

# Jeffrey D. Lehnen, P.G.

## Senior Hydrogeologist, Regional Groundwater Technology Leader

Jeff is a principal hydrogeologist and senior consultant in CH2M HILL's Gainesville office with over 34 years of experience in Florida regarding water resource planning and design, construction and testing of Floridan aquifer water supply wells, Class I and V deep injection wells, ASR wells, and monitoring wells. He has contributed significantly to continuing efforts to resolve state and federal underground injection control issues pertaining to deep injection wells and ASR wells. He has proven experience and recognition for his skills with solving complex water resources issues and for providing guidance to clients and regulatory agencies on difficult policy and regulatory issues.

### **Education**

B.S., Geology 1977, University of Florida

### **Professional Registrations**

Professional Geologist (PG No. 447), Florida

### **Work History**

Black, Crow and Eidsness; 1978 - 1979

CH2M HILL; 1979 – present

### **Membership in Professional Organizations**

National Ground Water Association (NGWA)

Water Environment Federation (WEF)

Ground Water Protection Council (GWPC)

## Distinguishing Qualifications

- Extensive experience with construction and testing of large capacity Floridan aquifer water supply wells, Class I Injection wells, ASR, and monitoring wells throughout Florida
- Recognized as an expert in Florida hydrogeology and large diameter well construction and testing
- Extensive experience with Water Use Permitting (WUP) using regional and site specific groundwater models to evaluate environmental impacts and constraints on water bodies with established Minimum Flows and Levels (MFLs)
- Experience with aquifer performance testing (APT), groundwater flow models, geophysical logging, geologic data, hydraulic tests, and water quality data to evaluate hydrogeologic conditions and to optimize the design of water supply, injection, ASR, and monitoring wells,
- Expert witness experience for water supply projects, water quality criteria exemption, solid waste management, contamination assessment, and injection and groundwater flow conditions.

I have been the principal investigator of dozens of studies, field tests, designs, permitting, construction, drilling, testing, reporting, of groundwater projects throughout Florida. These include:

- Water supply alternatives, development, design, rehabilitation, construction and testing for projects at: JEA, GRU, Okaloosa County, LNP, Brandy Branch, Fort Meyers, FCAA, Cooper City, Sunrise, Palm Coast.
- Class I injection well feasibility, permitting, design, construction and testing for projects in Florida, Texas, Indiana, Ohio, Michigan, Delaware, Mississippi, California, and Arizona.
- Class I Injection well projects: Air Products, Champion, Gulf Power, Florida Key Aqueduct Authority, Miami Dade Water and Sewer Department, Biscayne Landing, Coral Springs Improvement District, North Springs Improvement District, Seacoast Utilities, Boynton Beach, West Melbourne, Palm Bay, St. Lucie County, Stuart, Pratt and Whitney, Manatee County, Hercules (Vero Beach), QO Chemical (Belle Glade).
- Miami Dade Water and Sewer Department: Technical advisor to Director of Utilities and County attorney supporting UIC issues affecting Dade County facilities. Provided guidance affecting capital cost impacts of \$100 million projects.

## Professional Organization Activities

- Florida Pulp and Paper Industry (FPPA): Pulp and paper industry solid waste management study leading to industry specific practices. Industry practices study report, committee activity with FDEP, and published technical paper.
- Florida Water and Environment Association (FWEA) Utility Council: UIC rule changes and development of alternative regulatory management strategy. Committee member as one of two technical support positions. Developed UIC risk assessment strategy, oversaw University of Miami research group executing study, presentations to FDEP, EPA, and public meetings.
- FDEP Technical Advisory Committee (TAC): Technical committee member on rule making TAC for the FDEP developing revised UIC regulations. Prepared presentations, costs impact evaluations, white paper.
- Northeast Florida Utility Council Group (NEFUCG): Technical committee member providing highly detailed model analysis, impacts, and calibration evaluations supporting the committee's water supply planning involvement. Prepared 8 half day workshop presentations to the committee and to the SJRWMD model subgroup.

