Submitted: May 8, 2015
Revised: September 8, 2015

In the Matter of Crow Butte Resources, Inc.
(License Renewal for the In Situ Leach Facility, Crawford, Nebraska)
Docket No. 40-8943-OLA
ASLBP No. 08-867-02-OLA-BD01
2015 Evidentiary Hearing

NRC Staff Hearing Exhibits

NRC Exhibit #	Witness	Related Contention	Description
NRC-001-R	All Witnesses	All Contentions	Revised Testimony of David Back, Tianqing Cao, Nathan Goodman, Thomas Lancaster, Paul Nickens and Elise Striz (July 29, 2015)
NRC-001A	Back	All Contentions	Affidavit of David Back
NRC-001B	Cao	All Contentions	Affidavit of Tianqing Cao
NRC-001C-R	Goodman	All Contentions	Affidavit of Nathan Goodman
NRC-001D	Lancaster	All Contentions	Affidavit of Thomas Lancaster
NRC-001E-R	Nickens	All Contentions	Affidavit of Paul Nickens
NRC-001F			[REMOVED]
NRC-001G	Striz	All Contentions	Affidavit of Elise Striz
NRC-002	Back	All Contentions	Statement of Professional Qualifications of David Back (May 8, 2015)
NRC-003	Cao	All Contentions	Statement of Professional Qualifications of Tianqing Cao (May 8, 2015)
NRC-004	Goodman	All Contentions	Statement of Professional Qualifications of Nathan Goodman (May 8, 2015)
NRC-005	Lancaster	All Contentions	Statement of Professional Qualifications of Thomas Lancaster (May 8, 2015)
NRC-006	Nickens	All Contentions	Statement of Professional Qualifications of Paul Nickens (May 8, 2015)
NRC-007			[REMOVED]
NRC-008	Striz	All Contentions	Statement of Professional Qualifications of Elise Striz (May 8, 2015)

NRC Exhibit #	Witness	Related Contention	Description
NRC-009	All Witnesses	All Contentions	Safety Evaluation Report (Revised) (August 2014)
NRC-010	All Witnesses	All Contentions	Final Environmental Assessment (October 2014)
NRC-011	All Witnesses	All Contentions	Finding of No Significant Impact (October 2014)
NRC-012	All Witnesses	All Contentions	NRC Materials License SUA-1534
NRC-013	All Witnesses	All Contentions	NUREG-1569, Standard Review Plan for In Situ Uranium Recovery Facilities (June 2003)
NRC-014	All Witnesses	All Contentions	NUREG-1748, Environmental Review Guidance for Licensing Actions Associated with NMSS Programs (August 2003)
NRC-015	Back, Lancaster, Striz	Contention A	Final Environmental Assessment for Crow Butte ISR Project (1989) (excerpt)
NRC-016	Back, Lancaster, Striz, Goodman	Contentions A, 12	NRC (2007), NUREG/CR-6870, “Consideration of Geochemical Issues in Groundwater Restoration at Uranium In-Situ Leach Mining Facilities”
NRC-017	Back, Lancaster, Striz, Goodman	Contentions A, 9, 12	NRC (2001), NUREG/CR-6733, “A Baseline Risk-Informed, Performance-Based Approach for In Situ Leach Uranium Extraction Licensees”
NRC-018	Back, Lancaster, Striz	Contention A	NRC (1985), NUREG/CR-3709, “Methods of Minimizing Ground-Water Contamination from In Situ Leach Uranium Mining”
NRC-019	Back, Lancaster, Striz	Contention A	Staub et al (1986), NUREG/CR-3967, “Analysis of Excursions at Selected In Situ Uranium Mines in Wyoming and Texas”
NRC-020	Back, Lancaster, Striz	Contention C	Regulatory Guide 3.11, “Design, Construction, and Inspection of Embankment Retention Systems at Uranium Recovery Facilities,” Rev. 3 (Nov. 2008)
NRC-021	Back, Lancaster, Striz	Contention C	Collings, S.P. and R.H. Knode, “Geology and Discovery of the Crow Butte Uranium Deposit, Dawes County, Nebraska,” 74th Annual Symposium on Uranium and Precious Metals, AIME (1984) (excerpts)

