

Summary

30+ years Geophysical experience.

Education

Ph.D., Geological Engineering and Geohydrology. University of Arizona. Tucson, Arizona.

M.S., Geophysics (Cum Laude). Bernard Price Institute of Geophysics, University of the Witwatersrand, Johannesburg, South Africa.

B.S., Geophysics and Geochemistry (dual major). University of Arizona. Tucson, Arizona.

Experience

1987 – Present. Founder, President, Chief Technical Officer, Chief Scientist.
hydroGEOPHYSICS, Inc. Tucson, Arizona.

Founder, president, and Chief Technology Officer of hydroGEOPHYSICS, Inc., a consulting and contracting services firm for ground water, oil and gas, geothermal, mineral, engineering, and environmental geophysics. Services include: geophysical survey design and guidance, data interpretation and reporting, computer applications, theoretical and laboratory studies, and design and manufacture of geophysical support equipment. Wrote interactive forward modeling software for resistivity, induced polarization, gravity, magnetics, and refraction seismics. Developed the High Resolution Resistivity™ (HRR™) method and the Residual Potential Mapping (RPM) method. Patented quantitative electrical leak detection methodology in use at the Hanford Nuclear Site, Washington. Evaluated prototype resistivity instruments for OYO and Advance Geosciences Inc.

1985 – 1987. Adjunct lecturer and Associate instructor. University of Arizona, Tucson, Arizona.

Taught field geophysics course to undergraduate and graduate students. Taught land surveying to under-graduate and graduate students in field hydrology course. Supervisor in global positioning satellite (GPS) course and field studies. Performed earth-tide studies using gravity monitoring.

1983 – 1985. Consultant. Phoenix Geophysics, Inc. Denver, Colorado.

Senior consultant on industry-funded research program to evaluate the application Spectral Induced Polarization to hydrocarbon exploration. Established test sites, modified data acquisition procedures, created spectral modeling guidelines, supervised field operations, interpreted data, and reported results.

1979 – 1980. Senior Research Geophysicist. Exxon Production and Research Company, Houston, Texas.

Responsible for guidance of minerals geophysics research for Exxon Minerals worldwide. Performed theoretical computer studies of electrical geophysical techniques. Supervised two researchers developing interpretation aids for electrical methods. Modified existing code and wrote new code for electromagnetic modeling. Authored and co-authored three volumes of theoretical curves (see publications). Traveled internationally to foreign affiliates to teach, train, and guide field operations. Fast-tracked for managerial position.

1976 – 1979. Senior Minerals Geophysicist. Esso Minerals Africa, Johannesburg, South Africa.

Responsible for EMA's southern Africa exploration geophysics. Focused on uranium exploration, but also used geophysics for base and precious metal exploration. Wrote geophysical forward modeling software (FORTRAN). Developed and tested an on-board, IBM Series 1 process control computer for digital logging of radiometrics. Computerized Beaufort West field office. Evaluated accuracy of methods for wet chemical and radiometric assays. Performed ore reserve calculations. Developed financial analysis software for mineral deposits for use on TI Silent 700 portable terminal. Published and lectured on radiometric logging methods. Designed unique borehole probes for induced polarization. Served as internal consultant to other Esso foreign affiliates and advisor to EPRCo.

1976. Consultant to United Nations Development Program. Haiti.

Responsible for geophysical field operations for induced polarization, resistivity, and magnetometry in Haiti for mining development. Provided weekly production reports in French. Developed fluency in Creole.

1975. Geophysicist. Zonge Engineering and Research Organization, Tucson, Arizona.

Developed field operation procedures for Complex Resistivity (CR) surveys. Performed CR surveys in the Western United States. Trained crews for CR. Wrote FORTRAN code for Dec PDP-8 mini computers. Performed CR data reduction, decoupling, interpretation, and laboratory measurements. Principal investor.

1974 – 1975. Independent Geophysical Consultant. Tucson, Arizona.

Performed mining exploration surveys with electrical methods, magnetometry, and gravimetry. Reduced data, interpreted and reported results. Performed ground water investigations and geotechnical studies using geophysical methods.

1972 – 1974. Graduate Student. Department of Geosciences, University of Arizona, Tucson, Arizona.

Performed electrochemical measurements (current-voltage, chronopotentiometry, chronoamperometry, cyclic voltammetry) on metallic sulfides in the Chemistry Department under Dr. George Wilson. Wrote processing software in assembly language for HP-1000 mini-

computers. Built hardware interfaces between mini-computers and laboratory experiments. Fabricated electrodes, glassware, and other experimental apparatus.

Chief Geophysicist. Mining Geophysical Surveys, Tucson, Arizona.

Responsible for supervision of multiple geophysical crews performing mineral exploration surveys. Ran crews in the western United States, Mexico, and Central America. Responsible for data interpretation and reporting. Computerized data processing and introduced computer modeling. Introduced innovated analog data acquisition methods.

Geophysicist, Computer Programmer. Geo-Comp Exploration Inc./Computech Ltd.