## Management Positions with CH2M HILL

- Department manager of groundwater group responsible for workload, career development, business development, and operations for 12 staff - 1985 to 1993.
- Division manager, Group Leader, and Operations Leader of Water Resources division and Water Business Group responsible for 30 staff in groundwater, surface water, water treatment, planning, economics, wastewater treatment, and design disciplines – 1993 to 2007.
- Florida Water Business Group staff manager responsible for workload balancing, hiring, firing, and staff development for 90 staff in 8 offices in Florida – 1999 to 2003.
- Southeast Region Water Business Group Staff Manager responsible for workload balancing, staff management, and staff development for 250 professionals in the Southeast states – 2003 to 2006.
- SE Region Groundwater Technology Leader responsible for technical delivery, quality management, client interface, staff development, business development for groundwater resource projects in Florida and the Southeast Region – 2006 to present.

## Awards:

- BTI Consulting Group 1996 Client Services A-Team. Given by industry members to candidates demonstrating a commitment to client service and technical excellence.
- Engineering Quality Advancement Award 2009. Given by the Gainesville office of CH2M HILL recognizing excellence in innovative solutions, commitment to quality and effective leveraging of all technical disciplines in project execution. Mr. Lehnen is the only hydrogeologist to receive the award.

## Example Project Descriptions

### Water Supply and Wellfield Management

**Water Supply Development for Progress Energy, Levy Nuclear Power Facility; Levy County, Florida.** Senior hydrogeologist responsible for permit application team developing Federal and State applications for proposed nuclear power plant in Levy County. Evaluated alternative water supply scenarios, developed groundwater flow model and wetland interaction evaluations, and prepare freshwater supply elements of permit applications for the FDEP, SWFWMD and the NRC COLA. The SCA was approved in 2009 and the NRC permitting is ongoing.

**CUP Permitting and Water Supply Planning, JEA; Jacksonville, Florida.** He is the senior hydrogeologist for the project under which JEA plans to consolidate the water supply system of 35 wellfields and water plants and constructing 30 new Floridan aquifer supply wells and two pipeline river crossings intended to interconnect the wellfields by the year 2030. He is leading the groundwater evaluations for renewal of their CUP which requires extensive groundwater flow modeling of predictive scenarios, evaluation of impacts to local and regional wetlands, lakes and springs, and development of a regional groundwater monitoring plan intended to complement the SJRWMD and USGS monitoring networks. The CUP renewal will consolidate 31 separate CUPs under one permit. The requested allocation will exceed 155 mgd in 2030 and will be one of the largest public utility uses in Florida.

**Wellhead Protection Ordinance Development, JEA; Jacksonville, Florida.** Assisted JEA with evaluating a draft implementation plan for the City of Jacksonville's wellhead protection ordinance. Helped develop an alternative approach that focused on identifying and addressing potential pathways through the confining beds thereby protecting the resource. Developed a public information presentation and white paper and assisted JEA with presentations at the JEA management level, the City's attorneys, and the EQD environmental committee, and a mayor's special subcommittee. The revised approach was eventually adopted by the City and the wellhead protection ordinance was re-written.

**Wellfield Capacity Evaluation and Optimization Tool, GRU; Gainesville, Florida.** He led the development of a capacity evaluation and optimization tool to address well drawdown interference problems at Murphree WTP. The analytical tool is used to predict the wellfield's firm raw water pumping capacity and to develop operating procedures and pumping capacity changes that will increase the wellfield's raw water production by reducing drawdowns and well interference. The tool simulates wellfield operations and was used to develop a matrix of interference for the 16 wells in the wellfield for both transient and steady state conditions. The tool gives the operators a series of well operation and rotation tables which optimize wellfield operation to drawdown and water quality for incremental demand scenarios.

**Water Use Permit Application and Evaluations, GRU; Gainesville, Florida.** He led the groundwater evaluation aspects of the water use permit renewal for GRU. The SJRWMD NCF model was used to develop a local wellfield model with refined model cell sizes, detailed surficial aquifer characterization, and extensive wetland impact simulations resulting from pumping the Floridan aquifer. The SJRWMD finally agreed there were no detrimental impacts to wetlands around the wellfield. The SJRWMD NEF regional model was used to evaluate regional impacts to lakes in the Keystone Heights area. The SRWMD NF model was also used to evaluate impacts to springs on the Santa Fe and Suwannee Rivers resulting from pumping at the GRU wellfield. The CUP was successfully issued in 2009.

## Groundwater Resources Management and Planning

**ASR Feasibility Screening Tool, SJRWMD, Palatka, Florida.** Managed the preparation of a technical screening tool that determines the relative feasibility of aquifer storage and recovery (ASR) wells for raw or treated water storage. This publication was developed under the Alternative Water Supply Strategies program. The publication presents a methodology for evaluating the water resources needs, hydrogeologic and water quality factors, and costs of alternatives necessary to evaluate whether ASR is a feasible option at a particular site or facility.

