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EDUCATION

COLORADO STATE UNIVERSITY, Fort Collins, Colorado
1997 B.S. Geology
GPA: 3.4 of 4.0

COLORADO STATE UNIVERSITY, Fort Collins, Colorado
1990 M.S. Civil Engineering (Groundwater/Environmental Hydrogeology)
GPA: 3.7 of 4.0

OHIO UNIVERSITY, Athens, Ohio
1980 B.S. Civil Engineering Cum Laude
GPA: 3.2 of 4.0

PROFESSIONAL EXPERIENCE

1999 to present — USDOI NATIONAL PARK SERVICE, Water Resources Division
Fort Collins, Colorado
Hydrologist

Provide technical support and expertise to National Park units nationwide related to water resources issues in support of water rights, especially as related to ground-water hydrology and ground-water/surface-water interactions.

1998 — COLORADO DEPT OF NATURAL RESOURCES, Division of Water Resources
Denver, Colorado
Water Resource Engineer

Conducted hydrologic analysis and evaluation of applications to use ground water pursuant to Colorado Revised Statutes, rules, regulations, and policies of the State Engineer. Analysis consisted of quantifying availability of ground water and evaluating potential for injury to decreed water rights. Provided technical information to the general public, hydrologic consultants, legal firms, and public and private organizations in relation to Colorado Revised Statutes, administrative policies, hydrology, and availability of ground water throughout the state.

1995 to 1999 — INDEPENDENT CONSULTANT
Fort Collins, Colorado
Civil Engineer/Hydrogeologist

Proposed, secured, and conducted a variety of hydrologic and geotechnical projects, including: hydrogeologic investigations; technical oversight of hydrologic investigations and environmental remediation activities; field oversight of geotechnical construction; senior report review; and litigation technical support.

1993 to 1995 — ENSR CONSULTING AND ENGINEERING
Fort Collins, Colorado
Senior Hydrogeologist

Managed and conducted a variety of environmental projects. Provided senior hydrogeologic expertise and guidance to staff geologists, hydrologists, and engineers and to other ENSR project managers. Participated in business development, proposal preparation, and cost estimating.

1991 to 1993 — INDEPENDENT CONSULTANT
Fort Collins, Colorado
Geohydrologic Engineer

Proposed, secured, and conducted a variety of environmental projects, including: hydrogeologic investigations and design of remedial systems for contaminated soil and groundwater, technical oversight of investigations/remedial activities, senior report review, litigation support, senior supervision of field investigative teams, and field construction supervision.

1990 to 1991 — ADRIAN BROWN CONSULTANTS, INC.
Denver, Colorado
Groundwater Engineer

Conducted hydrogeologic investigations and engineered solutions to ground-water problems: 1) for mining companies; and 2) related to spills and/or leakage of solvents and petroleum products into ground-water systems.

1981 to 1989 — U.S. GEOLOGICAL SURVEY, Water Resources Division
Denver, Colorado (1983-89)
Meeker, Colorado (1981-83)
Hydrologist

Conducted hydrologic and hydraulic studies to assess water-supply potential and hydrologic impacts from mining. Directed and conducted a wide range of field investigations. Wrote technical reports summarizing results.

Taught 3-day course entitled, "*Aquifer-Test Design, Operation, and Analysis*" at the USGS National Training Center, once per year (1986-89).

1980 to 1981 WOODWARD-CLYDE CONSULTANTS, INC., Soils Division
Denver, Colorado
Geotechnical Engineer

Supervised field exploration, analyzed data, and wrote reports that made design recommendations for foundation support of proposed construction.

Observed and monitored earthwork construction to assure that design specifications were being implemented.

REPRESENTATIVE PROJECTS

WATER SUPPLY:

- *Federal Government Agency (Colorado) - Hydrogeologic Investigation, Field Program, Aquifer Testing.* Directed regional water-supply assessment of the alluvial aquifer in the White River valley of northwestern Colorado. Activities included: geologic mapping of the extent of surficial deposits, an extensive inventory of existing water-wells, potentiometric-surface mapping, ground-water sampling and analysis, and aquifer testing and analysis.