NRC Exhibit #	Witness	Related Contention	Description
NRC-022	Back, Lancaster, Striz	Contention C	South Dakota Dept. of Environment and Natural Resources, "The 2014 South Dakota Integrated Report for Surface Water Quality Assessment" (March 2014) (excerpts)
NRC-023	Back, Lancaster, Striz, Goodman	Contention D	Dickinson, K.A., "Distribution of the basal clastic unit of the Oligocene Chadron Formation in the Alliance 2-degree quadrangle, northwestern Nebraska," U.S.G.S Open-File Report 90-416 (excerpts)
NRC-024	Back, Lancaster, Striz, Goodman	Contention D	Swinehart, J.B et al., "Cenezoic Paleogeography of Western Nebraska," in Cenozoic Paleogeography of West-Central United States, R.M. Flores and S.S. Kaplan, Eds.(1985) (excerpts)
NRC-025	Back, Lancaster, Striz, Goodman	Contention D	Heakin, A.J., "Water Quality of Selected Springs and Public Supply Wells, Pine Ridge Indian Reservation, South Dakota, 1992-97," USGS Water Resources Investigations Report 99-4063 (2000)
NRC-026	Back, Lancaster, Striz, Goodman	Contention D	Davis, K.W., Putnam, L.D. and A.R. LaBelle, "Conceptual and Numerical Models of Groundwater Flow in the Ogallala and Arikaree Aquifers, Pine Ridge Indian Reservation Area, South Dakota, Water Years 1980–2009," USGS Scientific Investigations Report 2014-5241 (2014) (excerpts)
NRC-027	Back, Lancaster, Striz, Goodman	Contention D	Diffendal, R.F. "Geomorphic and structural features of the Alliance 1° x 2° Quadrangle, western Nebraska, discernible from synthetic-aperture radar imagery and digital shaded-relief maps," Contributions to Geology, University of Wyoming, v. 30, no. 2, p. 137-147, December 1994 (excerpt)
NRC-028	Back, Lancaster, Striz, Goodman	Contention D	Crow Butte Resources, Inc., Application for Nebraska Department of Environmental Quality (NDEQ) Class III Underground Injection Control (UIC) Permit (revised Jan. 6, 2010) (excerpts)
NRC-029	Back, Lancaster, Striz, Goodman	Contention D	Dugan, J.T., McGrath, T. and R.B. Zelt,. "Water-Level Changes in the High Plains Aquifer – Predevelopment to 1992," U.S.G.S. Water Resources Investigations Report 1994-4027 (1994) (excerpts)
NRC-030	Back, Lancaster, Striz, Goodman	Contention D	Gjelsteen, T.W. and S.P. Collings, Relationship Between Groundwater Flow and Uranium Mineralization in the Chadron Formation, Northwest Nebraska (1988) (excerpts)

NRC Exhibit #	Witness	Related Contention	Description
NRC-031	Back, Lancaster, Striz, Goodman	Contention D	NRC, Policy Statement on the Treatment of Environmental Justice Matters in NRC Regulatory and Licensing Actions, 69 Fed. Reg. 52,040 (Aug. 24, 2004)
NRC-032	Back, Lancaster, Striz, Goodman	Contention D	Final Environmental Assessment for the Proposed Renewal of U.S. Nuclear Regulatory Commission License No. SNM–124 for Nuclear Fuel Services, Inc., Docket No. 70-143, October 2011 (excerpts)
NRC-033	Back, Lancaster, Striz	Contention F	Printed webpage -- USGS description of the White River Group in Nebraska, obtained from http://mrdata.usgs.gov/geology/state/sgmc-unit.php?unit=NETw;0 on 4/24/2015
NRC-034	Back, Lancaster, Striz	Contention F	Printed webpage -- USGS-AAGS National Geologic Map Database – Geolex summary for White River Group, obtained from http://ngmdb.usgs.gov/Geolex/Units/WhiteRiver_11141.html on 4/22/2015)
NRC-035	Back, Lancaster, Striz	Contention F	USGS-AAGS National Geologic Map Database – Geolex summary for Chadron Formation, obtained from http://ngmdb.usgs.gov/Geolex/Units/Chadron_7037.html on 4/22/2015)
NRC-036	Back, Lancaster, Striz	Contention F	Crow Butte Resources, Inc., Application for Nebraska Department of Environmental Quality (NDEQ) Class II Underground Injection Control (UIC) Permit (revised Jan. 6, 2010) (excerpt – page E-32)
NRC-037	Back, Lancaster, Striz	Contention F	Ferret Exploration Company of Nebraska, 1987 Environmental Report (excerpt)
NRC-038	Goodman, Nickens	Contention 1	List of Consultation Communications Between the NRC Staff and the Oglala Sioux Tribe
NRC-039	Goodman, Nickens	Contention 1	Letter from Larry Camper, NRC Division Director, to Theresa Two Bulls, OST President (Jan. 13, 2011)
NRC-040	Goodman, Nickens	Contention 1	Letter from Kevin Hsueh, NRC Branch Chief, to L. Robert Puschendorf, Nebraska SHPO (June 20, 2013)

