



UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
ATOMIC SAFETY AND LICENSING BOARD

In the Matter of

CROW BUTTE RESOURCES, INC.

(Marsland Expansion Area)

Docket No. 40-8943-MLA-2

ASLBP No. 13-926-01-MLA-BD01

Hearing Exhibit

Exhibit Number:

Exhibit Title:

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:)	
)	Docket No. 40-8943
CROW BUTTE RESOURCES, INC.)	
)	ASLBP No. 08-867-02-OLA-BD01
(License Renewal))	

AFFIDAVIT OF ROBERT LEWIS

I, Robert Lewis, do hereby state as follows:

1. I am the Owner and Principal Hydrogeologist of AquiferTek LLC. In this position, I provide specialized hydrogeologic and environmental consulting services. A statement of my professional qualifications is attached.
2. I am responsible for the paragraphs in the direct testimony on Contention 2 that are marked with my initials.
3. I attest to the accuracy of those statements, support them as my own, and endorse their introduction into the record of this proceeding.
4. I hereby certify under penalty of perjury that the forgoing is true and complete to the best of my knowledge, information, and belief.

Executed in accord with 10 C.F.R. § 2.304(d),

signed electronically by Robert Lewis
Robert Lewis
123 N. College Ave. #200
Fort Collins, CO 80524
blewis@aquifertek.com

Dated at Fort Collins, Colorado
this 16th day of August 2018

Robert Lewis, PG: Principal Hydrogeologist

Mr. Lewis is owner and Principal Hydrogeologist of AquiferTek LLC, providing specialized hydrogeologic and environmental consulting services to mining companies, oil and gas companies, attorneys, water purveyors, municipalities, consultants, and others. Mr. Lewis has over 27 years of experience as a groundwater scientist and environmental consultant, and is a registered Professional Geologist in Wyoming. Mr. Lewis has been involved in more than 300 consulting projects and environmental investigations worldwide. He has broad experience, with expertise in the areas of groundwater flow and transport modeling, mine hydrology, soil and groundwater contamination investigation and remediation, fate and transport of organic, inorganic, and radiological constituents, and water resource development. Robert has provided expert witness testimony and litigation support on numerous occasions. He has significant project management experience, and has served as manager in charge of technical and professional development. Mr. Lewis has authored technical papers, peer-reviewed journal articles, and book chapters concerning mine hydrology and water quality, groundwater modeling, and water resource evaluation. He has served as Associate Editor of *Ground Water* journal, and has been a member of ASTM subcommittees D.18.04 (Determination of Hydrogeological Parameters) and D18.21.10 (Ground Water Modeling).

EDUCATION & CERTIFICATIONS

- * Certified Professional Geologist, Wyoming, 1991 (#522)
- * M.S., Geology (Hydrogeology), Colorado School of Mines, 1988
- * B.S., Geology, University of Colorado, Boulder, 1985
- * OSHA 40-Hour and 8-Refresher Hazwoper Training Certifications
- * ExxonMobil Loss Prevention Training

ACADEMIC AND PROFESSIONAL HONORS

- * Associate Editor, *Ground Water Journal* (AGWSE/NGWA), 1998-2001
- * Association of Ground Water Scientists and Engineers Distinguished Service Award
- * ASTM Committee D18 (Hydrologic Modeling/Parameter Estimation), 1997-1998

PROFESSIONAL WORK HISTORY

- * 1/2014 to Present, AquiferTek LLC, Golden, Colorado: Owner and Principal Hydrogeologist

- * 10/2010 – 1/2014, Aqui-Ver, Inc., Golden, Colorado: Principal Hydrogeologist
- * 2001 - 2010 - WorleyParsons/Komex, Principal Hydrogeologist, Golden, Colorado
- * 1998 - 2001 - Independent Consultant - Westminster, Colorado
- * 1995 - 1998 - Associate Hydrogeologist - Denver, Colorado
- * 1991 - 1994 - Senior Hydrogeologist - Lakewood, Colorado
- * 1990 - 1991 - Project Hydrogeologist - Denver, Colorado
- * 1988 - 1990 - Project Hydrogeologist - Irvine, California
- * 1985 - Geologist - Boulder, Colorado