- *Federal Government Agency (Rocky Mountain Region) - Hydrogeologic Investigation, Borehole Geophysical Analysis.* Participated in regional analysis of the water resources of selected bedrock aquifers in the Upper Colorado River Basin. Conducted quantitative analysis of borehole geophysics data to estimate aquifer hydraulic properties.

- *Federal Government Agency (Colorado) - Hydrogeologic Investigation, Field Program, Drilling, Sampling, Stream-Aquifer Analysis.* Participated in an analysis of the effects of surface-water withdrawals for municipal water supply on subalpine wetland hydrology in the Williams Fork Mountains of central Colorado. Conducted investigation of the nature and extent of ground-water/surface-water hydraulic relationships in wetlands areas.

- *State Government Agency (Colorado) – Hydrogeologic Investigation, Permit Reviews.* Conducted reviews of water-well permit applications for both "exempt" and "non-exempt" conditions in both over-appropriated and not over-appropriated watersheds within the State of Colorado. Assisted in evaluating and processing a large backlog of applications, and bringing the State into compliance with regulations that require that water-well permit applications be processed within 45 days of receipt by the State.

MINING:

- *Surface Gold Mine (South Dakota) - Hydrogeologic Investigation, Field Program, Drilling.* Field supervisor for a multidisciplinary remedial investigation (RI) of trace metals in soil, water, and biota at a CERCLA site downgradient from a surface gold mine in the Black Hills region of South Dakota. Activities included: writing standard

operating procedures and securing approval from EPA for field work to be done; drilling, installation, and sampling of monitoring wells; siting, construction, and operation of stream-gaging and sampling network; and sampling of stream sediment and bedload.

- *Underground Lead/Zinc Mine (New Mexico) - Hydrogeologic Investigation, Field Program, Drilling.* Directed field investigation of surface water, springs, soils, alluvial groundwater, and bedrock groundwater conditions. Devised remedial strategy for containment of lead and zinc contamination from the area of an abandoned underground mine, through a small wetland, and into a major river near Santa Fe, New Mexico.

- *Surface Copper Mine (Utah) - Hydrogeologic Investigation, Contamination Assessment, Groundwater Modeling, Remedial Strategies.* Conducted assessment of contamination and evaluation of operational and remedial strategies for various facilities associated with an open-pit copper mine near Salt Lake City, Utah, including waste-rock piles, heap-leach system, tailings impoundments, and ore processing facilities. Used numerical modeling to optimize design of proposed groundwater remediation system.

- *Surface Lead Mine (Colorado) - Hydrogeologic Investigation, Field Program, Drilling, Sampling.* Directed field investigation of leaching of trace metals from tailings dams into surface streams at a CERCLA site near Leadville, Colorado.

- *Federal Government Agency (Colorado) - Hydrogeologic Investigation, Field Programs, Drilling, Sampling, Aquifer Testing.* Conducted hydrologic studies for potential oil-shale development in the Piceance basin of northwestern Colorado. Activities included: planning, design, operation, and analysis of extensive aquifer testing in an anisotropic, fractured, leaky artesian, multi-aquifer bedrock aquifer system; potentiometric-surface mapping of these bedrock aquifers; drilling, well construction, sampling, and aquifer testing at numerous locations in alluvial aquifers; and stream gaging-station operation and maintenance.

- *Federal Government Agency (Colorado) - Hydrogeologic Investigation, Field Program, Drilling, Sampling, Aquifer Testing.* Planned, supervised, and conducted a multi-year, regional investigation of the hydrogeology of a potential surface coal mining area near Craig, Colorado. Activities included field geologic mapping; an extensive drilling, borehole geophysical logging, and well-construction program in both bedrock and alluvial aquifers; soil, bedrock, groundwater, surface water, and stream sediment sampling; aquifer system identification; potentiometric-surface mapping; implementation of a multi-year monitoring program; and aquifer testing in both bedrock and alluvial aquifers. Bedrock aquifers in one part of the study area displayed flowing artesian conditions. Special well-construction procedures were used to shut in the flowing wells, and flowing-well aquifer tests were conducted.

