

Section 2 – Introduction

2.1 Purpose of this Report

The purpose of this report is to present information, conclusions, and recommendations for the City of Tarpon Springs to utilize in the planning and possible development of its public water supply, which would minimize and ultimately eliminate its dependency on other water suppliers. Through the evaluation of existing literature, similar experiences of other water suppliers, and specific evaluation of City facilities, this report presents preliminary recommendations for the most feasible water supply plan to meet current and future City needs.

In defining feasibility, water supply option(s) are evaluated using the following criteria:

- Cost of produced water (permitting, design, construction, and O&M costs)
- Potential for public acceptance
- Required time for implementation
- Potential for future expansion
- Potential environmental impacts
- Simplicity of permitting and compliance

2.2 Overview of Water Supply and Reject Disposal Options Reviewed

The following are the water supply options reviewed for the purposes of this report. In addition to the water supply options listed below, the primary disposal options reviewed include underground injection, disposal to surface water, or in cases of very low salinity, reject blending with WWTP effluent.

- FWS = freshwater surface: no salt removal required, minimal treatment
- FWG = Freshwater ground: minimal treatment, no salt removal
- FBS = Freshwater brackish surface: some salt removal (250 mg/L - 3,000 mg/L Cl⁻)
- FBG = Freshwater brackish groundwater: some salt removal (250 mg/L - 3,000 mg/L Cl⁻)
- BWS = Brackish Water Surface: moderate salt removal required (3,000 mg/L to 10,000 mg/L Cl⁻)
- BWG = Brackish Water Ground: moderate salt removal required (3,000 mg/L to 10,000 mg/L Cl⁻)
- DS = Desalination Surface Water: high salt removal required (>10,000 mg/L Cl⁻)
- DG = Desalination Groundwater: high salt removal required (>10,000 mg/L Cl⁻), i.e. the use of deep wells for raw water supply
- IR = Indirect reuse: the indirect supply of the water source with either reclaimed water or stormwater
- DR = Direct reuse: the direct treatment of reclaimed water for drinking water

Of the above listed options, FWS and DR can be eliminated as potential water supply options. FWS can be eliminated because there are no surface water bodies of sufficient capacity and quality to qualify as a viable fresh water source, which requires a reliability of < 250 mg/L chlorides. DR, because of public acceptance challenges and the potential long timeline required for implementation is not considered viable at this time. IR can be considered as a strategy to assist in the permitting and operation of wellfields; however, IR cannot be considered a water supply option in itself. As a result, essentially 7 options (shown in underline) remain for closer evaluation in this study.

2.3 Water Supply History of the City of Tarpon Springs

The City of Tarpon Springs has relied primarily on other water suppliers for its potable drinking water. This reliance for such a vital commodity has proven to be at a continued cost, not just in revenues paid to the supplier, but also in water quality issues and concerns.

Between 1926 and 1930 the City of Tarpon Springs made its first attempt to become self sufficient with potable water by utilizing surface water from Lake Tarpon. This was abandoned within a few years due to the salt water concentrations in the lake. These concentrations were attributed to a direct hydraulic connection between Lake Tarpon and Spring Bayou. Since 1930 the City has been reliant upon outside sources for its water supply.

In the late 1970's a subsequent effort was made to investigate the development of additional water supplies, which would reduce the dependency on Pinellas County Utilities (PCU) as the City's supplier of water. In 1978 the City of Tarpon Springs explored the possibility of producing additional water supply from groundwater sources. CH2M Hill, Inc. was contracted to perform an evaluation of potential water supply development. Two areas were identified in the Hydrological Report as potential groundwater supply areas in the City of Tarpon Springs. One area that has been identified was along the Progress Energy high voltage power line easement from approximately Sandy Hollow Drive south along Disston Avenue, south of Klosterman Road approximately ½ mile, west from Lillian Road east to U.S. Hwy 19. The other area identified in the study was an area near Lake Tarpon south of Tarpon Avenue along Highland Avenue and from Lake Tarpon east to Richard Irving Parkway. (Due to current and planned development in the Lake Tarpon area, the siting and placement of any groundwater production wells in this area would be difficult.)

