

KAYRENE BROTHERS
529 EAST FAIRWAY ROAD
HENDERSON, NEVADA 89015
(702) 564-4872

EXPERIENCE:

4/02 – present **SOUTHERN NEVADA WATER AUTHORITY**
Deputy General Manager – Engineering and Operations, Las Vegas, NV

Overseeing the four SNWA Engineering and Operations Departments: Groundwater Resources Department, Surface Water Resources Department, Engineering Department and the Southern Nevada Water System. These departments are responsible for managing existing and acquiring future water resources, constructing necessary regional facilities, and treating and transmitting regional water supplies such as Colorado River water from Lake Mead.

8/95 – 4/02 **SOUTHERN NEVADA WATER AUTHORITY**
Director of Resources, Las Vegas, NV

Managing the Resource Department, which includes two technical Divisions: Resource Planning and Environmental Planning. The Resources Department is responsible for the assessment and evaluation of all regional water resources issues, including Colorado River water. The department, which encompasses over 30 professional staff, is active in hydrologic research, managing existing ground-water resources, and evaluating future ground- and surface water resources and the potential environmental impact resulting from development of these resources for the SNWA and District. The department is responsible for evaluating the hydrologic resources and environmental systems of the Colorado, Muddy and Virgin Rivers as well as other environmental, hydrologic, and resource issues for the SNWA as well as the District.

8/94 – 8/95 **CONSULTING HYDROLOGIST**
Las Vegas, NV

Consulting hydrologist specializing in computer modeling of ground- and surface water systems. Also a principal in Basic Concept Hydrologic (BCH) a firm which offers many hydrologic services including basic data collection, geochemical computer modeling, water quality sampling and evaluation of chemical analyses, as well as artificial recharge project management.

6/86 - 8/94 **LAS VEGAS VALLEY WATER DISTRICT**
Sr. Hydrologist, Las Vegas, NV

Supervised hydrologists and GIS technicians working on the development of ground- and surface-water resources in eastern and central Nevada, known as the Cooperative Water Project (CWP). Helped integrate various databases for the CWP including Landsat TM data, land use, digital elevations, and water rights through use of *AutoCAD*, *ERDAS*, and *ARCInfo* software. Developed a regional ground-water flow model using the USGS MODFLOW program, which encompasses 90 hydrographic basins to simulated potential impacts from proposed ground-water withdrawals. Developed computer models for individual ground-water basins and co-authored reports regarding these basins. Helped develop artificial recharge projects where treated Colorado River water is injected into the Las Vegas Valley principal aquifer and stored to meet future water demands.

10/84 - 6/86 **CLARK COUNTY DEPARTMENT OF COMPREHENSIVE PLANNING**
Principal Planner, Las Vegas, NV

Conducted flood control studies for areas of the County, using various computer models including TR-20, HEC-1, HEC-2, and FEMA FANS (for assessment of alluvial fans). Reviewed and prepared comments on DOE documents relating to siting a high level nuclear waste repository. Assessed various projects and their potential impacts on the Clark County 208 Plan and amended as necessary.

1/80 - 10/84 **KERR - McGEE CORPORATION**
Environmental Engineering Coordinator and Quality Control Supervisor

Henderson, NV: Supervised the operation of the on-site analytical laboratory which monitors process operating parameters as well as final quality for products such as ammonium perchlorate (oxidizer for the space shuttle), manganese dioxide, and boron. Established an extensive ground-water monitoring network for evaluating ground-water contamination migration and developed a ground-water mitigation program. Closed hazardous waste landfills and petitioned for delisting/decontaminating hazardous waste storage sites.

Oklahoma City, OK: Assessed impacts of various hazardous waste treatment / storage / disposal (TSD) facilities on ground water and obtained necessary RCRA permits for TSD facilities. Designed wastewater treatment and hazardous waste TSD facilities. Testified in public hearings regarding new environmental regulations.

6/77 - 10/80 **PHILLIPS PETROLEUM COMPANY**
Environmental Engineer

Albuquerque, NM: Reviewed and commented on environmental legislation and regulations relating to the uranium industry. Prepared permit and license applications. Designed and selected pollution control facilities.

Bartlesville, OK: Developed environmental process designs for petroleum refineries and petrochemical plants. Obtained NPDES permits for facilities and reviewed and commented on new environmental regulations impacting petroleum refineries and petrochemical plants.