NRC Exhibit #	Witness	Related Contention	Description
NRC-041	Goodman, Nickens	Contention 1	Letter from L. Robert Puschendorf, Nebraska Deputy SHPO, to Kevin Hsueh, NRC Branch Chief (July 15, 2013)
NRC-042	Goodman, Nickens	Contention 1	Attendance Sheet for the February 12, 2012 Tribal Consultation Meeting for the Proposed Dewey Burdock, Crow Butte North Trend, and Crow Butte License Renewal Projects (redacted)
NRC-043	Goodman, Nickens	Contention 1	Letter from Larry Camper, NRC Division Director, to Bryan Brewer, OST President (Mar. 12, 2013)
NRC-044	Goodman, Nickens	Contention 1	Letter from Bryan Brewer, OST President, to Larry Camper, NRC Division Director (Mar. 29, 2013)
NRC-045	Goodman, Nickens	Contentions 1, 6, 12	NUREG-1910, “Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities” (excerpt)
NRC-046	Goodman, Nickens	Contention 1	NUREG-2173, “Tribal Protocol Manual” (September 2012)
NRC-047	Goodman, Nickens	Contention 1	NUREG-2173, “Tribal Protocol Manual” (December 2014)
NRC-048	Goodman, Nickens	Contention 1	CEQ and ACHP, “NEPA and NHPA: A Handbook for Integrating NEPA and Section 106” (March 2013)
NRC-049	Goodman, Nickens	Contention 1	Nebraska State Historic Preservation Office, “National Historic Preservation Act, Archeological Properties, Section 106 Guidelines” (May 22, 2006)
NRC-050	Goodman, Nickens	Contention 1	SC&A Trip Report for June 2011 Site Visit (June 20, 2011)
NRC-051A	Goodman, Nickens	Contention 1	SC&A Trip Report for October 2012 Site Visit (Nov 6, 2012) (Part 1 of 3)
NRC-051B	Goodman, Nickens	Contention 1	SC&A Trip Report for October 2012 Site Visit (Nov 6, 2012) (Part 2 of 3)
NRC-051C	Goodman, Nickens	Contention 1	SC&A Trip Report for October 2012 Site Visit (Nov 6, 2012) (Part 3 of 3)
NRC-052	Goodman, Nickens	Contention 1	Santee Sioux Nation Tribal Historic Preservation Office TCP Report for Crow Butte Project, Dawes County, Nebraska (Redacted)

NRC Exhibit #	Witness	Related Contention	Description
NRC-053	Goodman, Nickens	Contention 1	National Oceanic & Atmospheric Administration, Record of Climatological Observations for Fort Robinson and Chadron Stations (November-December 2012)
NRC-054A	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 1 of 15)
NRC-054B	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 2 of 15)
NRC-054C	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 3 of 15)
NRC-054D	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 4 of 15)
NRC-054E	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 5 of 15)
NRC-054F	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 6 of 15)
NRC-054G	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 7 of 15)
NRC-054H	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 8 of 15)
NRC-054I	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 9 of 15)
NRC-054J	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 10 of 15)
NRC-054K	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 11 of 15)
NRC-054L	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 12 of 15)

