

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Application for increase
in wastewater rates in Monroe
County by K W Resort Utilities Corp.

Docket No. 20170141-SU

REBUTTAL TESTIMONY

OF

EDWARD R. CASTLE

on behalf of

K W Resort Utilities Corp.

1 **Q. Please state your name, profession and address.**

2 A. My name is Edward R. Castle. I am Vice President of Weiler Engineering Corporation, and
3 Director of its wastewater division. My business address is 6805 Overseas Highway,
4 Marathon, Florida 33050.

5 **Q. Have you presented direct testimony in this case?**

6 A. No, I have not.

7 **Q. Have you previously filed testimony in Utility Rate Case Proceedings before the Florida
8 Public Service Commission?**

9 A. Yes. I provided testimony in Docket No. 150071-SU, as well as Docket 070293-SU.

10 **Q. Are you sponsoring any exhibits?**

11 A. Yes, I am sponsoring the following exhibits: Exhibit ERC-1, my resume; Exhibit ERC-2, the
12 November 29, 2016 letter I prepared providing my justification why Evoqua should be
13 considered a sole source provider for the wastewater treatment plant rehabilitation.

14 **Q. Were these Exhibits prepared by you and your staff?**

15 A. Yes they were.

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

17 A. The purpose of my rebuttal testimony is to respond to the Office of Public Counsel witness
18 Andrew T. Woodcock's assertions that there was no reason to deviate from the standard
19 requirement that three competitive bids be obtained, with regard to the wastewater treatment
20 plant rehabilitation construction.

21 **Q. Why did you determine that Evoqua should be considered a sole source provider for the
22 wastewater treatment plant rehabilitation project?**

23 A. I detail the reasons for this conclusion within Exhibit ERC-2, the November 29, 2016 letter
24 entitled "Rehabilitation of Existing Evoqua WWTP Trains". Firstly, detailed structural
25 drawings for the plant are not available, and the fabrication of substitute components could

1 result in inadequate structural strength and potential structural failure.

2 **Q. Mr. Woodcock contends that if detailed structural drawings are not available, it is safe**
3 **to assume they are also not available to Evoqua, giving Evoqua no advantage over**
4 **another contractor. Do you agree with this statement?**

5 A. No, I do not. Mr. Woodcock's assumption that the detailed structural drawings are not available
6 to Evoqua is incorrect. Evoqua was the original designer of the two treatment trains in question
7 and fabricated the individual structural components. This effort would have included the
8 production of structural detail drawings and specifications for those individual components.
9 That information belongs to Evoqua and is not available to KWRU, Weiler Engineering or to
10 other potential WWTP fabricators.

11 **Q. Are there other reasons for your determination that Evoqua should be considered a sole**
12 **source provider for the project?**

13 A. Yes. Evoqua provided the two treatment trains which required rehabilitation, and designed
14 them specifically for the Stock Island service area and to meet the specific raw wastewater
15 characteristics associated with the system. The planned rehabilitation will require that the
16 structural components, piping and mechanical systems to be replaced. If another contractor
17 were to manufacture and install components without adequate knowledge and understanding
18 of the specific influent characteristics and the non-standard biological process that the
19 treatment trains use to achieve AWT, inadvertent changes to the process may be made. Evoqua
20 was intimately involved with the design of the AWT conversion of the two existing trains and
21 helped to ensure that physical and mechanical systems would function to achieve AWT. Other
22 contractors would not have that knowledge and understanding.

23 **Q. Mr. Woodcock contends that there is nothing particularly unique about these treatment**
24 **trains. Is that true?**

25 A. No, it is not. Field erected treatment plants are unique. They are designed to accommodate

1 the specific flows and influent characteristics for the area to be served. The two treatment
2 trains were originally designed to provide extended aeration secondary treatment with filtration
3 and high-level disinfection. The treatment trains have since been modified by Evoqua to
4 provide advanced wastewater treatment, including nitrogen and phosphorus removal, along
5 with filtration and high-level disinfection. The nitrification-denitrification process used in
6 these two trains is a custom-designed post-anoxic process with final reaeration. The process
7 in not one of the standard biological nitrogen removal processes such as the MLE, the A²O, the
8 Bardenpho or the UTC processes more commonly used for biological nitrogen removal.