REPRESENTATIVE PROJECT EXPERIENCE

- * Provided consulting support on more than 100 projects involving aquifer restoration, hydrologic impact analyses, mine permitting, and stability monitoring at in-situ uranium mines in Wyoming and Nebraska over the last 17 years.
- * Served as project manager and primary technical investigator in support of mine restoration plan development at an in-situ uranium mine in northwest Nebraska. Work included groundwater flow and transport modeling of 11 separate mine units and optimization of ISR wellfield restoration plans.
- * Served as project manager for aquifer test plan preparation, test performance, and technical report preparation at planned uranium ISR mine near Marsland, Nebraska.
- * Served as project manager and primary technical investigator in the development of an industrial water supply for petroleum development company located in eastern Utah. Work included installation of a 2,600-foot test well and large-diameter water supply well, aquifer testing, and long-term water supply planning including the development and application of a regional groundwater flow model.
- * Served as project manager and primary technical investigator supporting the development of Aquifer Exemption Boundaries (AEBs) for 27 existing and planned mine units at an operating uranium ISR facility in Carbon County, Wyoming. Work included the development and application of a groundwater flow and transport model to simulate the movement and recovery of a hypothetical release (excursion) from an operating commercial ISR wellfield.
- * Served as project manager and primary technical investigator in the performance of a Cumulative Hydrologic Impact Assessment at a uranium ISR mine in Carbon County, Wyoming. Work involved development and application of a regional-scale groundwater flow model to predict the aquifer drawdown impacts due to ISR uranium mining and other industrial developments within a 10-mile radius of the ISR facility.
- * Served as project manager and primary technical investigator in the performance of a Cumulative Hydrologic Impact Assessment at a satellite uranium ISR facility in Campbell County, Wyoming. Work involved development and application of a regional-scale

groundwater flow model to predict the aquifer drawdown impacts due to ISR uranium mining and other industrial developments within a 10-mile radius of the ISR facility.

- * Served as project manager and primary technical investigator in the performance of a Cumulative Hydrologic Impact Assessment at a satellite uranium ISR facility in the Gas Hills, Wyoming. Work involved development and application of a regional-scale groundwater flow model to predict the aquifer drawdown impacts due to ISR uranium mining within a 10-mile radius of the ISR facility.
- * Provided litigation support on behalf of various public utilities and law firms. Work included groundwater flow and transport modeling to support insurance recovery for environmental damages at more than 55 former Manufactured Gas Plant (MGP) sites in Georgia, Wisconsin, Indiana, Illinois, Iowa, Delaware, and Michigan.
- * Provided expert witness testimony and prepared an expert report concerning the probability of structural leakage at five former Manufactured Gas Plant (MGP) sites in Michigan.
- * Provided expert witness testimony and prepared an expert report concerning the probability of structural leakage at six former Manufactured Gas Plant (MGP) sites in Indiana.
- * Provided oversight of ground water sampling and monitoring program at a rare earth element mine in California and Nevada. Work included quarterly groundwater sampling, data analysis, and report preparation.
- * Served as project manager and primary investigator of hydrogeologic study to predict the impacts of open-pit mine dewatering and filling on the local and regional aquifer system at a mine site in Carbon County, Wyoming. Work involved development and application of a three-dimensional groundwater flow and transport model to predict the impacts of pit dewatering and filling.
- * Served as project manager and primary technical investigator providing restoration plan development support for an in-situ uranium mine in the Powder River Basin, Wyoming. Work included groundwater flow and transport modeling of 10 separate mine units and optimization of ISR wellfield restoration plans.
- * Served as project manager for confidential study to develop in-situ groundwater bioremediation methods for dissolved uranium and heavy metals.
- * Provided oversight of deep bedrock well installation and conducted aquifer testing of a fractured rock aquifer at the former BHP Billiton (Rio Algom) Lisbon uranium mill site in La Sal, Utah.
- * Served as project manager in support of bond surety support and updates for Power Resources, Inc. Highland Uranium Project (HUP).
- * Served as project manager and principal investigator in the preparation of an Alternate Concentration Limits (ACL) permit application for the Rio Algom Mining Corporation (RAMC) uranium mill tailings facility in La Sal, Utah.
- * Served as project manager and principal investigator in the preparation of an Alternate

Concentration Limits (ACL) permit application for former uranium mine and mill tailings site in the Shirley Basin, Wyoming.