NRC Exhibit #	Witness	Related Contention	Description
NRC-054M	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 13 of 15)
NRC-054N	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 14 of 15)
NRC-054O	Goodman, Nickens	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 15 of 15)
NRC-055	Goodman, Nickens	Contention 1	Marsland Cultural Resources Inventory (March 5, 2012)
NRC-056A	Goodman, Nickens	Contention 1	SC&A, Field Documentation of Potential Places of Tribal Religious or Cultural Significance (Dec. 2013) (Redacted) (Part 1 of 5)
NRC-056B	Goodman, Nickens	Contention 1	SC&A, Field Documentation of Potential Places of Tribal Religious or Cultural Significance (Dec. 2013) (Redacted) (Part 2 of 5)
NRC-056C	Goodman, Nickens	Contention 1	SC&A, Field Documentation of Potential Places of Tribal Religious or Cultural Significance (Dec. 2013) (Redacted) (Part 3 of 5)
NRC-056D	Goodman, Nickens	Contention 1	SC&A, Field Documentation of Potential Places of Tribal Religious or Cultural Significance (Dec. 2013) (Redacted) (Part 4 of 5)
NRC-056E	Goodman, Nickens	Contention 1	SC&A, Field Documentation of Potential Places of Tribal Religious or Cultural Significance (Dec. 2013) (Redacted) (Part 5 of 5)
NRC-057	Goodman, Nickens	Contention 1	SRI Foundation, “Overview of Places of Traditional Religious and Cultural Significance: Cameco/Powertech Project Areas” (June 8, 2012)
NRC-058	Back, Lancaster, Striz	Contention 6	Potentiometric Map Excerpts from 2009 RAI Response
NRC-059	Back, Lancaster, Striz	Contention 6	Excerpts from May 2009 RAI Response
NRC-060	Back, Lancaster, Striz	Contention 9	Memorandum from Nancy Sutley, CEQ Chair, to Heads of Federal Departments and Agencies, “Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact” (Jan. 14, 2011)
NRC-061	Back, Lancaster, Striz	Contention 9	NRC Regulatory Issue Summary 2009-05 (April 29, 2009)

NRC Exhibit #	Witness	Related Contention	Description
NRC-062	Goodman	Contention 12	1993 Land Application Proposal (June 1993) (excerpt)
NRC-063	Goodman	Contention 12	NDEQ, Title 118 – Ground Water Quality Standards and Use Classification (Rev. 2006)
NRC-064	Goodman	Contention 12	EPA, National Primary Drinking Water Regulations
NRC-065	Goodman	Contention 12	Printed webpage – EPA, Basic Information About Selenium in Drinking Water, obtained from http://water.epa.gov/drink/contaminants/basicinformation/selenium.cfm on 5/5/2015
NRC-066	Cao, Back, Lancaster, Striz, Goodman	Contention 14	Table of Historic Earthquakes within 100 miles of CBR Facility and Histogram of Magnitudes
NRC-067	Cao, Back, Lancaster, Striz, Goodman	Contention 14	Printed webpage -- USGS Earthquake Hazards Program, "Magnitude/Intensity Comparison", obtained from http://earthquake.usgs.gov/learn/topics/mag_vs_int.php on 4/20/2015
NRC-068	Cao, Back, Lancaster, Striz, Goodman	Contention 14	NUREG-2115, "Central-Eastern United States Seismic Source Characterization for Nuclear Facilities," Vol. 4, Appendices A and B (excerpts)
NRC-069	Cao, Back, Lancaster, Striz, Goodman	Contention 14	Printed webpages containing data and map from search of USGS Advanced National Seismic System online catalog, obtained from (http://earthquake.usgs.gov/earthquakes/search/) on 4/24/2015
NRC-070	Cao, Back, Lancaster, Striz, Goodman	Contention 14	U.S. Seismic Zone Map – based on 1997 Uniform Building Code (UBC) map
NRC-071	Cao, Back, Lancaster, Striz, Goodman	Contention 14	Petersen, M. D., T. E. Dawson, et al., "Fault displacement hazards for strike-slip faults," Bull.Seism. Soc. Am 101, No. 2 (April 2011), pp. 805-825 (excerpt)
NRC-072	Cao, Back, Lancaster, Striz, Goodman	Contention 14	Wells, D. L., and K. J. Coppersmith, "New empirical relationships among magnitude, rupture length, rupture width, rupture area, and surface displacement," Bull. Seism. Soc. Am. 84, No. 4. (August 1994), pp. 974-1002 (excerpt)