9 **Q. Mr. Woodcock further states that the work involved with the rehabilitation will not**
10 **materially change the treatment process of the plants, and that another competent**
11 **contractor (such as ECO-2000, Inc., Florida Environmental Construction, Inc., or others)**
12 **could perform the rehabilitation. Is that true?**

13 A. Mr. Woodcock is correct that the rehabilitation work will not materially change the treatment
14 processes, provided that the components are replaced without unintended modifications to the
15 structural, mechanical and biological systems. His contention that another competent
16 contractor could perform the work is not correct, to the extent that another contractor would
17 not have access to the detailed drawings and specifications needed to fabricate the structural
18 and mechanical components that are a part of the rehabilitation. The existing corroded
19 structural and mechanical components that are to be replaced must be replaced in kind. The
20 replacement structural components need to be fabricated to the exact dimensions and technical
21 specifications as the originals. Without access to the detailed structural drawings and
22 specifications, it would be highly impractical for another contractor to fabricate the
23 components and then field install them.

24 **Q. As further justification, you stated in Exhibit ERC-2 that each treatment train was**
25 **designed with specific hydraulic detention times, oxygen transfer efficiencies, biological**

1 **uptake rates and sludge setting characteristics necessary to achieve AWT treatment, and**
2 **that modifications to the flow characteristics or oxygen transfer rates may negatively**
3 **impact the systems' abilities to meet the AWT treatment requirements. Why does this**
4 **mitigate for Evoqua as a sole source?**

5 A. As previously stated, Evoqua is the only potential provider with access to the detailed designs
6 and specifications for the replacement components. If replacement components do not match
7 the dimensions, configurations and functions of the existing components, the potential exists
8 to change flow patterns, detention times, depth of submergence and other factors which can
9 affect oxygen transfer, detention times, flow patterns and potentially other characteristics of
10 the treatment system, which in turn can affect the biological treatment process.

11 **Q. Mr. Woodcock states that from his review of the proposal from Evoqua, there is nothing**
12 **in the project that will change or alter the AWT process, or result in modifications of the**
13 **flow characteristics or oxygen transfer rates of the facility, and that even if those concerns**
14 **existed, any Professional Engineer with experience in wastewater design can make the**
15 **appropriate process design calculations and provide signed and sealed documents that**
16 **certify the ability of the plants to continue to meet AWT standards after the**
17 **rehabilitation. How do you respond to those statements?**

18 A. The process design calculations were prepared and submitted to the FDEP for permitting prior
19 to the modification of the treatment trains to achieve AWT. Those same calculations are
20 available now. However, a major rehabilitation project, carried out using replacement
21 components fabricated without the original detailed dimensions and specifications, may not
22 result in identical flow patterns, detention times and biological reaction rates as currently
23 provided and which have been demonstrated to achieve AWT treatment. To wait until the
24 rehabilitation project has been completed and to then have a professional engineer use the as-
25 built data to perform calculations that may, or may not, demonstrate that the rehabilitated

1 facilities will achieve AWT treatment is a backwards approach. The intent of the project is to
2 perform a rehabilitation project that will result in treatment trains that perform the same after
3 the rehabilitation project as prior to the rehabilitation project. If the rehabilitation project is
4 correctly performed, the process calculations used for the design of the facilities will be
5 unchanged.

6 **Q. Are there other reasons Evoqua should be considered a sole source provider?**

7 A. Yes, there are. In ERC-2, I identify that these treatment units are unique mechanical systems
8 comprised of numerous interconnected components that must function as a whole. Because no
9 detailed drawings are available to contractors other than Evoqua, fabrication of substitutes
10 would likely result in improper fit without detailed dimensional drawings. In addition to the
11 repair and replacement of structural and mechanical components, the scope of work also
12 includes replacing the existing fixed fine bubble diffusers with removable fine bubble diffusers
13 in the aeration zones of both plants. The diffusers are critical to the treatment process and can
14 significantly impact air flow rates and oxygen transfer efficiencies. Evoqua designed the
15 aeration system as part of the upgrade to AWT. The calculations of oxygen demand and
16 necessary air flow rates and oxygen transfer efficiencies were performed by Evoqua. The
17 diffuser system was then designed by Evoqua to provide the necessary air flow rate and oxygen
18 transfer efficiencies using the existing centrifugal blowers. The utilization of a contractor other
19 than Evoqua creates a risk that the replacement diffuser system will not function properly.
20 Small changes in the submergence depth, friction losses in the diffuser piping, and head losses
21 across the diffuser membranes can all impact air flow rates, and bubble size variations and
22 aeration pattern changes affect oxygen transfer efficiencies. Changes in air flow rates or oxygen
23 transfer efficiencies can prevent the treatment trains from achieving AWT quality treatment,
24 as required by KWRU's operating permit.

