACADFILE/XTRA/CPP GENERAL ARRANGEMENT.dwg

Table 5.8-5: Operational Environmental and Effluent Monitoring Program

Sample Type	Location	Type	Number	Frequency	Analyses
Air (Radon)	Nearest residences and in the prevalent wind direction Environmental control station near Crawford, NE.	Continuous	7 1	Semiannual	Rn-222
Air (particulate)	Same locations as radon air monitoring	Continuous	7	A minimum of 2 weeks per month when dryer is in use	U-nat Ra-226 Pb-210
Surface Soil (top 5 cm)	Plant site before topsoil removal	Grab	2	Once	U-nat Ra-226
	Plant site after topsoil removal	Grab	2	Once	U-nat Ra-226
	Evaporation ponds before excavation	Grab	2	Once	U-nat Ra-226
	Air sampling stations	Grab	7	Once	U-nat Ra-226
Subsurface soil	Plant site	1/3 meter composites to one meter	1	Once	U-nat Ra-226
Groundwater	Water supply wells within 1 km of area wellfield	Grab	1	Quarterly	U-nat Ra-226
Surface water	Each stream passing through wellfield area (one upstream and one downstream)	Grab	2	Quarterly	U-nat Ra-226
	Each water impoundment in wellfield area	Grab	1	Quarterly	U-nat Ra-226
Direct Radiation	Air sampling stations	Continuous	7	Quarterly exchange of dosimeters	External gamma
Sediment	Each body of water where surface water sampling is performed	Grab upstream and downstream of wellfields	1 or 2	Annually	U-nat Ra-226 Pb-210

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Table 7.12-2: Estimated Percent Reduction in Available Drawdown in Chadron Aquifer Water Wells as a Result of the Crow Butte ISL Operations

Water Well Number	Static Water Level (feet)[1]	Total Depth of Well (feet)	Figure Number: Drawdown vs. Time	Projected Maximum Drawdown (feet)	Maximum Available Drawdown (feet)[2]	Reduction of Available Drawdown (percent)
2	-60 est.	650	7.12-2	-23.4	530	-4.4
22	-70 est.	400	7.12-2	-23.2	270	-8.6
33	-20 est.	212	7.12-2	-22.1	132	-16.7
124	-50 est.	520	7.12-2	-22.8	410	-5.6
32	-39.8	400	7.12-3	-26.2	300	-8.7
51	-30 est.	300	7.12-3	-26.8	210	-12.8
72	-82.2	450	7.12-3	.25.5	308	-8.3
52	4.62[3]	420	7.12-4	-24.7	365	-6.8
55	-6.25[3]	320	7.12-4	-26.8	254	-10.5
60	20 est.	312	7.12-4	-25.9	272	-9.5
61	19.64[3]	280	7.12-4	-26.4	240	-11.0
65	22.52[3]	260	7.12-4	-25.6	223	-11.5
97	57.75[3]	380	7.12-5	-22.2	378	-5.9
114	60 est.	470	7.12-5	-21.9	470	-4.7
123	21.37[3]	280	7.12-5	-23.0	241	-9.5
					Average =	-9.0

1 + = Above Ground Level; - = Below Ground Level

2 To the Top of the Chadron Sandstone; assumes 60 feet sand thickness

3 Measured 11/83

10 ENVIRONMENTAL APPROVALS AND CONSULTATIONS

10.1 ENVIRONMENTAL APPROVALS FOR THE CURRENT LICENSED AREA

As discussed previously, this is an LRA for Radioactive Source Materials License SUA-1534, originally submitted in September of 1987 and renewed in 1997. All other required permits for the existing Crow Butte Project have been obtained and maintained since that time. A summary of the relevant permits and authorizations for the current License Area is given in **Table 10.1-1**.