EDUCATION:

B.S. Environmental Engineering, New Mexico Institute of Mining and Technology
May 1977. Graduated in top 5% of Class - Designated Tech Scholar

REFERENCES:

Terry L. Katzer, Consulting Hydrologist
Cordillerian Hydrologic, Inc.
(702) 853-7409

Patricia Mulroy, General Manager
Southern Nevada Water Authority
(702) 258-3104

David A. Donnelly

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- Katzer, T., and Brothers, K., 1989, **Perils of progress -- hydrogeological hazards in Las Vegas Valley, Clark County, Nevada**: Proceedings of the American Water Resources Association Arizona Section, Volume 19
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- Brothers, K., and Katzer, T., 1990, **Water banking through artificial recharge, Las Vegas Valley, Clark County, Nevada**: Journal of Hydrology, 115 (1990) 77-103, Elsevier Science Publishers B.V., Amsterdam--Printed in the Netherlands
- Brothers, K., Johnson, M, and Morris, T., 1990, **Hydraulics of artificial recharge through existing production wells, Las Vegas Valley, Clark County, Nevada**: Proceedings in the Third Annual Symposium-Arizona Hydrological Society "Survival in the Desert: Water Quality and

Quantity Issues Into the 21st Century", pp. 191-199

Katzer, T., Brothers, K., Johnson, M., Morris, T., and Bernholtz, A., 1991, **Design and evaluation joint-use wells for water supply and artificial recharge in Las Vegas Valley, Clark County, Nevada**: Presented at AWWA Exposition, Philadelphia, PA, June 24-28, 1991

Bernholtz, A., Brothers, K., and Katzer, T., 1991, **Analyses of aquifer responses due to continued artificial recharge of treated Colorado River water, Las Vegas Valley, Clark County, Nevada**: Presented at the AIH Annual Meeting "Hydrology & Hydrogeology in the 90s", November 3-7, 1991, Orlando, Florida

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- Katzer, Terry, and Brothers, Kay, 1992, **Meeting the urban water demands in Nevada, the Las Vegas proposal**: Proceedings of the Rocky Mountain Ground-Water Conference, June 15-17, 1992, Boulder, Colorado.
- Johnson, M.E., Brothers, K., and Katzer, T.L., 1992, **The ultimate water witch: LANDSAT digital imagery of eastern and southern, Nevada**: AWRA 28th Annual Conference Abstract Proceedings, p. 18
- Bernholtz, Alan and Brothers, Kay, 1993, **Changing Colorado River quality and its impact on artificial recharge in Las Vegas Valley, Nevada**: Sixth Biennial Symposium on Artificial Recharge of Groundwater Symposium Proceedings, p. 161-170
- Miller, C.J., Wilson, L.G., Amy, G.L., and Brothers, Kay, 1993, **Fate of organochlorine Compounds During Aquifer Storage and Recovery: The Las Vegas experience**: Journal of Ground Water, Vol. 31, No. 3, May-June 1993, pp. 410-416
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Cooperative Water Project Series

- Brothers, K., Tracy, J., Katzer, T., Stock, M. Bentley, C., Zdon, A., and Kepper, J., 1992, **Hydrology and interactive computer modelling of ground and surface water in the Lower Virgin River Valley, primarily in Clark County, Nevada**: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 1, 90 p.
- Woodward-Clyde Consultants, Dames and Moore, and the Las Vegas Valley Water District, 1992, **Environmental report of the Virgin River water resource development project, Clark County, Nevada**: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 2, 130 p.
- Brothers, K., Buqo, T., and Tracy, J., 1993, **Hydrology and steady state ground-water model of Coal and Garden Valleys, Lincoln and Nye Counties, Nevada**: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 8, 52 p.
- Brothers, K., Buqo, T., and Tracy, J., 1993, **Hydrology and steady state ground-water model of Snake Valley, East-Central Nevada, and West-Central Utah**: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 9, 66 p.

- Brothers, K., Katzer, T., Mojib, R.M., Grinnell, G., Bernholtz, A., and Johnson, M., 1993, **Addendum to hydrology and interactive computer modelling of ground and surface water in the Lower Virgin River Valley, primarily in Clark County, Nevada**: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 1-A, 35 p.
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- Brothers, K., Buqo, T., Bernholtz A., and Tracy, J., 1994, **Hydrology and steady state ground-water model of Spring Valley, Lincoln and White Pine Counties, Nevada**: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 13, 69 p.
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- Brothers, K., Katzer, T., and Johnson, M., 1996, **Hydrology and steady state ground-water model of Dry Lake and Delemar Valleys, Lincoln County, Nevada**: Las Vegas Valley Water District, Cooperative Water Project, Series Report No. 16,48 p.