

**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

<b>NRC Exhibit #</b>	<b>Witness</b>	<b>Related Contention</b>	<b>Description</b>
NRC-001	All Witnesses	All Contentions	Testimony of David Back, Tianqing Cao, Nathan Goodman, Thomas Lancaster, Paul Nickens, Mirabelle Shoemaker and Elise Striz (May 8, 2015)
NRC-001A	Back	All Contentions	Affidavit of David Back
NRC-001B	Cao	All Contentions	Affidavit of Tianqing Cao
NRC-001C	Goodman	All Contentions	Affidavit of Nathan Goodman
NRC-001D	Lancaster	All Contentions	Affidavit of Thomas Lancaster
NRC-001E	Nickens	All Contentions	Affidavit of Paul Nickens
NRC-001F	Shoemaker	All Contentions	Affidavit of Mirabelle Shoemaker
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	Shoemaker	All Contentions	Statement of Professional Qualifications of Mirabelle Shoemaker (May 8, 2015)

NRC Exhibit #	Witness	Related Contention	Description
NRC-008	Striz	All Contentions	Statement of Professional Qualifications of Elise Striz (May 8, 2015)
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	Heaken, 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 <a href="http://mrdata.usgs.gov/geology/state/sgmc-unit.php?unit=NETw:0">http://mrdata.usgs.gov/geology/state/sgmc-unit.php?unit=NETw:0</a> 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 <a href="http://ngmdb.usgs.gov/Geolex/Units/WhiteRiver_11141.html">http://ngmdb.usgs.gov/Geolex/Units/WhiteRiver_11141.html</a> on 4/22/2015)
NRC-035	Back, Lancaster, Striz	Contention F	USGS-AAGS National Geologic Map Database – Geolex summary for Chadron Formation, obtained from <a href="http://ngmdb.usgs.gov/Geolex/Units/Chadron_7037.html">http://ngmdb.usgs.gov/Geolex/Units/Chadron_7037.html</a> 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, Shoemaker	Contention 1	List of Consultation Communications Between the NRC Staff and the Oglala Sioux Tribe
NRC-039	Goodman, Nickens, Shoemaker	Contention 1	Letter from Larry Camper, NRC Division Director, to Theresa Two Bulls, OST President (Jan. 13, 2011)
NRC-040	Goodman, Nickens, Shoemaker	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, Shoemaker	Contention 1	Letter from L. Robert Puschendorf, Nebraska Deputy SHPO, to Kevin Hsueh, NRC Branch Chief (July 15, 2013)
NRC-042	Goodman, Nickens, Shoemaker	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, Shoemaker	Contention 1	Letter from Larry Camper, NRC Division Director, to Bryan Brewer, OST President (Mar. 12, 2013)
NRC-044	Goodman, Nickens, Shoemaker	Contention 1	Letter from Bryan Brewer, OST President, to Larry Camper, NRC Division Director (Mar. 29, 2013)
NRC-045	Goodman, Nickens, Shoemaker	Contentions 1, 6, 12	NUREG-1910, "Generic Environmental Impact Statement for In-Situ Leach Uranium Milling Facilities" (excerpt)
NRC-046	Goodman, Nickens, Shoemaker	Contention 1	NUREG-2173, "Tribal Protocol Manual" (September 2012)
NRC-047	Goodman, Nickens, Shoemaker	Contention 1	NUREG-2173, "Tribal Protocol Manual" (December 2014)
NRC-048	Goodman, Nickens, Shoemaker	Contention 1	CEQ and ACHP, "NEPA and NHPA: A Handbook for Integrating NEPA and Section 106" (March 2013)
NRC-049	Goodman, Nickens, Shoemaker	Contention 1	Nebraska State Historic Preservation Office, "National Historic Preservation Act, Archeological Properties, Section 106 Guidelines" (May 22, 2006)
NRC-050	Goodman, Nickens, Shoemaker	Contention 1	SC&A Trip Report for June 2011 Site Visit (June 20, 2011)
NRC-051A	Goodman, Nickens, Shoemaker	Contention 1	SC&A Trip Report for October 2012 Site Visit (Nov 6, 2012) (Part 1 of 3)
NRC-051B	Goodman, Nickens, Shoemaker	Contention 1	SC&A Trip Report for October 2012 Site Visit (Nov 6, 2012) (Part 2 of 3)

NRC Exhibit #	Witness	Related Contention	Description
NRC-051C	Goodman, Nickens, Shoemaker	Contention 1	SC&A Trip Report for October 2012 Site Visit (Nov 6, 2012) (Part 3 of 3)
NRC-052	Goodman, Nickens, Shoemaker	Contention 1	Santee Sioux Nation Tribal Historic Preservation Office TCP Report for Crow Butte Project, Dawes County, Nebraska (Redacted)
NRC-053	Goodman, Nickens, Shoemaker	Contention 1	National Oceanic & Atmospheric Administration, Record of Climatological Observations for Fort Robinson and Chadron Stations (November-December 2012)
NRC-054A	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 1 of 15)
NRC-054B	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 2 of 15)
NRC-054C	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 3 of 15)
NRC-054D	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 4 of 15)
NRC-054E	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 5 of 15)
NRC-054F	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 6 of 15)
NRC-054G	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 7 of 15)
NRC-054H	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 8 of 15)
NRC-054I	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 9 of 15)
NRC-054J	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 10 of 15)

NRC Exhibit #	Witness	Related Contention	Description
NRC-054K	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 11 of 15)
NRC-054L	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 12 of 15)
NRC-054M	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 13 of 15)
NRC-054N	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 14 of 15)
NRC-054O	Goodman, Nickens, Shoemaker	Contention 1	Marsland Class III Cultural Resource Investigation (April 28, 2011) (Part 15 of 15)
NRC-055	Goodman, Nickens, Shoemaker	Contention 1	Marsland Cultural Resources Inventory (March 5, 2012)
NRC-056A	Goodman, Nickens, Shoemaker	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, Shoemaker	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, Shoemaker	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, Shoemaker	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, Shoemaker	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, Shoemaker	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

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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-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 <a href="http://water.epa.gov/drink/contaminants/basicinformation/selenium.cfm">http://water.epa.gov/drink/contaminants/basicinformation/selenium.cfm</a> 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 <a href="http://earthquake.usgs.gov/learn/topics/mag_vs_int.php">http://earthquake.usgs.gov/learn/topics/mag_vs_int.php</a> 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 ( <a href="http://earthquake.usgs.gov/earthquakes/search/">http://earthquake.usgs.gov/earthquakes/search/</a> ) 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



<b>NRC Exhibit #</b>	<b>Witness</b>	<b>Related Contention</b>	<b>Description</b>
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-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)