Table 10.1-1 Environmental Approvals for the Current License Area

Issuing Agency	Permit Description
	Crow Butte Project
Nebraska Department of Environmental Quality **PO Box 98922** **Lincoln, Nebraska 68509-8922**	Underground Injection Control Class III Authorization NE0122611 Approved: April 24, 1990 Modified: June 12, 2014
	Aquifer Exemption CBO Site Approval Effective: March 23, 1984
	Underground Injection Control Class I Deep Disposal Well #1 Authorization NE0211670 Replaces: NE0210457 Approved: June 12, 2014 Expires: June 11, 2024
	Underground Injection Control Class I Deep Disposal Well #2 Authorization NE0210825 Approved: November 24, 2010 Expires: November 30, 2020
	National Pollutant Discharge Elimination System Permit NE0130613 Approved: September 27, 2011 Expires: September 30, 2016 (Replaced NE0206369 approved July 2, 2004)
	Construction Stormwater NPDES General Permit NER 100000 Authorization No. NER104581 Approved: January 19, 2006
	Authorization for Class V Well Underground Injection Authorization NE0210917 Approved: May 14, 2010 (Replaced NE0207888 11/6/2000) Expires: May 13, 2020
	Evaporation Pond Design Approved: July 21, 1988

	North Trend Expansion Area
	Aquifer Exemption North Trend Expansion Approval Effective: April 18, 2011 Underground Injection Control Class III North Trend Expansion Area Authorization NE0210740 Approved: August 10, 2011
	Mineral Exploration
	Mineral Exploration Permit NE0210824 Panhandle of Nebraska Exploration 2000 Holes Approved: January 28, 2013 Expires: August 18, 2014 (Replaced NE0209317)
	Mineral Exploration Permit NE0211334 Crawford Exploration 300 Holes Approved: July 16, 2012 Expires: July 27, 2017 (Replaced NE0210679)
Nebraska Department of Natural Resources **301 Centennial Mall South** **Lincoln, Nebraska 68509-4676**	Industrial Ground Water Permit (I-2A) Approved: August 7, 1991 Amended: October 30, 2014
Nebraska Department of Health and Human Services Regulation and Licensure **PO Box 95007** **Lincoln, Nebraska 68509-5007**	Class IV Public Water Supply Permit NE3121024 Approved: April 12, 2002
U.S. Nuclear Regulatory CommissionWashington, DC 20555	Source Materials LicenseSUA-1534Issued: December 29, 19891st Renewal: February 28, 19982nd Renewal: November 5, 2014
U.S. Environmental Protection Agency **1200 Pennsylvania Ave, NW,** **Washington, DC 20460**	Aquifer Exemption – Crow Butte Project Approval Effective: March 23, 1984 Aquifer Exemption – North Trend Expansion Area Approval Effective: April 18, 2011
Federal Communications Commission	Radio Station Authorization Approved: July 20, 2012 Expires: July 20, 2022

Source: Crow Butte Resources, Inc.

CROW BUTTE RESOURCES, INC.

SERP 16-05

Proposed License Renewal Application
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Crow Butte Resources, Inc.
d/b/a Cameco Resources
Crow Butte Operation

SECURITY PLAN

June 29, 2016
Revision #3

SECURITY PLAN

Purpose and Scope

Crow Butte Operation (CBO) is committed to:

- Providing employees with a safe, healthful, and secure working environment;
- Maintaining control and security of NRC licensed material;
- Ensuring the safe and secure handling and transporting of hazardous materials;
- Managing records and documents that may contain sensitive and confidential information;

The purpose of this Security Plan is to ensure that CBO operations are conducted in such a manner that these objectives are met.

This plan applies to CBO operations at the Crow Butte Uranium Project and other CBO properties, as appropriate. This plan also applies to the transport of licensed or hazardous materials by CBO employees over public highways.

Regulatory Requirements

Security and Control of NRC Licensed Material

CBO is authorized by a license issued by the U.S. Nuclear Regulatory Commission (NRC) to receive, acquire, possess, and transfer natural uranium ("source material") and byproduct material defined in 10 CFR §40.4 as follows:

Source Material: (1) Uranium in any physical or chemical form or (2) ores that contain by weight greater than one twentieth of one percent (0.05%) uranium. Common examples would include uranium in solution, loaded on ion exchange resins, in slurry form, or as dry product.

Byproduct Material: The tailings or wastes produced by the extraction or concentration of uranium from any ore processed primarily for its source material content, including surface wastes resulting from uranium solution extraction processes. Common examples would include contaminated equipment, materials, and wastes produced during facility operations.

