State of Florida

Public Service Commission

-M-E-M-O-R-A-N-D-U-M-

DATE: December 8, 1995

TO: All Parties of Record and Office of Public Counsel

FROM: Tim Vaccaro, Senior Attorney, Division of Legal Services

RE: **Docket No. 950387-SU** - Application for a rate increase for North Ft. Myers Division in Lee County by Florida Cities Water Company - Lee County Division.

Please note that an unscheduled, informal meeting took place the morning of December 6, 1995, at:

Florida Public Service Commission
Room 170-I, Gerald L. Gunter Building
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Mike Jenkins, Harold McLean and Jack Shreve of the Office of Public Counsel (OPC) met with Tom Walden of the Commission Staff. Among the topics discussed were the following:

ACK ____
AFA ____
APP ____
CAF ____
CMU ____
CTR ____
EAG ____
LEG ____
LIN ____
OPC ____
RCH ____
SEC 1
WAS ____
OTH ____

1) The reason for the utility's higher rates;

2) The likely reduction of utility expense if excessive infiltration is found;

3) The margin reserve calculation and its divergence from normal Commission practice resulting from the circumstances of this docket;

4) Whether different rate base and rates would result from applying the normal amount of margin reserve (eighteen months growth).

Staff provided written materials to OPC, which consisted of notes and a copy of the <u>Water Pollution Control Federation Manual of Practice No. 9 (WPCF MOP9)</u>. Copies of the notes and pertinent pages of WPCF MOP9 are attached to this notice.

TV/mw

Attachments

cc: Division of Water & Wastewater (Willis, Clark, Crouch, Galloway, Merchant, Rendell, Walden)
Division of Records & Reporting
Division of Auditing & Financial Analysis (Vandiver, Bouckaert)
Division of Legal Services (Jaber, Jaeger)

DOCUMENT NUMBER-DATE
12567 DEC 14 95
FPSC-RECORDS/REPORTING

NOTES FROM DEP FILES

4/13/95 DEP meeting
Odors from WWTP
Mr. Strambouly – odors on wkends & holidays
Gregor St. Johns – H_2S odors – EQ tank

~~[illegible]~~, ~~Baumbach~~, Stambouly (Shuckers Rest)
Karliskint, Griggs
DEP: Grob, Kongara, Schall, Barienbrock

Shuckers Rest – inside the Marina 995-7001

3/23 Carl Stambouly
Odor problem at Shuckers Rest

3/6/95 Ltr from DEP to Stambouly
1. Hauling of sludge only when rest. closed
2. 8–12 mo to re-route sludge from digester to EQ tank
3. Bioxide feed at LS 1 to be [illegible] reduce odors

3/6 – Shuckers complaint – odor

2/24/95 From Susanne Kittle, FCWC to Griggs
List of complaints of odor 11/93 – 2/95
24 entries (3 from Shuckers)

2/20 Complaint @ DEP – Shuckers

Schematic
NEWWWFLO

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Grease blockage (contained spill)
Spill on No Key Dr. 1/19/95 Letter (Wilson)

Ltr 1/4/95 to DEP from [illegible]
Spill on 1/3/95 CS#15
Hidden Acres
Electrical failure of float switches
spill in swale; recovered &
disposed of to WWTP
2,000 gal

New eqpt at WWTP

Burkhead digester
add aeration

EQ tank
mech. mixer
Move air piping to digester
Drum screen for grit removal

Sludge recirc pumps 3
~~Draw from~~ To send sludge to EQ tank

Effluent reuse
Cl_2 : fiberglas building
new piping on site
new line to Lochmoor

Lime silo to be added

Hoffman blowers
upgraded

Add'l air added to smaller aeration tank

16 bags lime outside ; lime slurry tank

Photo Birkdale Av, So side, 50 yd E of 24th Av
60 acre parcel ; W of Littlestone Court
for inclusion in cert. area

Effluent to Lochmoor
cost of line; installation resp; maint resp
CIAC ; line to terminate where?

00501

ask about Dev agreements for sec

Contract for effluent use —
min, max, daily use; cost;
metering method;

photo — Tropic Isles Baptist Church
(opp. Panzola on OG Blvd)

photo 41.28 acres
Frank D'Alessandro 481-6999
between Panzola & Palm Island on OGB

photo — ~~Bartlett~~ Barnett Park Comm Center
Breckbrook (near LS #6)
"Tenants — notice ..."

photo — Jim Mc ___ ReMax
489-0444 (opposite ~~Bartlett~~ Park)
25 acre creek front lots

photo — Skyline Woods (off Skyline, W of Moody)
Jan & Geo. Adams SWANK!

photo — Pink/gray house in Skyline Woods

photo — Gray stucco w/ ... in Skyline Woods
photo — Beige house / metal roof
photo — Yellow house / metal roof

photo "For Sale 5.5 acres — marina
call Lawrence Coleman 813-481-4046
On So side of Hancock Bridge, east of Moody

8.00

photo — Marinatown condos 36,000 2 Bed/2bath
Coldwell Banker McFadden & Simonds 9349332

00502

FLORIDA CITIES - NORTH FT. MYERS
950387-SU   USED/USEFUL CALCULATION

From Sch F-6, MFRs

÷4590 ERCs

USE THIS

Plant capacity	1.25 mgd	
	1.1753	256 gpd
- unused capacity	.0747 mgd	
ADF during year	.9421 mgd	205 gpd
÷ ERCs for year	4590	
=	205 gpd/ERC	

~~Unused capacity~~ 74,700 @256 gpd
÷ 205 gpd/ERC
= 364 ERCs ↓
292 ERCs

Therefore, allow 292 ERCs in the margin reserve.

are known to have contributed appreciable percentages of total infiltration.

