PETER J. SCHREUDER, P.G., C.P.G

President, Senior Hydrogeologist - Schreuder Inc.

EDUCATION

- M.S. Groundwater Hydrology and Water-Resources Administration - University of Arizona, 1974
- B.S. Mathematics with Minor in Chemistry - University of Arizona (with high distinction), 1971
- Studies in Chemistry, Physics, Mathematics, and Crystallography - University of Amsterdam, Netherlands, 1958
- Certificate of Achievement; The Ground Water Professional as an Expert Witness; National Water Well Association; 1985
- Certificate of Training; Ground Water Flow Modeling Laboratory; United States Geological Survey; Phoenix (AZ); 1968
- Diploma: The Netherlands Institute of Advertising and Publicity; 1964

PROFESSIONAL REGISTRATION

- Registered Professional Geologist, Arkansas, Florida,
- Certified Professional Geologist, AIPG

PROFESSIONAL AFFILIATIONS

- American Institute of Professional Geologists
- American Water Resources Association
- Association of Ground Water Scientists and Engineers
- National Water Well Association
- Water Pollution Control Federation
- International Association of Hydrologists

FIELDS OF SPECIALIZATION

- Water Resource Development and Management
- Groundwater Contamination Investigations
- Groundwater Flow and Contaminant Transport Modeling
- Preparation of Water Use Permits, Environmental Impacts, Environmental Audits Development of Regional Impacts Assessments
- Expert Testimony and Litigation Support

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Professional Background

In 1966, Mr Schreuder worked as an analyst in the chemical laboratory of the Federal Institute of Drinking Water Supplies in the Netherlands. He was asked and agreed to join a team of scientists of the University of Groningen and the International Atomic Energy Commission to conduct a study to determine the hydrologic parameters of a regional ground water system in the Lake Chad basin. The project would determine the age of the ground water using carbon 14 dating techniques. Mr. Schreuder was asked to collect and process the ground water samples in the field. After the sample collection phase of the project was terminated after two years, Mr. Schreuder was asked to join the team of scientists of the Electric Analogue Model Laboratory of the US Geological Survey in Phoenix to construct a two layered electric analogue ground water flow model of a one million square mile area in the Lake Chad Basin. He built and operated this model at the headquarters of the United Nations Educational and Cultural Organization in Paris (France).

Through this work, Mr. Schreuder became interested in expanding his professional education by obtaining and advanced degree in Ground Water Hydrology from the University of Arizona in 1974. Upon completion of his degree, he was invited to join the staff of a new office established by Geraghty & Miller, Inc. in Tampa (FL) in 1975. In 1975, Mr. Schreuder served as Project Manager and principal investigator of the Four River Basins Water-resources Management Study (WRMS) to evaluate the ground water and surface water supply potential in the 16 county areas that comprise the Southwest Florida Water Management District as part of a U.S. Army Corps of Engineers Study. In 1978

EXPERIENCE SUMMARY

Mr. Schreuder has more than 40 years of experience in groundwater hydrology, with much of that experience in Florida. He recently developed the concept of the Aquifer Recharge and Recovery Project. The essence of the concept is the use of natural treatment provided by wetlands in combination with filtration through natural sands to improve to quality of wastewaters and surface water such that they will meet drinking water standards prior to injection and storage in the underlying Floridan Aquifer. This concept has been accepted by the Southwest Florida Water Management District and has been incorporated in their recovery strategy for the Southern Water Use Caution Area. This concept was developed after 14 years of research funded primarily by the Florida Institute of Phosphate Research and partially by the Southwest Florida Water Management District.

