Exhibit No.:	_____
Issue:	Systems features and capacity Compliance with regulatory and engineering standards
Witness:	David G. Krehbiel
Sponsoring Party:	Big Island Water & Sewer Company, Inc.
Case No.:	Case No. WO-2007-0277 **Joined for hearing with Case No. WC-2006-0082**

BIG ISLAND WATER & SEWER COMPANY, INC.

Case No. WO-2007-0277
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Case No. WC-2006-0082

DIRECT TESTIMONY

OF

DAVID G. KREHBIEL

Camdenton, Missouri
February, 2007

DAVID KREHBIEL DIRECT

BACKGROUND

Q. **Please state you name and your business address.**

A. My name is David G. Krehbiel and my business address is 63 Blair Ave., Camdenton, MO 65020.

Q. **By whom are you employed and what is your position?**

A. I am employed by Krehbiel Engineering, Inc. as a Consulting Engineer.

Q. **Please describe your education, professional credentials and previous work experience.**

A. I obtained a Bachelor of Science Degree in Civil Engineering from the University of Missouri, Columbia in 1961, and returned to that institution to earn my Masters of Science in the same field in 1964. From 1961 to 1964 I worked for Krehbiel Construction Company, Inc. as an Engineer and Corporate Secretary. From 1965 to 1969 I acted as President of the Missouri Engineering Corporation. From 1969 to the present I have been employed by Krehbiel Engineering, Inc. of Camdenton either in management capacities or as an engineer with the group. I am licensed by the State of Missouri as a Professional Engineer and Professional Land Surveyor.

Q. **For whom are you testifying in this proceeding?**

A. Folsom Ridge LLC and the Big Island Homeowners Water and Sewer Association, Inc. (the Association)

Q. **What is the purpose of your testimony?**

A. I will be covering several topics in my testimony. First, I will describe for the Commission the role of my engineering firm in the design of the water and sewer systems serving Big Island at the Lake of the Ozarks. I will explain the features of each system and the layout of each at this time. I will also advise the Commission of the expected additions and improvements to the system that are either planned or underway at this time.

DESIGN AND FEATURES OF THE WATER AND SEWER SYSTEMS.

Q. **Mr. Krehbiel, when was your firm retained by Folsom Ridge LLC in connection with the water and sewer systems for the Island.**

A. We submitted a letter of engagement for our services to Folsom Ridge on February 19, 2004 to provide consulting engineering services regarding the separation of the water distribution lines and sewer collection lines. Ms. Barb Brunk is expected to testify about the circumstances involving this event but basically, Folsom Ridge was required to abandon an existing water line that had been installed too closely to a wastewater collection line. Our firm was hired at the time the replacement line was under consideration. Krehbiel Engineering has

also been involved in the design and construction of extensions and improvements to the systems.

Q. **Please explain the design and components of the water system.**

A. The water system is comprised of the following components: a water supply well, three (3) ground storage tanks, a booster pumping system and distribution system. The well has an estimated capacity of 140 gpm. This is adequate to serve 320 residential customers. The pumping equipment delivers a flow of approximately 100 gpm, and will have to be upgraded to supply 140 gpm. The ground storage tanks were designed to serve 80 residential customers. They are in the process of being replaced with a standpipe designed to serve 320 residential customers. The distribution system is adequately sized to serve 320 residential customers.

Q. **Please explain the design and components of the sewer system.**

A. The sewer system is comprised of a septic tank effluent pumping (STEP) collection system and a recirculating sand filter treatment facility. Wastewater from each home is treated at each individual home with a septic tank. The gray water is pumped from the septic tanks through small diameter pipes to the recirculating sand filter where the water is treated to meet Missouri Department of Natural Resources (DNR) discharge limits. The original treatment facility was designed to treat 22,525 gallons per day. The addition currently under construction will provide for treatment of an additional flow of 41,625 gallons per day.