**Project Manager and lead Hydrogeologist, Paradise Run 50 MGD ASR Demonstration Project; SFWMD, Okeechobee, Florida.** As a result of the 2004 and 2005 hurricane seasons, the SFWMD has implemented projects under the Lake Okeechobee and Estuaries Recovery Program that are designed to divert surface waters from the northern Okeechobee basins, store water upstream of the Lake, and treat waters reaching the Lake to improve water quality. Under this program, CH2M HILL recently led a site selection process for a 50 mgd ASR well system that will meet the goals of the LOER program.

Initial conceptual designs were prepared for the 50 mgd ASR systems at two finalist sites, and one site was selected by SFWMD. A test ASR well was drilled to 1,400 ft and was completed to allow future selection of an upper and/or lower ASR zone. Preliminary site investigations were completed in 2008 to evaluate geotechnical, ecological, topographic, endangered species, and cultural artifacts aspects of the selected site. Water quality treatability pilot testing is planned to evaluate filtration and natural wetland treatment, and disinfection processes (ultra violet, ozone, and hypochlorite).

## Class I and V Wastewater Injection Well Systems

**Gulf Power Plant Smith, Panama City, Florida.** Gulf Power Company (GPC) is interested in developing an alternative source of water to supply existing combustion turbine cooling towers at the plant. The feasibility of utilizing municipal sanitary reclaimed wastewater is based on identifying a viable cooling tower blowdown disposal method. CH2M HILL is providing hydrogeologic services to drill and test a 7,000 ft deep exploratory well to evaluate potential injection zones and determine their capacity for disposal. CH2M HILL is providing service for the design of the drilling and testing program, permit application, services during construction, and interfacing with the regulatory agencies. Promising zones have been identified to date and additional drilling and testing is underway. A successful injection zone will allow GPC to proceed with negotiations with the Bay County municipal utilities to use reclaimed water in the cooling towers. This not only addresses GPC's needs but could eliminate a significant nutrient load from the surface water systems around Bay County.

**Gulf Power Plant Crist, Pensacola, Florida.** Gulf Power Company (GPC) recently constructed a new stack scrubber system at the Plant Crist facility in Pensacola, Florida. This process will produce a highly saline waste stream that will be injected into two Class I industrial injection wells for disposal. The injection system is comprised of two 6-in FRP tubing injection wells completed between 2,100 and 2,720 ft each with 100% disposal capacity. Each injection well has a nearby 1,200 ft deep upper Floridan monitoring well complete above the Bucatunna clay confining beds to monitor for vertical migration of injected fluids.

The injection system includes a gypsum settling pond, filtration and treatment plant, effluent storage tank and injection system pumping station. The system went operational in the fall of 2009. CH2M HILL designed the injection wells and injection pumping station, assisted in obtaining the FDEP UIC construction permit, provided services during construction, testing, and is assisting in system startup. The project was conceived and has met urgent schedule milestones for startup to coincide with scrubber startup and testing. The first 2 yrs of operation have been successful with no loss of injection well capacity.

**Class V Injection Well Permitting, Design, Construction, and MIT, Air Products and Chemicals, Pace Florida.** Mr. Lehnen has provided hydrogeologic services to APCI with a feasibility evaluation of using Class I injection for treated groundwater disposal. Since then he was responsible for preparing the construction permit application package submitted to FDEP in 1996. He led the technical aspects of the design; permit compliance, construction and testing of the injection well system between 1998 through 2001. He assisted with securing the current FDEP operating permit (2005) and was also involved with the 5 yr mechanical integrity testing performed in 2005.

**Class I Injection Well Permitting, City of West Melbourne; West Melbourne, Florida.** Mr. Lehnen has provided hydrogeologic services to the City of West Melbourne for nearly 20 years. He was responsible for the design, permitting, construction and startup of the City's Class I injection well system in 1986. He assisted with securing the FDEP operating permit, rehabilitating the monitoring wells, designing a replacement deep zone monitoring well, and several mechanical integrity tests. He assisted the City in obtaining a capacity re-rate for the injection well system from 4.8 to 6.0 mgd.