- * Served as primary technical investigator in the preparation of an aquifer restoration cost estimate report for the former Petrotomics uranium mill tailings facility in the Shirley Basin, Wyoming.
- * Served as primary investigator and project coordinator in the preparation of a groundwater modeling and ACL feasibility report for the Rio Algom Mining Corporation (RAMC) Lisbon uranium mill in La Sal, Utah.
- * Served as primary technical investigator in the evaluation of the groundwater Corrective Action Program (CAP) at the RAMC Lisbon uranium mine and tailings facility.
- * Served as project coordinator and technical investigator for a background water quality assessment at the Rio Algom Mining Corporation (RAMC) Lisbon uranium mill facility in La Sal, Utah.
- * Prepared an expert opinion report concerning the source of elevated sulfates in shallow groundwater at the Crow Butte Resources (CBR) in-situ leach (ISL) uranium mine in Crawford, Nebraska.
- * Conducted technical review and provided recommendations to improve the groundwater Corrective Action Program at a former uranium mine and mill tailings site in the Gas Hills, Wyoming.
- * Provided technical oversight and conducted peer-review of transport modeling conducted in support of an ACL application at a former uranium mill tailings site in the Sweetwater River Basin, Wyoming.
- * Managed and performed CERCLA Site Investigations (SIs), Preliminary Assessments (PAs), and Feasibility Studies (FSs) at U.S. DoE and DoD facilities containing high-level and low-level nuclear and radioactive wastes and source materials, including projects at the Dugway Proving Ground (Utah) and the Rocky Flats Plant (Colorado).
- * Served as project manager supervising the preparation of a Soil Decommissioning Plan for a former uranium mill tailings site in New Mexico. The facility contained extensive areas of windblown tailings containing radioactive elements and source material. Work included the performance of regional and site-scale radiological surveys, fate and transport assessment, benchmark dose modeling, closure planning, and preparation of a soil remediation plan.
- * Performed computer simulations involving the fate and transport of radiological constituents in soil and groundwater in support of citing and permitting of a proposed nuclear reactor in Illinois.
- * Conducted a third-party review of groundwater quality data at the Minera Yanacocha, SRL gold mine in Cajamarca, Peru – the second largest gold mine in the world.
- * Supervised and conducted hydrogeologic investigations in support of a successful solution mining permit application for a large underground copper mine in the Upper Peninsula of Michigan. Performed numerical and analytical groundwater flow modeling to predict the

rate of mine filling, and the rate of mine discharge. Models were used to assess the effectiveness of various engineering controls to reduce uncontrolled mine discharge.

- * Conducted technical review of groundwater flow and contaminant transport modeling and provided strategic recommendations in support of litigation at an operational gold and copper mine in Arizona.
- * Supervised and performed CERCLA Preliminary Assessments (PA's) and Site Investigations (SI's) at U.S. Army facilities in Colorado, Utah, and Montana.
- * Supervised and conducted groundwater flow and solute transport modeling in support of CERCLA Remedial Investigations/Feasibility Studies (RI/FS) at U.S. DoD facilities in California, Missouri, and Massachusetts. Modeling included detailed conceptual design of remedial well fields for VOC removal and containment. Work included the performance and analysis of aquifer tests at production well locations in support of modeling efforts.
- * Conducted three-dimensional groundwater flow and transport modeling of TCE transport at an U.S. Army Depot in Northern California. Modeling was used to assist in the selection of remedial alternatives and the proper location of potable supply wells.
- * Supervised and performed numerous remedial investigations and remedial actions at landfills, railroad maintenance facilities, and Underground Storage Tank (UST) sites. Field investigations involved monitor well installation, soil and groundwater sampling, geophysical surveys, aquifer testing, and soil gas sampling and analysis.
- * Designed soil vapor extraction and groundwater sparging remediation system at former petroleum UST site. Design included the performance of in-situ air permeability and aquifer tests.
- * Conducted geologic hazard assessment at former U.S. Naval base in northern California. Work included detailed seismic hazard assessment, including mapping of recent faults, computer modeling of strong ground motion, and estimation of liquefaction potential resulting from a hypothetical earthquake with a 50-year return period.