25

1 **Q. Mr. Woodcock stated that this is “not rocket science”, and that with proper field**
2 **investigation, specifications, and construction submittal review, an experienced**
3 **contractor can provide the services without compromising structural integrity. Do you**
4 **agree with this statement?**

5 A. While it is possible, it is not likely, and would be prohibitively expensive. In order for a
6 contractor to successfully fabricate the needed structural components, engineering drawings
7 showing detailed dimensions of each component would need to be produced. This would
8 require detailed field measurements both of exterior components and interior, submerged
9 components. Each treatment train would need to be taken out of service, emptied and cleaned.
10 Emptying and cleaning of first one train, and then the other, including disposal of sludge, grit
11 and debris, would incur a substantial cost. The engineering field work to obtain dimensions
12 and metal thicknesses would be time consuming and expensive, and given the current state of
13 corrosion of some components, may not provide accurate dimensions. Drafting and review of
14 the details would take a considerable amount of additional time, as would the compilation of
15 the associated technical specifications. It would also expose KWRU to the possibility of delays
16 and change orders should some of the field-gathered dimensions prove to be inaccurate due to
17 loss of material due to corrosion.

18 **Q. Mr. Woodcock states that none of the reasons stated in ERC-2 preclude any other**
19 **provider of treatment plant rehabilitation services from providing the service, and that**
20 **none of the reasons you provided are an impediment to competitively bidding the**
21 **projects. Do you believe you have provided sufficient justification for Evoqua to serve as**
22 **a sole source provider?**

23 A. Yes, I do. As stated, each structural and mechanical component that is fabricated or provided
24 must be an exact match when the field rehabilitation begins. Expecting any contractor other
25 than Evoqua to perform the rehabilitation cost-effectively would be similar to expecting any

1 auto body shop to be able to repair a wrecked car without the ability to buy fenders, bumpers,
2 radiators, etc. from the manufacturer, but rather to fabricate components and to do so without
3 detailed drawings and specifications. It is not a reasonable expectation.

4 **Q. In your experience, can the competitive bidding process cause a bidder to bid higher due**
5 **to the cost of bid preparation or other factors?**

6 A. Yes, it can. In typical competitive bids, the cost of preparing a formal quote with project
7 approach, qualifications statements, relevant experience history, equipment lists, references
8 and provision of a bid bond will add cost that the bidders will try to recover in the bid price.
9 Communications in a formal bid process are also restricted which can inhibit a full
10 understanding of the expected scope of work, so bidders have more uncertainties in the actual
11 cost of the work. Bidders will typically either include some extra costs for unknowns, or they
12 may bid the project with a minimal scope and depend on change orders to recover any
13 unanticipated effort required to complete the work. Either approach can result in a higher cost
14 for the project than one where open communication between the project representatives and
15 the prospective bidder allow for development of a full understanding of the project scope.

16 **Q. Was there any “value engineering” inherent in the process of developing a scope of work**
17 **for Evoqua?**

18 A. KWRU and Weiler Engineering staff met onsite together and with Evoqua representatives to
19 discuss the project and to develop the scope of work. Having the plant operations personnel
20 work with the owner’s engineers to ensure that all rehabilitation issues were identified,
21 followed by site meetings with Evoqua technicians, resulted in a scope of work that guarantees
22 that the needs of the operators are met, that sound engineering is followed and that the project
23 is constructible. Without input from contractors, projects may suffer from constructability
24 issues, which increases project costs.

1 **Q. Is it your position that any bids received from a third party would have been substantially**
2 **higher than the cost of the Evoqua contract?**

3 A. Yes. Contractors experienced with rehabilitations of WWTPs would recognize that, without
4 detailed dimensional drawings and specifications, the project would require extensive field
5 work prior to the start of fabrication to gather dimensional data and to produce shop drawings
6 for the fabrication. They would also recognize that the fabricated structural components would
7 have an increased likelihood of having improper fit when field erection commenced. That
8 would result in costs for re-fabrication of components and the associated delays that would
9 need to be recovered in the bid price. It is possible that an unscrupulous or unqualified
10 contractor would bid low with the intent of increasing the project cost after award through
11 change orders. In either case, the ultimate cost of the project would be higher than entering
12 into a contract with Evoqua, who has the detailed drawings for the structural components.