After the hydrological study that was performed by CH2M HILL (1978), the City contracted with another engineering firm, Glace & Radcliffe, in the mid-1980's to select a location and construct wells within the areas identified by the CH2M HILL report. The area selected was along the Progress Energy high voltage transmission easement on the west side of Disston Avenue between Klosterman Road and Sandy Hollow Drive.

In the late 1980's test wells were installed along with monitoring wells to determine the possible production of this area. After data was accumulated from the test wells and monitoring wells, four production wells were installed and were permitted through the SWFWMD, with an average daily capacity of 216,000 gallons each and a peak monthly capacity of 252,000 gallons each. The City's Water Use Permit is included in Appendix A of this report. Each of the production wells was drilled to a total depth of 100 feet to 135 feet and was cased to approximately 70 feet. Six (6) inch submersible well pumps were installed into the production wells. Additional testing after installation was then performed on these wells and data was collected.

Testing following construction determined that water could be produced at a rate of 200 gpm to 300 gpm from each of the wells except for well 5A. The report on this well indicated that it was not capable of producing water at the rate of the other three wells. These wells have never been brought on line as water sources.

In summary, water supply independence in the City of Tarpon Springs has been a long time in coming considering the first efforts began nearly 80 years ago. Organizational instability has greatly contributed to the lack of progress toward this goal. In contrast, other local area municipalities, such as the City of Dunedin and the City of Oldsmar, with long term City Managers and top level personnel, have already achieved water supply independence or are close to achieving this goal, respectively.

2.4. Recent work on existing wells (modification for chloramines)

With the decision by Tampa Bay Water to change the disinfectant in the region's water supply from "Free" chlorine to "Chloramines", the City of Tarpon Springs was also required to change disinfectant. In order to make the changeover, the engineering firm of Jones Edmunds and Associates was hired to prepare design documents and to certify the major permit modification that was required. An "Application for a Public Drinking Water Facility Construction Permit" was submitted to and approved by the DOH to allow the required modifications to accommodate chloramines. The move to chloramines requires increased frequencies of well checks, special sampling, and monitoring.

In early 2003, the City completed recent testing and re-evaluation of the existing wells located adjacent to Disston Avenue. The test results were consistent with previous data and indicate the wells can produce quality water requiring minimal treatment. A detailed discussion of the testing and the results is presented in Section 3 of this report. Documentation of the test and its data is contained in Appendix B of this report.

Based on these test results, it is recommended these existing wells be outfitted with the proper treatment equipment for each (treating each well as a separate supply) and that each well be brought on line as soon as possible. This will reduce the amount of water purchased from PCU, and will begin to move the City towards a position of gaining control of its water resources.

2.5 Past Water Quality Issues With Purchased Water

Water quality became a focal issue in the late 1980's. The DOH was considering placing a building moratorium on the City of Tarpon Springs to prevent any further expansion in areas until certain water quality issues were resolved. Staff members performed an extensive analysis of the city's distribution system and collected data through the implementation of an aggressive flushing program.

This flushing program was designed to identify and determine:

- Areas of water quality concerns;
- The cause of water quality issues;
- Frequency/interval of areas requiring flushing;
- Intensity of flushing; and,
- The measures required to reduce customer complaints.

The evaluation showed:

- The quality of water being purchased and delivered from the provider at times exhibited low to absent chlorine residual;
- Disinfectant residuals deteriorated at each of the numerous interconnects between the City of Tarpon Springs and the water provider;
- Due to the multiple interconnects and large pipe sizing, hydraulic valving created "Dead Zones" or areas of "No Flow"; and,
- Existing city production wells were not producing daily permitted quantities

To offset these conditions, adjustments were made in the city's distribution and water treatment wells to reduce water quality issues. These actions included:

- Increased run times at city water supply wells to provide maximum water supply from these wells reducing purchased water volume;