The NRC requires licensees to maintain control over such licensed material. 10 CFR 20, Subpart I, *Storage and Control of Licensed Material*, requires the following:

§20.1801 Security of Stored Material

The licensee shall secure from unauthorized removal or access licensed materials that are stored in controlled or unrestricted areas.

§20.1802 Control of Material not in Storage

The licensee shall control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.

Stored material would include uranium packaged for shipment from the facility or byproduct materials awaiting disposal. Examples of material not in storage would include yellowcake slurry or loaded ion exchange resin removed from the restricted area for transfer to other areas.

Security Requirements for DOT Hazardous Materials

CBO routinely receives, stores, uses, and ships hazardous materials as defined by the U.S. Department of Transportation (DOT). In addition to the packaging and shipping requirements contained in the DOT Hazardous Materials Regulations (HMR), 49 CFR 172, Subpart I, *Security Plans*, requires that persons that offer for transportation or transport certain hazardous materials develop a Security Plan. Shipments may qualify for this DOT requirement under the following categories:

§172.800(b)(4) A shipment of a quantity of hazardous materials in a bulk package having a capacity equal to or greater than 13,248 L (3,500 gallons) for liquids or gases or more than 13.24 cubic meters (468 cubic feet) for solids;

§172.800(b)(5) A shipment in other than a bulk packaging of 2,268 kg (5,000 pounds) gross weight or more of one class of hazardous material for which placarding of a vehicle, rail car, or freight container is required for that class under the provisions of subpart F of this part;

§172.800(b)(7) A quantity of hazardous material that requires placarding under the provisions of subpart F of this part.

DOT requires that Security Plans assess the possible transportation security risks and evaluate appropriate measures to address those risks. All hazardous materials shippers and transporters subject to these standards must take measures to provide personnel security by screening applicable job applicants, prevent unauthorized access to the hazardous materials or vehicles being prepared for shipment, and provide for en route security. Companies must also train appropriate personnel in the elements of the Security Plan.

Responsibilities

Responsibilities of personnel have been designed to both ensure compliance and further implement CBR's policy for providing a safe working environment with cost-effective incorporation of the philosophy of maintaining radiation exposures as low and reasonably achievable (ALARA). The specific responsibilities of security plan personnel including managerial and operational personnel are described in Section 5 of the Source Material License Renewal, SUA-1534. The Crow Butte Resources Organizational Chart, is shown in Section 5, Figure 5.1-1 of the Source Material License Renewal, SUA-1534. Organizational changes will be maintained through the Safety Environmental Review Panel (SERP) process.

Restoration Manger

The Restoration Manger will ensure that the individuals responsible for implementing this Security Plan have the appropriate training and resources required.

SHEQ Manager

The SHEQ Manager has overall responsibility for the implementation of the Security Plan. The SHEQ Manager will periodically review this plan for improvements. In addition, the SHEQ Manager will be responsible for reviewing Security Plans submitted by carriers that are contracted to transport materials covered by this plan.

Individual

Individuals whose job functions involve maintaining control of licensed material or shipping and transporting radioactive materials are responsible for ensuring that the security requirements of this plan are implemented.

Permit Area and Facility Security

CBO provides adequate measures to ensure the safety and security of employees, contractors, visitors and CBO equipment and facilities. This section was developed to explain the general security procedures and guidelines that apply to the physical structures and facilities within the permit area. Following are the guidelines and procedures that apply to security issues related to CBO physical facilities:

Central Processing and Restoration Facility Areas

All Central Processing and Restoration facility areas where source or byproduct material is handled are fenced. The main access road is equipped with a locking gate. The access road and areas around the Central Processing facility are monitored by strategically placed surveillance cameras. A 24-hour per day 7-day per week staff is on duty at these facilities.

Plant Operators perform an inspection to ensure the proper storage and security of licensed material at the beginning of each shift. The inspection determines whether all licensed material is properly stored in a restricted area or, if in controlled or unrestricted areas, is properly secured. In particular, Operators will ensure that loaded ion exchange resin, slurry, drummed yellowcake, and byproduct material is properly secured. If licensed material is found outside a restricted area, the Operator ensures that it is secured, locked, moved to a restricted area, or kept under constant surveillance by direct observation or surveillance cameras. The results of this inspection are documented in the Control Room Log Book.