13 **Q. Do you have anything more to add regarding the statements of Mr. Woodcock, regarding**
14 **the assertion that the rehabilitation project should have been competitively bid?**

15 A. No

16 **Q. Have you reviewed the chart at Exhibit ATW-5, Page 1, related to engineering costs for**
17 **the wastewater treatment plant?**

18 A. Yes, I have.

19 **Q. Are the adjustments provided in that chart correct?**

20 A. Yes, they are.

21 **Q. Do these amounts represent engineering fees for KWRU's capital projects for its plant in**
22 **service?**

23 A. Yes, they do.

24 **Q. Does that conclude your rebuttal testimony?**

25 A. Yes, it does.

**EDWARD R. CASTLE, P.E.**

VICE PRESIDENT

ROLEWASTEWATER
DEPARTMENT MANAGER**EDUCATION**BACHELOR OF SCIENCE
CHEMICAL ENGINEERING
UNIVERSITY OF KENTUCKY**LICENSURE**FLORIDA LICENSED
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- ❖ Principle with Weiler Engineering
- ❖ 24+ years wastewater planning, design and operation
- ❖ Extensive wastewater modeling experience
- ❖ Experience with gravity, pressure, and vacuum sewers
- ❖ Class A Wastewater Treatment Plant Operator

RELEVANT EXPERIENCE

Mr. Castle specializes in residential, commercial and municipal wastewater engineering projects throughout South Florida and the Florida Keys and has more than twenty years experience working in South Florida. As Project Engineer, Mr. Castle will be responsible to insure the quality and accuracy of the projects for the County. He has served in this capacity on all the projects listed below. Mr. Castle was formerly the Region Director for Synagro, Inc. in charge of the Biosolids Management Division.

REPRESENTATIVE PROJECTS

Marathon Wastewater and Stormwater Project: Mr. Castle worked closely with the City in preparing the Facilities Plans, including a phased \$120 M Capital Projects and an annual O&M Budget. Mr. Castle and his staff prepared a very detailed analysis of different collection technologies and phasing plans for the Islands of Marathon. As a result of their extensive efforts, the Weiler team reduced the cost of the overall wastewater collection and treatment system less than one half of the previously bid wastewater project. The WEC Plan was approved by FDEP and the State Clearing House for participation in the State Revolving Fund loan program. Mr. Castle has assisted the City in receiving over \$19.2 M in grants and \$24.5 M in loans. Grants have been received from SFWMD, FDEP, FDOT and NEPA, as well as ARRA grants. The collection systems involved a variety of collection and transmission technologies including vacuum, low pressure, and gravity systems. A variety of wastewater treatment technologies were used at the WWTPs sites and service included the design and implementation of Supervisory Control and Data Acquisition (SCADA) systems with Human Machine Interface (HMI) and plant dewatering and sludge handling facilities. Integrating an innovative stormwater management system into the design, and construction of the wastewater system, has saved the City an additional \$40 M and won the EPA PISCES Award. Mr. Castle worked very closely with the City of Marathon Staff and has functioned as an extension of City staff as a City engineer. Under his direction, Mr. Castle's staff provided construction administration where they conducted construction progress meetings, provided public outreach services and performed construction inspection and engineering. He assisted in the training of City staff on Operation and Maintenance, GIS and asset management, helping to train staff to use the GIS equipment and asset management system software.



EDWARD R. CASTLE, P.E.
VICE PRESIDENT

(Continued from page 5)

Key Largo Wastewater Treatment District: The many tasks in this project include overseeing engineering consultants, planning, design, construction administration, compliance reviews and general consulting services. Mr. Castle prepared the Facilities Plan for the wastewater system to serve 13,000 EDUs in multiple service areas. The Plan was passed through the State Clearing House and is used to obtain funding through SRF and other loans, as well as grant funding from FDEP, Monroe County and ARRA. Based on the plan, design firms were hired to implement the plan, and WEC reviewed the design and provided construction administration for the \$130M project. WEC was tasked with a large portion of the collection system design. WEC has also designed several vacuum stations in residential and commercial areas. Mr. Castle is the Engineer of Record for the District's wastewater treatment plant expansion.