- *Federal Government Agency (Colorado) - Hydrogeologic Investigation, Field Program, Drilling, Sampling, Aquifer Testing.* Studied the processes controlling ground-water contamination down-gradient from reclaimed open-pit coal mines near Steamboat

Springs, Colorado. Activities included: drilling, borehole geophysical logging, well construction, sampling, and aquifer testing of 18 flowing artesian wells; spring sampling; and implementation of a long-term monitoring program.

OIL AND GAS:

- *Oil Refinery (Kansas) - Hydrogeologic Investigation, Drilling, Sampling.* Planned and conducted a hydrogeologic site characterization for RCRA Closure of surface waste-water impoundments at a refinery in McPherson, Kansas. Field program included drilling angled boreholes beneath the waste-water impoundments.

- *Natural Gas Production Company (New Mexico) - Hydrogeologic Investigation.* Conducted a literature review and hydrogeologic evaluation to determine existing dissolved gas contamination in shallow fractured bedrock and alluvial aquifers prior to deep drilling for natural gas. Information was to be used for protection against alleged impacts due to cross-contamination of aquifers during deep drilling.

- *Oil Refinery (Wyoming) - Hydrogeologic Investigation.* Devised a hydrogeologic investigation to determine the nature and extent of groundwater contamination due to infiltration of chlorinated compounds in waste oils from an unlined surface impoundment in southwestern Wyoming.

- *Natural Gas Processing Plant (Colorado) - Hydrogeologic Investigation, Drilling, Sampling, Remedial Strategy.* Planned and conducted investigation and devised remedial strategy for cleanup of soil and groundwater contamination by organic constituents at a natural gas processing plant and booster site in eastern Colorado.

- *Oil Storage Facility (North Dakota) - Groundwater Control System, Field Program.* Supervised construction of a remedial system, consisting of a French drain, sump, pumping apparatus, and storage system, to contain seepage of oil-field brine into a shallow groundwater system near Minot, North Dakota.

- *Oil-Field Equipment Yard (Wyoming) - Hydrogeologic Investigation, Field Program, Drilling, Sampling.* Planned and conducted soil and groundwater investigation, and assessed potential contamination from an industrial sump used to dispose of oil-field drilling-equipment wash waters.

- *Gasoline Station (Colorado) - Litigation Support.* Provided litigation technical support for a commercial facility in Denver, Colorado, affected by an adjacent gasoline spill and associated groundwater contamination.

- *Commercial Real-Estate Transaction (Colorado) - Senior Technical Review, Remedial Strategy.* Provided technical review of hydrogeologic investigations and proposed remedial system (a vapor extraction system) for cleanup of soil and shallow groundwater from gasoline contamination beneath a shopping center in Colorado Springs, Colorado.

- *Commercial Airline (Colorado) - Hydrogeologic Investigation, Field Program, Sampling, Regulatory Support.* Conducted investigation, cleanup, and regulatory support for a jet-fuel spill at Stapleton International Airport in Denver, Colorado.

MANUFACTURING AND CHEMICAL INDUSTRIES:

- *Manufacturing Facility (New Jersey) - Hydrogeologic Investigation, Fate-and-Transport Analysis.* Conducted a fate-and-transport analysis of chlorinated solvents dissolved in groundwater in both shallow alluvial sediments and in a fractured bedrock aquifer, as part of a human-health risk assessment to establish alternate clean-up levels at a manufacturing facility in Newark, New Jersey.

- *Manufacturing Facility (Oklahoma) - Hydrogeologic Investigation.* Planned and conducted investigation to determine extent of hexavalent chromium in shallow groundwater beneath a RCRA Interim-Status Permitted surface impoundment.