Performed field geophysical surveys using induced polarization, resistivity, magnetometry, and VLF electromagnetics. Sampled cuttings on rotary drill rig. Geologically mapped alteration patterns around porphyry copper deposits. Wrote computer programs (FORTRAN) for multi-channel airborne geophysical system. Wrote contouring software. Wrote statistical processing code for induced polarization and resistivity data. Wrote paper-tape reading and error-correction software. Concurrent coursework for M.Sc. in Geophysics at the University of Arizona.

Patents

United States Patent 7141982 - Estimation of leakage rates using voltage measurements.

Publications and Conference Proceedings

Fink, J.B., 1976, Electrochemical Experiments on Base Metal Sulfides, 52nd Ann. Mtg. of the Southwest and Rocky Mountain Division of the AAAS, Tucson, Arizona.

Wynn, J.C., Zonge, K.L., Fink, J. B., and Young, G.N., 1974, Electromagnetic Coupling: A comparison of removal techniques and the cultural coupling problem, 44th Ann. Internat. Mtg. and Expos. Soc. Explor. Geophys., Dallas, Texas, abstract, Geophysics, 40, 1.

Zonge, K.L., Fink, J. B., Young, G.N., and Wynn, J.C., 1974, Recent advances in complex resistivity measurements, 44th Ann. Internat. Mtg. and Expos. Soc. Explor. Geophys., Dallas, Texas abstract, Geophysics, 40, 1.

Fink, J. B., 1978, On K Factors and Gamma Log Calculations, Geophysics, 43,7.

Fink, J. B., 1979, Borehole Logging Techniques, Training Course on Radiometric Prospecting Techniques, Lecture 7, South African Atomic Energy Board, Pelindaba, Transvaal.

Fink, J. B., 1979, Interfacial Phenomena Between Liquid Electrolytes and Semiconducting Base Metal Sulfides, M.Sc. Dissertation, Univ. of the Witwatersrand, Johannesburg, South Africa.

Fink, J. B., 1980, Warburg Impedance What It Is and What It Isn't, 50th Ann. Internat. Mtg. and Expos. Soc. Explor. Geophys., Houston, Texas.

Fink, J. B., 1980, Logarithmic Pseudosections for IP and Resistivity, 50th Ann. Internat. Mtg. and Expos. Soc. Explor. Geophys., Houston, Texas.

Fink, J. B., 1981, Electrochemistry of Induced Polarization, Advances in Induced Polarization and Complex Resistivity, University of Arizona, Tucson, Arizona.

Fink, J. B., 1980, Electromagnetic Coupling Curves for the Collinear Dipole Dipole Array, Vol I, Homogeneous Earth, Exxon Production Research Co., Report EPR.16EX.80 (proprietary).

Fink, J. B., Meyer, W.H., and Sedeora, S.S., 1982, Electromagnetic Response Curves for the Collinear Dipole Dipole Array, Vol II, Two Layer Earth, Resistive Basement, Exxon Minerals Co., Report GRS.6EM.82 (proprietary).

Meyer, W.H., Sedeora, S.S., and **Fink, J. B.**, 1983, Electromagnetic Response Curves for the Collinear Dipole Dipole Array, Vol III, Two Layer Earth, Resistive Surface Layer, Exxon Minerals Co., Report GRS.15EM.82 (proprietary).

Fink, J. B., Hoenig, S.A., and Griffith, J., 1986, Electrochemical aspects of WC CO drill bit wear, *Wear*, 108, 97 101.

Fink, J. B., and Pelton, W.H., 1984, Dipole dipole frequency domain EM sounding, 54th Ann. Internat. Mtg. and Expos. Soc. Explor. Geophys., Atlanta, Georgia, Expanded Abstracts, pp. 119 121.

Sternberg, B.K., Thomas, S.J., and **Fink, J. B.**, 1987, Report on Electrical Resistivity and Induced Polarization (IP) Surveys for the Desertron Maricopa and Sierrita Sites, LASI 87 3, Department of Mining and Geological Engineering, University of Arizona.

Fink, J. B., 1988, Spectral impedances for a normal array crossing a planar boundary between two media of complex resistivities, *The Log Analyst*, 29, 2, 132 137.

Fink, J. B., de la Fuente, M., Rodriquez, C., Cash, D., and Gerety, M., 1989, DC Resistivity at the Ahuachapán Geothermal Field, El Salvador; Proceedings Fourteenth Workshop Geothermal Reservoir Engineering, Report SGP TR 122, Stanford Geothermal Program, Jan. 24 26.

Fink, J. B., 1989, Induced Polarization: Electrochemistry, Fractal Geometry, and Geohydrologic Applications, Unpublished Ph.D. dissertation, University of Arizona, Tucson.

Fink, J. B., et al, editors; 1990, Induced Polarization, Applications and Case Histories; Investigations in Geophysics Series, Vol 4, SEG, Tulsa, Oklahoma.

Carpenter, M.C., Carruth, R.L., **Fink, J. B.**, Boling, J.K., and Cluer, B.L., 1992, Hydrogeology of Sand Bars 43.1L and 172.3L and the Implications on Flow Alternatives along the Colorado River in the Grand Canyon, Water Resources Investigation Report 92 4010, U.S.G.S.