AFFILIATIONS

- * National Ground Water Association
- * Colorado Ground Water Association
- * Geological Society of America (GSA)
- * Society of Mining Engineers (SME)

PUBLICATIONS

Mr. Lewis has prepared hundreds of written project reports, and has authored professional papers, book chapters, and presentations concerning the following:

- * Groundwater and solute transport modeling
- * Mine hydrology
- * Contaminant fate and transport in heterogeneous media
- * General water resources and environmental issues

The following is a list of publications and presentations:

- * Lewis, R. L. (2001). Ground Water Resources of South Park, Colorado, in The Colorado Ground-Water Atlas, Chapter 21, pp. 111-116, Colorado Ground Water Association.
- * Lewis, R.L. (1999). Predicting the Steady-State Water Quality of Pit Lakes, in Mining Engineering, Society for Mining, Metallurgy, and Exploration (SME), October 1999. SME reprint number 98-28.
- * Lewis, R.L., Isobel R. McGowan, Joseph I. Hershman, and Jochen Tilk (1997). Numerical Simulation of Bulkheads to Reduce Uncontrolled Discharge from an Underground Copper Mine, in Mining Engineering, Magazine of the Society for Mining, Metallurgy, and Exploration (SME), April, 1997, pp. 68-72.
- * Schramke, J. A., S. F. Murphy, R. L. Lewis, R. L. Medlock, and M. J. Franko (1997). Natural Attenuation of Ground Water Constituents at a Uranium Mill Tailings Site, Shirley Basin, Wyoming, in Tailings and Mine Waste '97, Balkema Publishing, pp. 499-508.
- * Lewis, R.L., Joseph I. Hershman, and Isobel R. McGowan (1996). Numerical Simulation of Low-Flow Bulkheads to Reduce Uncontrolled Discharge from an Underground Copper Mine, in Proceedings of the Second International Conference on Tailings and Mine Waste, 1996, Fort Collins, Colorado, A. A. Balkema Publishing, pp. 331-340.
- * Lewis, R.L., Michael D. Gard, Donald H. Koch, and Dennis W. Bower (1994). Simulation of TCE Transport in a Complex Alluvial Aquifer System: A Case Study Comparison of Two Popular Solute Transport Models, in Proceedings of the 1994 Groundwater Modeling Conference, Colorado State University Press, pp. 287-296.
- * Lewis, R.L., Donald H. Koch, Isobel R. McGowan, Craig MacPhee, and Dennis W. Bowser (1993). Remedial Well-Field Design Using MODFLOW and RAND3D, DDRW Sharpe Site, Lathrop, California, in Proceedings of the 1993 Federal Environmental Restoration Conference and Exhibition, Hazardous Materials Control Resources Institute, pp. A17-A18.
- * Lewis, R. L. (1988). Late Quaternary Faulting in the Northeastern Tahoe Basin and Northern Carson Range, Nevada, in EOS, Transactions of the American Geophysical Union.
- * Lewis, R.L. (1988). Geology, Neotectonics, and Geologic Hazards of the Mount Rose 7.5-Minute Quadrangle, Northern Tahoe Basin, Nevada, Nevada Bureau of Mines and Geology Open File Report.

- * Lewis, R.L. (1988). Geologic Map of the Mount Rose 7.5-Minute Quadrangle, Northern Tahoe Basin, Nevada, Nevada Bureau of Mines and Geology Open File Map.
- * Lewis, R.L. (1988). Geologic Hazards Map of the Mount Rose 7.5-Minute Quadrangle, Northern Tahoe Basin, Nevada, Nevada Bureau of Mines and Geology Open File Map.