NRC Exhibit #	Witness	Related Contention	Description
NRC-073	Cao, Back, Lancaster, Striz, Goodman	Contention 14	USGS, "Ten percent probability of exceedances in 50 years map of peak ground acceleration"
NRC-074	Cao, Back, Lancaster, Striz, Goodman	Contention 14	Wald, D.J., V. Quitoriano, et al, "Relationships between peak ground acceleration, peak ground velocity, and modified Mercalli intensity in California," Earthquake Spectra 15, No. 3 (August 1999), pp. 557-564 (excerpt)
NRC-075	Cao, Back, Lancaster, Striz, Goodman	Contention 14	Hill, D.P., and S.G. Prejean, "Dynamic Triggering" (Sept. 5, 2006) (excerpt)
NRC-076-R2	All Witnesses	All Contentions	Revised Testimony of David Back, Tianqing Cao, Mark Fuhrmann, Nathan Goodman, Thomas Lancaster, Paul Nickens and Elise Striz (July 29, 2015)
NRC-077	Fuhrmann	All Contentions	Statement of Professional Qualifications of Mark Fuhrmann (June 8, 2015)
NRC-078	Back, Lancaster, Striz	Contention C	Johnson, C.D. and A.H. Dunstan, "Lithology and Fracture Characterization From Drilling Investigations in the Mirror Lake Area, Grafton County, New Hampshire," USGS Water Resources Investigations Report 98-4183 (1998) (excerpt)
NRC-079	Back, Lancaster, Striz	Contention C, 9	Regulatory Guide 4.14, "Radiological Effluent and Environmental Monitoring at Uranium Mills," Revision 1 (1980)
NRC-080	Back, Fuhrmann, Goodman, Lancaster, Striz	Contention D, 6	List of ASTM Aquifer Test Standards
NRC-081	Back, Fuhrmann, Goodman, Lancaster, Striz	Contention D	Ferris, J.G., Knowles, D.B., Brown, R.H. and R.W. Stallman, "Theory of Aquifer Tests," Geological Survey Water Supply Paper 1536-E (1962) (excerpt)

NRC Exhibit #	Witness	Related Contention	Description
NRC-082	Back, Fuhrmann, Goodman, Lancaster, Striz	Contention D	Rhodes, M.C., Keil, K.G., Frederick, W.T, Leithner, J.S, Peterson, J.M and M.M. MacDonell, "Utilizing Isotopic Uranium Ratios in Ground-water Evaluations at NFSS," presented at 2007 NGWA Naturally Occurring Contaminants Conference: Arsenic, Radon, Radium and Uranium, Charleston, SC (March 2007)
NRC-083	Goodman, Nickens	Contention 1	Parker, P.L. and T.F. King, "Guidelines for Evaluating and Documenting Traditional Cultural Properties," U.S. Department of the Interior, National Park Service, National Register Bulletin 38 (1998)
NRC-084	Goodman, Nickens	Contention 1	Printed webpage – National Park Service guidelines for state historic preservation plans, obtained from http://www.nps.gov/preservation-planning/stateplanning.html on 5/31/2015
NRC-085	Goodman, Nickens	Contention 1	Nebraska State Historical Society, "Building on the Historic and Cultural Foundations of Nebraska," The State Historic Preservation Plan for Nebraska – 2012-2016.
NRC-086	Back, Lancaster, Striz	Contention 6, 9	Letter from Larry Teahon, Cameco, to Ron Burrows, NRC, regarding restoration of Mine Units 2 and 3, with enclosures (letters from Cameco to NDEQ dated May 9, 2013, and Aqui-Ver report, "Pore Volume Restoration Analysis") (August 8, 2013)
NRC-087	Back, Lancaster, Striz	Contention 6	Actual vs. Projected Drawdown Map prepared by NRC Staff
NRC-088	Back, Fuhrmann, Lancaster, Striz	Contention 9	Letter from Daniel Gillen, NRC, to Michael Griffin, Cameco, regarding acceptance of Wellfield Unit 1 restoration, with enclosures (Technical Evaluation Report and amended license) (February 12, 2003).
NRC-089	Back, Fuhrmann, Lancaster, Striz	Contention 9	Technical Evaluation Report, Christensen Ranch Mine Units 2 Through 6 Restoration Report, Uranium One USA, Inc., Willow Creek Facility (October 23, 2012)
NRC-090	Back, Fuhrmann Lancaster, Striz	Contention 9	Striz, E.A., "ISR Wellfield Background and Restoration Ground Water Quality Data: Collection, Statistical Analysis and Public Access," presented at National Mining Association 2013 Uranium Recovery Workshop (May 2013).

NRC Exhibit #	Witness	Related Contention	Description
NRC-091	Back, Fuhrmann, Goodman, Lancaster, Striz	Contention D	American Geological Institute, "Dictionary of Geological Terms," 3rd Edition (R.L. Bates and J.A. Jackson, eds.), 1984 (excerpt)
NRC-092	Goodman	Contention 12	Errata to the Final Environmental Assessment (July 23, 2015)
NRC-093	Striz, Back, Lancaster	Contentions C, D	NRC Staff Response to Intervenors' Request for Modeling Information (Sept. 8, 2015)
NRC-094	Striz, Back, Lancaster	Contentions C, D	NUREG/CR-6940/PNNL-16396, "Combined Estimation of Hydrogeologic Conceptual Model, Parameter and Scenario Uncertainty with Application to Uranium Transport at the Hanford Site 300 Area" (July 2007)