He has extensive water resources consultant experience and has been

project manager for numerous studies concerning the determination of water availability, water resource management, water quality investigations, exploratory drilling, installation of numerous large capacity wells in the Floridan Aquifer, aquifer test evaluations, and integrated water-resources systems analysis. Mr. Schreuder has worked since 1975 in west-central Florida and is very familiar with the hydrogeology of this area. He has been involved in the initial investigations of several studies in the area. At present he is installing a 16 inch diameter 800 feet deep production well in the City of Dade City. He just completed a 14 year assessment of the water resources in the Keystone Heights area in North Florida focusing on aquifer recharge from Sand Hill Lakes into the underlying Upper Floridan Aquifer through recent and ancient karst features. He completed a three year pilot study to determine the feasibility of using wetland created on clay settling areas in combination with tailing sand deposits left behind by the phosphate mining industry to treat domestic and industrial waste and storm water runoff to meet federally mandated drinking water standards prior to recharge to the Floridan Aquifer. He has been conducting extensive research for the Florida Institute of Phosphate Research and the Southwest Florida Water Management District since 1994. At Pine Level he designed and installed a 24-inch diameter test production well to a depth of 1,550 feet that was pumped for 30 days at a rate of 10,500 gallons per minute. He analyzed data from 17 monitor wells to determine aquifer characteristics.

Mr. Schreuder rehabilitated seven water supply production wells operated by the City of Clearwater. These wells were not used because of sanding problems and rising concentrations of chlorides. Mr. Schreuder has continued to be actively involved in many investigations concerning the determination of groundwater availability, water quality investigations, aquifer test evaluations, and integrated water resource system analysis in northwest Hillsborough County, the Highlands Ridge area, the southern half of the Southwest Florida Water Management District (Sarasota, Citrus, Brevard, Orange, Osceola, Volusia, and Collier Counties). In addition, Mr. Schreuder has worked on the preparation of hazardous-waste permit applications, assessment of groundwater contamination caused by industrial and municipal waste disposal practices, the design and implementation of monitor well networks, chemical sampling
and analysis programs, and abatement procedures to clean-up contaminated groundwater resources. He has also provided expert testimony in permit application hearings regarding consumptive use permits, as well as other hydrogeological testimony relating to landfills and hazardous waste disposal sites.

The United States Geological Survey (USGS) trained Mr. Schreuder in 1968 to use electric analogue ground-water flow models to assess regional water supply availability options. He was appointed and served as Director of the Electric Analog Groundwater Model Laboratory at the United Nations Educational, Scientific, and Cultural Organization in Paris until September 1969. He started his career as a field hydrogeologist in 1966 working for the United

Nations Development Program in Africa conducting basin-wide hydrogeologic and groundwater quality investigations for a proposed large-scale development of irrigated agriculture.

Mr. Schreuder is fluent in Dutch, French, German, and English. He has worked in the Middle East, Africa, Europe, and North America. He has presented guest lectures at the Delft Technical University in the Netherlands in 1968 and at the Polytechnical University of Lausanne, Switzerland in 1967. He worked as a chemist at the Institute for Drinking Water Supplies in The Netherlands, and was head of a seismic field crew of the Compagnie General Geophysique in France.

PUBLICATIONS

Schreuder, P.J., Earls, J.K., and J.M. Dumeyer, 2006. "*Impact of Phosphate Mining on Streamflow",* prepared for the Florida Institute of Phosphate Research.

Schreuder, P.J., 2005, *"Pilot Project to Test Natural Water Treatment Capacity of Wetland and Tailing Sand Filtration on Mined Phosphate Lands",* prepared for the Florida Institute of Phosphate Research.

Schreuder, P. J., and J. D. Dumeyer, 2000. "*Feasibility of Natural Treatment, Aquifer Recharge, Storage, and Conveyance of Waste-, Storm - and Surface Waters Using Mined Phosphate Lands, A concept to Expand Regional Water Resource Availability"*, prepared for the Florida Institute of Phosphate Research (in press).

Schreuder, P. J., Dumeyer, J. D., Harrison, C. H., Andrews, S. A. and H. L. Barnette, 2000. *"Water Quality Investigation of In-Situ Tailing Sand Deposits under Natural Environmental Conditions,"* prepared for the Florida Institute of Phosphate Research (in press).

Dove, F.H. and P.J. Schreuder, 1978. "*Location of Municipal Well Fields in an Environmentally Sensitive Region.*" Bulletin of the American Water Resources Association.

Schreuder, P.J. and J.J. Geraghty, 1977. Proceedings of Seminar: "*Environmental Land*

Use Planning, An Integrating Theme for Area Wide Impact Assessment of the Central Florida Phosphate Industry," Bartow, Florida.