Mine Units and Wellhouses

Lixiviant is found in injection piping in the wellfields, wellhouses and trunklines to the Central Processing Plant and Restoration Building. All mine units and wellfields are fenced and all entry gates have signs posted restricting public access. Each wellhouse is locked with an electronic keypad. The mine site is staffed 24-hours a day, 7-days per week. During each shift an inspection is performed to ensure each wellhouse is secure, free of leaks, and to verify correct pressures and settings are maintained. During the shift inspection, wellfields (Mine Units) are monitored for trunkline leaks and to monitor for unauthorized access. Inspections are documented on the Shift Wellfield Inspection sheet and the Control Room Log Book. Nonconformities are reported to appropriate supervisors and site management for further evaluation and corrective actions if necessary.

Office Building

There is a reception area located at the main entrance into the office building. All other entrances are locked during off-shift hours. There are a limited number of traceable keys to the office and they are given out to select employees. The main door and the door to the Central Plant facility entrance are also locked with an electronic keypad.

Visitors entering the office are greeted and announced to the receiving person. All visitors are required to sign the access log and indicate the purpose of their visit and the employee to be visited. The person being visited is responsible to supervise the visitors at all times when they are on site. Visitors are only allowed at the facility during regular working hours unless prior approval is obtained from the Restoration Manager or the SHEQ Manager.

Driver, Cargo and Equipment Security

Transport of licensed/hazardous material by CBO employees is generally restricted to moving ion exchange resin from a Satellite facility to the Central Processing Plant or transferring contaminated equipment between company facilities. This transport generally occurs over short distances through remote areas. Therefore, the potential for a security threat during transport by CBO vehicle is minimal. The goal of the driver, cargo, and equipment security measures is to ensure the safety of the driver and the security and integrity of the cargo from the point of origin to the final destination by:

- Clearly communicating general point-to-point security procedures and guidelines to all drivers and non-driving personnel;

- Providing the means and methods of protecting the drivers, vehicles, and customer's cargo while on the road; and
- Establishing consistent security guidelines and procedures that shall be observed by all personnel.

Locked and Secured Equipment

For the security of all tractors and trailers, the following must be adhered to:

- If material is stored in the vehicle, access must be secured at all openings with locks and/or tamper indicators;
- Off-site tractors will always be secured when left unattended with windows closed, doors locked, the engine shut off, and no keys or spare keys in or on the vehicle;
- The unit is to be kept visible by an employee at all times when left unattended outside a restricted area.

The security guidelines and procedures apply to all transport assignments. All drivers and non-driving personnel are expected to be knowledgeable of, and adhere to, these guidelines and procedures when performing any load-related activity.

Training

All drivers and employees are required to attend training upon employment in accordance with the training requirements specified in SHEQMS Program Volume VII, *Training Manual*. The training includes (but is not limited to):

- The need for awareness;
- Security requirements in this plan;
- Employee, material, and equipment security;
- Specialized "Hazardous Material" training required under the DOT HMR;
- Workplace violence

Hazardous Material Control and Training

Hazardous materials and specialized radioactive shipments (Class 7) training sessions are conducted for all employees involved in handling, packaging, shipping, and transporting hazardous materials as defined by DOT.

The training includes all regulatory requirements of the following:

Emergency Preparedness procedures prepared for use in the event of an emergency involving a radioactive materials shipment and are contained in SHEQMS Program Volume VIII, *Emergency Manual*, CBR-EPRP-008. These procedures contain the emergency contact and product information necessary to

respond in an emergency. Copies of this material are provided in the transportation packages for use by drivers, CBR-EPRP-011.

All key management personnel are trained in Emergency Response. Periodic meetings are held to review and modify procedures, as required. Key management personnel are available for emergency response through the Emergency Notification procedures in SHEQMS Program Volume VIII, *Emergency Manual*, CBR-EPRP-010.