- Increased chlorine feed rates at the City of Tarpon Springs water supply wells to supplement chlorine residuals supplied by the water utility provider;
- Staggered run times on city water supply wells to allow twenty-four (24) hour chlorine supplementation;
- Strategic valve manipulation to force water into areas of low flow and to reduce distribution hydraulic valving; and,
- Adjusted the frequency and intensity of flushing in the city's distribution system to improve water quality

The total number of water quality complaints was reduced from over seventy-two (72) complaints per month to approximately three (3) complaints per month within the 1st year of distribution analysis and modifications. These distribution analysis and modifications also reduced the number of locations requiring flushing from approximately one-hundred and fifty (150) to approximately thirty (30) and, through more strategic flushing, reduced the quantity of water required to be flushed. Staff was able to increase water production from the city's water supply wells, reducing the provider cost of purchased water and the dependency on water supplied by our contractual water provider.

2.6 Chloramines and Future Water Quality Concerns with Blending of Various Sources

The City of Tarpon Springs is now faced with new concerns as a result in a change in the form of disinfectant by the regional water supplier, Tampa Bay Water. This change has had a cascading effect on PCU and the City. With the introduction of chloramines as the new disinfectant, the number of routine samples indicating positive test results has increased. This has caused the need for more City equipment, more personnel, and more flushed or non-saleable water. The total number of gallons required for flushing to insure proper water quality within the City of Tarpon Springs, has increased from approximately 0.5% to 3% of the total volume purchased.

Chloramines were introduced in May of 2002 to offset the new regulations that were adopted by FDEP to reduce the TTHM (Total Trihalomethane Byproducts), which is formed by the reaction of chlorine and organic matter. This introduction of chloramines was determined as the method of reduction by TBW (Tampa Bay Water) based on their criteria.

Prior to the introduction of the new treatment method of chloramines, the City staff attended "Water Quality Forums" implemented by Pinellas County to inform wholesale customers of the possible effects this new method of treatment may have on drinking water distribution systems. Information was gathered at these meetings and independent research was performed by consulting other municipalities who had been on this type of treatment. Based on this information, the increased flushing was instituted to remove any sedimentation that may have accumulated in the distribution system.

Since the mandatory introduction of the chloramines into the its water distribution system, water quality issues have been experienced. In July of 2002, distribution field technicians recorded a measured lapse of total chlorine entering into the City's distribution system at one of the Pinellas County interconnections. During routine compliance monitoring that same month, five (5) positive results of total coliform were experienced during the same sampling event. In an effort to remain in compliance, continued sampling was conducted and over one hundred and fifty (150) samples were collected with fourteen (14) of those having positive total coliform results.

Because of the high number of coliform results, the City was required by the DOH to perform specific tasks in an effort to identify the cause of the bacteriological concerns and develop a plan for response. Among the required items was the installation of a continuous chlorine monitor at the County delivery interconnect. This was installed at the City's expense so that the County's water quality could be monitored. The data collected validated that poor quality water was entering the City system from the County. A consultant performed a review of current distribution system operation and maintenance. Based upon collected data and consultant recommendations, new procedures were enacted for flushing and sampling, and new sampling locations were initiated to prevent interference from outside sources.

Through these continuous evaluations of the distribution system, in August 2002, new procedures were implemented regarding flushing and sampling methods. Although these methods helped, the City of Tarpon Springs still experiences some positive sample results throughout its distribution system. These occurrences continued through the months of September 2002, October 2002, November 2002, February 2003, and March 2003.

Since the inception of the new disinfectant, intensive communication has been maintained with other local governments and the Pinellas County Department of Health (DOH) by City staff regarding information on any experiences that they may have had. Since that time, information has been received from other local governments who are experiencing similar problems within their distribution system. In March 2003, DOH advised on the status of PCU and that Pinellas County was on the verge of an exceedance for compliance sampling.

In talking to Pinellas County staff, information was obtained regarding the extent of the problem that Pinellas County was experiencing. The City was informed that Pinellas County had to sample approximately one-hundred and sixty (160) additional samples in an effort to avoid "Non-Compliance" status in the month of February 2003. The County is permitted to average its samples county-wide which gives them a large degree of flexibility not available to a city the size of Tarpon Springs.