- *Wood-Treating Facility (Colorado) - Hydrogeologic Investigation, Field Program, Drilling, Sampling, Aquifer Testing, Fate-and-Transport Analysis, Regulatory Agency Negotiations, Evaluation of Remedial Strategies.* CERCLA RI/FS for a former wood-treating facility near Salida, Colorado, involving DNAPLs in a shallow terrace aquifer along the Arkansas River. Supervised and conducted investigation of hydrogeologic setting and nature and extent of contamination to soil, groundwater, and springs from creosote and other wood-treating products. Field activities included: drilling and well construction, including drilling through a aquifer impacted by DNAPL's and completing a well in the unimpacted regional aquifer beneath it; an inventory of springs; soil, groundwater, and spring sampling; field water chemistry analysis; and preliminary aquifer testing. Performed fate-and-transport analysis of dissolved and pure-phase creosote (a DNAPL) for input to human-health risk assessment. Devised and developed alternatives for remediation of impacted soil and groundwater.

OTHER:

- *Rail Yard (Montana) - Hydrogeologic Investigation, Senior Technical Review.* Provided technical critique of hydrogeologic investigations conducted, remediation technologies implemented, and additional remedial strategies that were being proposed as part of CERCLA RI/FS activities at a rail yard and locomotive repair facility located in an alluvial valley in Livingston, Montana. Constituents impacting groundwater included diesel fuel (an LNAPL) and various chlorinated compounds (DNAPL's).

PUBLICATIONS

2005 "Devils Hole Revisited: Why are Pupfish Numbers and Water Level Dropping Again?" by John G. Wullschleger and William P. Van Liew; *in* Park Science, Integrating Research and Resource Management, U.S. Department of the Interior, National Park Service, Volume 23, Number 2, Fall 2005, Jeff Selleck, editor, pg. 26-30.

2004 "The Effects of Increased Ground-Water Pumping in the Muddy River Springs Area on Water Levels in Nearby Carbonate-Rock Wells" by William P. Van Liew, Bradley E. Gillies, and Mohamed A. Aldhamari, National Park Service, Water Resources Division Report, Fort Collins, CO, submitted to the Nevada State Engineer, July 12, 2004, 11 pg., plus 27 figures and 2 appendices.

2000 "Protecting the Limited Water Resources of National Parks in the Arid Southwestern United States" by William P. Van Liew; *in* Ground Water: A Transboundary, Strategic, and Geopolitical Resource: The Association of Ground Water Scientists and Engineers, a division of the National Ground Water Association, 2000 Annual Meeting and Conference, Las Vegas, Nevada, 1 pg. (abstract).

1994 "An Evaluation of Soil Screening Level Guidance for the Groundwater Exposure Pathway in Risk Assessments" by Elizabeth D. Caldwell and William P. Van Liew, *in* Proceedings of the 1994 Groundwater Modeling Conference, Fort Collins, Colorado. Sponsored by Colorado State University Department of Civil Engineering and the International Groundwater Modeling Center, Colorado School of Mines.

1993 "Hydrology of the Hart Syncline Area, Northwestern Colorado," by William P. Van Liew and Stanley G. Robson, U.S. Geological Survey Water-Resources Investigations Report 92-4050, Denver, Colorado, 97 pg. plus 1 plate.

1991 "Geophysically Estimated Porosity of Selected Paleozoic Rocks in the Upper Colorado River Basin, Colorado, Utah, Wyoming, and Arizona," by Gregory A. Wetherbee and William P. Van Liew, U.S. Geological Survey Water-Resources Investigations Report 90-4049, Denver, Colorado, 30 pg. plus 3 plates.

1988 "Geophysically Determined Porosity of Paleozoic Rocks in the Upper Colorado River Basin," by Gregory A. Wetherbee and William P. Van Liew, *in* American Water Resources Association Monograph Series No. 14, "Regional Aquifer Systems of the United States - Aquifers of the Western Mountain Area", Bethesda, Maryland, pg. 161-169.

1985 Abstract of "Preliminary Assessment of the Ground-Water Resources of the Alluvial Aquifer, White River Valley, Rio Blanco County, Colorado," by William P. Van Liew and Marc L. Gesink, *in* Colorado Ground-Water Association Fourth Annual Field Trip Guidebook, July 27-28, 1985, "Water and Energy Resources of West Central Colorado", Lakewood, Colorado, pg. 43.