Q. **Have there been any improvements or additions to the systems since they were first constructed and installed. Please describe them for the Commission and the reasons for each.**

A. For reference purposes, the water system projects for Big Island have been categorized in the following Phases:

Phase I – Original system – supply – storage – distribution system – East side

Phase II – Completion of distribution system loop – West side

Phase III – Off island extension

Phase IV – First section of duplexes and triplexes

Phase V – Storage upgrade

Between Phases II and III the project to relocate the waterline to establish a 10 feet separation between the water and sewer line intervened. As I said earlier, Krehbiel Engineering was the engineer for the separation project and also for Phases IV and V.

Krehbiel Engineering was the consultant for the off island sewer line extension, the upgrade of the wastewater treatment facility and the sewer line extension to serve the first section of duplexes and triplexes.

The water and sewer line extensions were to serve additional customers.

The wastewater treatment facility and water storage upgrade are to provide for additional capacity for each system.

Q. **Did you coordinate the design and permitting of these improvements with DNR.**

A. Yes, I did.

Q. **Did your firm inspect the installation of the improvements to the systems?**

A. Our firm provided observation services for the relocation of the waterline in accordance with a settlement agreement reached between Folsom Ridge and DNR, and the extension of water and sewer lines and the upgrade to the wastewater treatment facility.

Q. **Have the improvements been inspected by DNR and have any improvements been rejected by DNR.**

A. To the best of my knowledge, the improvements have been inspected by DNR and no improvements have been rejected by DNR.

Q. **Mr. Ben Pugh has raised in his complaint concerns about the relocated water main and its position below a sewer main on an incline. Does the location of the sewer main pose a risk of contamination of the water supply?**

A. No, there is no risk to public health because of the location of these lines. The relocation of the water main is in full compliance with the regulations of DNR and otherwise in accord with applicable engineering standards. The required separation of the water line and the sewer line has been achieved. To accept what seems to be Mr. Pugh's logic, that no water line should be installed below a sewer line, is simply not practical in the field, --where topography, soil or rock conditions must be considered--and both DNR and professional engineers understand this.

Q. **Mr. Pugh has also raised a concern that the minimum required distance between the public water supply and the wastewater treatment plant for these two systems has not been met. He claims that the Big Island facilities are not in compliance with applicable regulations. Were the Big Island well and the wastewater treatment plant designed, constructed and separated in accordance with regulation?**

A. Yes. Although I was not the engineer when the well was drilled and the first phase of the treatment plant was constructed, at the time of the design, construction, and permitting of the Big Island water and wastewater systems, the applicable DNR regulation 10 CSR 20-8.020 (11) (A) 3 provided:

> Wastewater treatment facilities shall not be located within one hundred feet (100'), and preferably three hundred feet (300') of any well or water supply structure.

To the best of my knowledge, this regulation is still in effect. I have attached a copy to my testimony as Krehbiel Schedule 1. The well and the wastewater treatment system on Big Island are separated by more than 100 feet. In fact, the well structure and the discharge point for the treatment plant effluent are separated by more than 300 feet. The facilities are in compliance with the DNR Design Guide and again, are otherwise compliant with applicable engineering standards.

Q. **Have the water and sewer systems subject to transfer in this case been inspected by Big Island Water Company, Inc. and Big Island Sewer Company, Inc. (the 393 Companies)?**

A. Yes, a walk through and inspection of the wastewater treatment plant, the well and pumping facilities, and the mains, valves and other equipment for each system was conducted on January 10, 2007. I joined Ms. Pam Holstead and Mr. Gail Snyder representing the 393 Companies, Mr. Jim Crowder who works with Folsom Ridge, Mr. Chad Stout and Mr. Jim Heppler of LOWS, who is the current operator of the systems, and Kenny Carroll, the installation contractor for these systems for the walk through and inspection.

Q. **As a result of that walk through and inspection were any actions taken with respect to preparing the systems for transfer.**

A. There were none that required my services. I understand that LOWS may have performed some minor repairs or improvements that were requested by Ms.

Holstead and the others from the 393 Companies. Mr. McDuffey will address this in his separate testimony.

Q. **Does this conclude your direct testimony**?

A. Yes.