Fink, J. B., 1994, A Unified Method of Plotting DC Resistivity and Induced Polarization Data, poster session at the John S. Sumner Memorial Workshop on Induced Polarization, University of Arizona, Oct. 17-19.

Owen-Joyce, S. J., Wilson, R.P., Carpenter, M.C., and **Fink, J. B.**, 2000, Method to Identify Wells the Yield Water that will be Replaced by Water from the Colorado River Downstream from Laguna Dam in Arizona and California, Water Resources Investigation Report 00-4085, U.S.G.S. in cooperation with the Bureau of Reclamation.

Fink, J. B., 2000, The Application of Electrical Geophysical Methods to Hydrologic Problems, Arizona Hydrological Soc. Ann. Symp., oral presentation, September 20-22.

Fink, J. B., 2001, Vadose Zone Injection Monitoring with Electrical Geophysics, Arizona Hydrological Soc. Ann. Symp. oral presentation, September 12-15.

Fink, J. B., Ward, A. L., Gee, G. W., 2001, Vadose Zone Injection Monitoring with Electrical Geophysics Using Steel Casings as Electrodes, abstract EOS Trans. AGU, 82 (47), Fall Meet. Suppl, Abstract H31C-0246.

Fink, J. B., Levitt, M. T., Gee, G. W., 2002, Steel Casing Resistivity Technology (SCRT); An Innovative Electrical Geophysical Method for Leak Detection on Underground Storage Tanks, abstract EOS Trans. AGU, 83 (47), Fall Meet. Suppl., Abstract H61A-0749.

Fink, J. B., McGill, R. L., Levitt, M. T., 2002, Vadose Zone Transport Field Study: 3D Casing Tomography and High Resolution Resistivity, SAGEEP, Las Vegas, Nevada, Feb. 10-14.

Baldyga, C., & Fink, J. B., 2004, RPM - Residual Potential Mapping; A New Approach to Mise-a-la-Masse, SAGEEP, Colorado Spring, Colorado, Feb. 24-26.

McGill, R. L., Fink, J. B., 2004, Geophysical Methods Applied to Landfill Delineation and Characterization, Arizona Hydrological Soc. 2nd Biennial Symp. on Scientific Issues Related to Management of Landfills in Arid and Semi-Arid Regions, oral presentation, March 19-20.

Rucker, D. F., and Fink, J. B., 2007, Inorganic Plume Delineation using Surface High Resolution Electrical Resistivity at the BC Cribs and Trenches Site, Hanford. Vadose Zone Journal 6, 4, 946-958.

Ferré, T.P.A., Binley, A.M., Blasch, K.W., Callegary, J.B., Crawford, S.M., Fink, J.B., Flint, A.L., Flint, L.E., Hoffmann, J.P., Izbicki, J.A., Levitt, M.T., Pool, D.R., and Scanlon, B.R., 2007, Geophysical methods for investigating ground-water recharge, in Stonestrom, D.A., Constantz, J., Ferré, T.P.A., and Leake, S.A., eds., Ground-water recharge in the arid and semi-arid southwestern United States: U.S. Geological Survey Professional Paper 1703, p. 373-410.

Rucker, D.F., M.D. Sweeney, and J.B. Fink, 2005. The application of magnetic gradiometry and electromagnetic induction at a former radioactive waste disposal site. Annals of Nuclear Energy (in review).

Professional Registrations

Geophysical Engineer (Arizona #14742)

Land Surveyor (Arizona #17203)

Professional Engineer (New Mexico #11542)

Professional Geologist (Wyoming #1710)

Professional Geologist (Washington #2489)

Affiliations

American Association of Petroleum Geologists (AAPG)

American Geophysical Union (AGU)

Arizona Geological Society (AZGS)

Arizona Hydrological Society (AHS)

Association of Engineering Geologists (AEG)

Association of State Dam Safety Officials (ASDSO)
Environmental and Engineering Geophysical Society (EEGS)
National Ground Water Association (NGWA)
Society of Exploration Geophysics (SEG)
United States Society on Dams (USSD)

Certifications

MSHA certified
OSHA certified (29CFR 1910.120) Hazardous Materials Awareness
OSHA certified (29CFR 1910.1200) Hazard Communications (Department of Labor)

Military Service

162nd Combat Support Squadron, Arizona Air National Guard, Tucson, Arizona, Mar 1965 - Oct 1970.
Honor Flight - Graduate - USAF Basic Training, 1965, Lackland AFB, San Antonio, Texas.
Tech School - Honor Graduate - USAF 3320th Technical School - Jet Aircraft Mechanic, One and Two Engine Course ABF43131C, 1965, Amarillo Air Force Base, Amarillo, Texas.
Graduate - USAF - ABR43171C-15-3 Aircraft Maintenance Technicians Course, 1966, 162nd Combat Support Squadron, Tucson, Arizona.
Airman of the Year - 1967 - 162nd Combat Support Squadron, Tucson, Arizona.
Section Supervisor, Small Arms Training - 1968 to 1969 - 162nd Combat Support Squadron, Tucson, Arizona.
USAF Honorable Discharge - 7 October 1970.