1985 "Preliminary Assessment of the Ground-Water Resources of the Alluvial Aquifer, White River Valley, Rio Blanco County, Colorado," by William P. Van Liew and Marc L. Gesink, U.S. Geological Survey Water-Resources Investigations Report 84-4307, Lakewood, Colorado, 82 pg. plus 5 plates.

SUMMARY OF QUALIFICATIONS

Have formal education in both Geology and Civil Engineering, as well as 25 years professional experience in hydrogeologic investigations and in the solution of problems related to mining hydrology, water supply, and groundwater contaminant transport. Work experience has been with mining companies; a variety of Federal, State, County, and local governmental agencies; the oil-and-gas industry; manufacturing and chemical production facilities; and law firms, including work on several RCRA and CERCLA sites.

Have technical expertise in proposal, design, implementation, and supervision of:

Hydrogeologic Investigations, including conceptual understanding of the 3-dimensional geologic framework and ground-water flow-system processes. Have been the project hydrologist on 21 ground-water investigations in 10 states; in both porous and fractured media; in alluvial, bedrock, and multi-aquifer systems; with stream-aquifer interactions; and in both arid and humid climate regions.

Field Programs, including drilling, well installation, sampling, monitoring, aquifer testing, and construction supervision. Have supervised the drilling and installation of over 150 monitoring wells; and have planned, conducted, and analyzed over 50 aquifer tests, in a wide variety of hydrogeologic settings.

Quantitative Analyses, including aquifer-test analyses, fate-and-transport analyses, and numerical ground-water modeling. Have taught a 3-day short course entitled, *"Aquifer-Test Design, Operation, and Analysis"* for the U.S. Geological Survey for five years. Have conducted numerous fate-and-transport analyses for human-health risk assessments, involving the movement in ground water of dissolved constituents, both organic and inorganic, and of separate, immiscible fluid phases. Have experience with a variety of ground-water flow and transport models, including analytical models and both finite-difference and finite-element numerical models.

Ground-water Engineering and Problem Solving, including evaluation of remedial strategies; schematic design of groundwater barriers, drains, and dewatering systems; and senior technical review, regulatory agency negotiations, and litigation technical support.

MEMBERSHIPS IN PROFESSIONAL SOCIETIES:

Member: National Ground Water Association
Member: Colorado Ground Water Association
Member: Nevada Water Resources Association
Member: American Society of Civil Engineers
Member: Geological Society of America

JOB RELATED TRAINING COURSES:

U.S. Geological Survey short courses:

05/82	Ground-Water Concepts
11/82	Analytical Methods to Determine Aquifer Properties and to Predict Aquifer Response
01/84	Ground Water - Surface Water Relationships
04/84	Technical Report Writing
02/85	Advanced Geophysical Log Analysis and Formation Evaluation
03/85	Modeling of Ground-water Flow Using Finite-Difference Methods
03/86	Ground-water Flow Systems in Secondary Permeability Terranes
01/87	Water Quality Concepts

National Ground Water Association short course:

12/85	Water Well Construction and Design for Professional Engineers

USDA Soil Conservation Service short course:

01/86	West-Wide Snow Survey School (winter survival training)

Colorado State University graduate-level courses:

Fall '94	Environmental Law
Fall '95	Quantitative Hydrogeology

JOB RELATED CERTIFICATES AND LICENSES:

Registered Professional Engineer, Colorado (#24294, Since 05/86)
Certified Geologist-In-Training, Wyoming (#3740, Since 11/98)

JOB RELATED HONORS, AWARDS, AND SPECIAL ACCOMPLISHMENTS:

NPS Star Award, December 2004
NPS Star Award, December 2003
NPS Star Award, October 2001
NPS Time Off Award, July 2001
NPS On-the-Spot Award, December 2000
Graduated with Honors from Ohio University, June 1980
Recipient: Ohio University Dean's Achievement Scholarship, 1979-1980 school year
Selected: Membership in National Engineering Honor Society, 1978-1979 school year