Key West Resort Utilities: Mr. Castle was project manager for much of the collection system design and construction administration. One example of a recent project was to connect the Monroe County Detention Center, the Key West Botanical Gardens and the Florida Keys SPCA wastewater systems to the KW Resort Utility wastewater facility. Other recent projects include replacement of 4,000 feet of reclaimed water force main, the abandonment of three effluent disposal wells and numerous upgrades and expansions to the wastewater treatment plant including the conversion to Advanced Wastewater Treatment Standards and design of its reclaimed water pumping and distribution system. Mr. Castle is the engineer of record for numerous developments, designing and providing construction engineering for onsite vacuum and gravity systems, which were later owned by KWRU. Each project was completed within budget and on schedule. In his long experience serving as the consulting engineer for KWRU through a number of projects, including design and construction administration, Mr. Castle has demonstrated a positive consultant-client relationship which has been appreciated by all KWRU staff. Mr. Castle also provides general consulting services for KWRU related to Public Services Commission rate hearings, treatment process control and capital planning. Mr. Castle was responsible for aerobic digestion unit, and sludge drying beds as part of the dewatering and sludge handling process.

City of Marathon Private Plans Review: WEC helped the City of Marathon to develop their current Land Development Regulations. In addition to assisting with this process, Mr. Castle's staff provided plan reviews of private developments for the City of Marathon. The Marathon Staff performs reviews consisting of analyzing the site's wastewater collection and treatment systems, connection into the municipal sewer utility, site plan and stormwater review and traffic capacity for over 30 commercial developments. Plan reviews ranged from large resorts and private housing communities to smaller apartment complexes and commercial buildings. In addition to analyzing the site collection system components including gravity, vacuum and pump station system, Mr. Castle evaluates the capacity of the City's central collection system to receive the flow from the proposed development.

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November 29, 2016

Christopher Johnson, President
KW Resort Utilities Corp.
6630 Front Street
Key West, Florida 33040

RE: Rehabilitation of Existing Evoqua WWTP Trains

The two existing Advanced Wastewater Treatment (AWT) units at KW Resort Utilities Corporation (KWRU) are packaged treatment units that combine the following treatment processes into a single integrated circular tank:

- Influent equalization
- Aerobic treatment, including nitrification
- Anoxic treatment, including denitrification
- Re-aeration
- Effluent clarification with scum removal and sludge rakes
- Return/waste activated sludge pumping system
- Aerobic sludge digestion

Treatment systems of this kind are frequently called "package plants" since the entire treatment process is provided by a single supplier, with all necessary treatment processes included in a single "package". The design of both the mechanical and the biological processes is provided by the supplier, with all the components integrated into a single treatment system. The two existing treatment units each have a treatment capacity of 0.250 MD AADF and were provided with a process warranty, guaranteeing that the systems would meet AWT standards. The systems were designed and constructed by Evoqua (formerly Siemens).

Weiler Engineering has inspected the two existing AWT treatment trains at the KWRU facility. As with all wastewater treatment systems manufactured with coated steel, these units need periodic treatment and rehabilitation for corrosion, including replacement of corroded components, as well as enhancements to treatment components.

It is my professional opinion that Evoqua should be considered a Sole Source provider of the needed work for the following reasons:

KWRU 014802

- The treatment units rely on the steel members for structural support. Detailed structural drawings are not available. Fabrication of substitute components could result in inadequate structural strength and potential structural failure.
- Evoqua provided the existing two treatment units designed specifically for the Stock Island service area and the specific raw wastewater characteristics associated with the system.
- Each treatment unit was designed with specific hydraulic detention times, oxygen transfer efficiencies, biological uptake rates and sludge settling characteristics necessary to achieve AWT treatment. Any modifications to the flow characteristics or oxygen transfer rates may negatively impact the systems' abilities to meet the AWT treatment requirements.
- Evoqua provided a process warranty, guaranteeing the ability of the systems to meet AWT treatment standards. Modifications to the treatment systems by others would void the process warranty.
- The treatment units are unique mechanical systems comprised of numerous interconnected components that must function as a whole. Detailed dimensional drawings of the numerous individual components are not available. Fabrication of substitutes would likely result in improper fit without detailed dimensional drawings.

For the above reasons, Evoqua should be considered a Sole Source provider and the only viable option for the rehabilitation of the two existing treatment units.

If you have any questions or need further information, please let me know.

Sincerely,



Edward R. Castle, PE
Weiler Engineering Corporation