Additional information from Pinellas County staff and DOH indicated the primary location that PCU was experiencing problems was in the northwest sector of the county. The City of Tarpon Springs also received information that PCU had in fact performed sampling at the point of delivery from the County to the City of Tarpon Springs and these samples indicated "positive" test results for total coliform bacteria. The City is unable to control or remove the bacteria once it is introduced into the distribution system by Pinellas County.

In an effort to gain control over the quality of the water delivered by the County, the City Manager requested a meeting with the County Administrator and the County Utilities Director. This meeting was held in June 2003. At the meeting the concerns were presented to the County regarding poor water quality received, expenditures required of the City as a result of the poor quality of water received from the County, and the County's plan for resolution of these issues. Additionally, the City Manager asked the County Administrator and the Executive Director of Tampa Bay Water to agree to regular joint meetings between TBW, PCU and City staff. These meetings were held at the County's S. K. Keller Water Treatment Facility in an effort to increase communication and to resolve problems in a timely manner.

Based upon PCU concerns of additional future County distribution system water quality problems, PCU is preparing to perform what has been termed as "Routine Maintenance" (Free Chlorine Treatment) of the County distribution system. This would require the downstream

wholesale customers to follow the same schedule to maintain disinfection. This "Routine Maintenance" that PCU is to perform is anticipated to last between 2 weeks and 4 weeks, and may be required semi-annually. Additional flushed water requirements and temporary water quality issues are possible effects upon the City with each maintenance event. The County information indicates that if these routing maintenance events are not performed or are not successful, additional boil water notices could result. Given the recent history of water quality issues, it is anticipated that these issues may continue to occur as additional sources of water are brought on line and mixed within the regional distribution system. In its current configuration, the City lacks the necessary control to effect change for system improvement.

2.7 Increasing Costs Anticipated with TBW's and PCU's CIP Programs

As TBW moves forward in its reduction of fresh groundwater dependency mandated by the Southwest Florida Water Management District (SWFWMD), new alternative water supplies are being developed and facilities constructed. These costs are currently passed along to the local governments and utilities that rely on this supply.

Following in Table 2-1 are the most recent estimates of water rate escalation as prepared by the PCU. In addition to the PCU projections, estimated City retail rates are added for purposes of comparison. Table 2-1 indicates wholesale water rates are anticipated to increase a net of 55% from 2002 to 2006. It should be noted that the PCU projections could stand to dramatically increase beyond these projections should a new county blending/ treatment facility, Keller WTP improvements, or other large scale improvements be fast-tracked as a result of recent County water quality concerns. In addition, ongoing issues with the Tampa Bay Water desalination plant and other new water supply projects to be constructed may well increase the costs of purchased water in the years to come beyond what is currently anticipated.

Table 2-1. Summary of Current County Rate Projections and Estimated Resulting City Retail Rates

Year	Wholesale (PCU) Rate, \$/1000 gallons*	% Increase	Estimated City Retail Rate, \$/1000 gallons	% Increase
2002	\$1.79		\$3.16	
2003	\$2.09	17%	\$3.44	9%
2004	\$2.30	10%	\$3.78	10%
2005	\$2.53	10%	\$4.16	10%
2006	\$2.78	10%	\$4.57	10%

**Source: Pinellas County correspondence from Bob Mitchell/Director Finance and Information Systems dated December 2, 2002.*

Note: future City % increases roughly assumed to parallel County increases for this example

2.7 Water Supply Independence – The City in Control of Its Own Destiny

If water supply independence is achieved, the following will be accomplished:

- The City will be able to plan and control future major projects required to maintain or improve water quality
- The City will attain vital control of water quality entering its system and the choice of treatment/disinfectant
- The City will have more direct control over its rate schedules without subsidizing costly projects from the water supplier resulting in escalating water costs.
- The City will not have to depend on others for water supply capacity planning to allow continued growth

- The City will be able to produce water more economically and, as a result, additional revenue will be generated

The above forms the impetus for this study and this report.