## **Solid Waste and Industrial Permitting**

### **Industry Wide Solid Waste Study, Florida Pulp and Paper Association (FPPA); Florida**

He was project manager for the Florida Pulp and Paper Association (FPPA) Solid Waste Study. The FPPA chose to perform a comprehensive study of the industry solid waste practices in order to document that the standards for Class I municipal landfills were not appropriate for the solid waste disposal activities of this industry. The study characterized the solid waste produced by the industry and describing the solid waste management and monitoring practices of the industry. The data were gathered through field sampling of solid waste, leachate, and groundwater at nine paper mills in Florida. Literature reviews and a questionnaire of mill solid waste management and storage practice were incorporated into the study. The FDEP agreed that Class I landfill standards should not apply and has postponed further rulemaking applicable to the pulp and paper industry in Florida.

**Byproduct Storage Area (BSA) Consent Order Investigation, Northside Generating Station, JEA; Jacksonville, Florida.** He is the senior hydrogeologist for groundwater investigations negotiated under a Consent Order with FDEP for the BSA facility at the Northside Generating Station. He was part of the negotiating team for the Consent Order and has helped develop the supporting documentation for a solid waste permit renewal, a Sodium Exemption Request, a revised ZOD boundary, and the groundwater elements of the NPDES permit modification. The results of the study were able to differentiate sources of parameters detected in groundwater and demonstrate that no off-

site impacts are occurring. The Sodium Exemption, revised ZOD boundary, and the draft operations permit have been issued and the NPDES permit is expected soon. These permits will resolve long standing issues that could not be resolved without the comprehensive approach to data analysis and differentiation of water quality parameters.

**Groundwater Contaminant Assessment and Consent Order Negotiations, Smurfit Stone Container; Panama City, Florida.** He developed a groundwater contamination assessment as part of a consent order related to the mill's wastewater pretreatment system. For this investigation, extensive monitoring well construction and groundwater sampling were performed. Soil, sediment, and pretreatment pond sludge sampling and characterization were included in this investigation. He prepared all of the technical support materials and arguments for an administrative hearing. Extensive negotiations with FDEP attorneys resulted in a reasonable consent order and operating permit. Mr. Lehnen assisted in the design and construction of a large scale groundwater recovery system covering 3,000 ft of shoreline around the mill. Recovery wells were pumped using a patented jet-pump recovery system that requires only one pump to operate multiple wells. This simplifies operation and maintenance costs while pumping each well at the desired rate and drawdown.

## **Expert Witness Testimony**

**Progress Energy Levy Nuclear Plant, Levy County.** He provided expert witness services to support the water use permit elements of the FDEP Site Certification Application. Key issues addressed in his testimony included impact to the surficial aquifer system and wetlands from drawdown in the Floridan aquifer. The SCA was approved with monitoring conditions. (2009)

**Brandy Branch, JEA, the City of Jacksonville Water and Electric Utility.** He provided expert witness services to support the water use permit elements of the FDEP Site Certification Application for the Brandy Branch combined cycle gas turbine power plant. Key issues his testimony addressed included impact to wetlands from drawdown in the Floridan aquifer and other aquifer users. (2005)

**Smurfit Stone Container, Panama City.** He developed a groundwater contamination assessment as part of a consent order related to the mill's wastewater pretreatment system. For this investigation, extensive monitoring well construction and groundwater sampling were performed. Soil, sediment, and pretreatment pond sludge sampling and characterization were used to prepare a demonstration of compliance and to support a Sodium Water Quality Criteria Exemption Request. He led the preparation for an administrative hearing, working closely with the client's attorneys. Extensive negotiations with FDEP during the administrative hearing process resulted in a reasonable consent order, operating permit, and canceled hearing. (1997 – 2003)

**Manatee County Southwest WWTP.** Provided expert witness services for an administrative hearing for a Class I injection well construction permit. The intervenors maintained that the hydrogeology of the area was not fully understood and that migration of injected water could occur. Testing results from a test well demonstrated that the field conditions were suitable for injection and the hearing officer ruled in favor of the County on all challenged issues. (1988)

**U.S. Senate Subcommittee on Toxic Substances and Environmental Oversight.** Mr. Lehnen provided expert testimony on Class I injection well monitoring criteria to the Senate Subcommittee during the Committee's evaluation of underground sources of drinking water monitoring practices as part of proposed amendments to the Safe Drinking Water Act. (1986)