Prior to the introduction of compression-type joints, the bulk of infiltration, except in sewers containing excessive amounts of broken pipe, entered at faulty joints. Many sanitary sewers have been built with either cement-mortar, or hot-poured or cold-installed bituminous joints. None of these jointing materials is entirely satisfactory because of the initial difficulty in making a tight joint and its deterioration with time. Fortunately modern jointing practice and the use of compression-type joints make it possible to reduce leakage from this source drastically. Most leakage into new systems now can be traced to defects in foundations or pipe strengths, or to faulty construction. A detailed discussion of joints and jointing materials is found in Chapter 8.

Poorly laid house connections may be extremely important sources of excessive infiltration since these lines often have a total length greater than the collecting sewers. House connections have been found to contribute as much as 90 percent of the total infiltration into a system. Because inspection and workmanship sometimes are found wanting when it comes to house connections on private property, some cities require pressure tests to be conducted. Moreover, there is a need for suitable public control of these connections in every community, including specifications and an insistence on proper construction practices.

Existing sewerage systems frequently are very leaky. Infiltration rates as high as 60,000 gpd/mile (140 cu m/day/km) of sewer have been recorded for systems below groundwater, with rates up to and exceeding 1 mgd/mile (2,450 cu m/day/km) for short stretches.

Infiltration and exfiltration tests and allowances for new installations are discussed in Chapter 6.

As with all other sources of unwanted water, infiltration must be kept to a minimum if the cost of pumping and treating sewage is to be minimized (12).

Excessive amounts of infiltration also can result in increased pipe sizes or the supplementing of existing sewers.

In the design of extensions to existing systems, past practices and trends in infiltration allowances should be considered. A study (13) reported in 1955 shows that by far the majority of stipulated allowances fell within the ranges shown in Table VII.

In Table VIII are additional data from a study concluded in 1965 (14).

TABLE VII.—Infiltration Specification Allowances

Pipe Diam (In.)	Infiltration Permitted	
	(gpd/mile)	(gpd/in. diam/mile)
8	3,500 to 5,000	450 to 625
12	4,500 to 6,000	375 to 500
24	10,000 to 12,000	420 to 500

Note: In. × 2.54 = cm; gpd/in. diam/mile × 0.000925 = cu m/day/cm diam/km.

TABLE VIII.—Variation of Infiltration Allowances among Cities

Number of Cities Reporting	Allowance (gpd/in. diam/mile)
4	1,500
4	1,000
1	800
2	700
1	600
63	500
11	450 to 300
16	250 to 150
21	100
5	50

Note: Gpd/in. diam/mile × 0.000925 = cu m/day/cm diam/km.

Comparing the data of Tables VII and VIII, it appears that specified infiltration allowances have not been reduced significantly in the 10-yr interval between the reports. With non-compression type joints it is possible to meet the average specification allowance of 500 gpd/in. diam/mile (0.465 cu m/day/cm diam/km) in workmanship, but this low infiltration rate is not likely to be maintained where the system is in groundwater. The reasons are discussed in the section on joints in Chapter 8.

The selection of a capacity allowance to provide for infiltration should be based on the physical characteristics of the tributary area, the type of pipe and joint to be used, and the type and condition of the joints and pipes in the existing contributory sewers. For small to medium-sized sewers (24 in. and smaller; 61 cm) it is common to allow 30,000 gpd/mile (71 cu m/day/km) for the total length of main sewers, laterals, and house connections, without regard to sewer size. Others make an allowance of from 10,000 to 40,000 gpd/mile (24 to 95 cu m/day/km), depending on sewer size and job conditions. This design infiltration allowance is added to the peak rate of flow of wastewater and other components to determine the actual design peak rate of flow for the sewer.

Seepage allowances are for average conditions where a portion of the length of the sewers is above the groundwater table and a portion below. If a substantial portion is to be permanently below groundwater, a larger allowance for infiltration should be made or special watertight joints specified.

A survey of municipal infiltration allowances (14) is summarized in Table IX.

Design allowances for infiltration normally are greater than infiltration-exfiltration test allowances. The infiltration-exfiltration tests are performed when the sewer is new. The design allowance is based normally on the anticipated condition of the sewer when it is nearing the end of its useful life.

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to concrete channels. Erosion of inverts may result from much lower velocities when sand or other gritty material is carried.

In the case of sanitary sewers where high velocity flow is continuous and grit erosion is expected to be a problem, the limiting velocity often is taken to be about 10 fps (3 m/sec).

Maximum design velocities in storm sewers, which by their nature occur infrequently even if such conduits are designed for a mean annual storm, may be much greater than those for continuous flow.

3. Design Depth of Flow

Sanitary sewers normally are designed to carry the peak design flow with a depth from one-half to full. Alternatively stated, the full-pipe capacity shall be from 100 to 200 percent of the design peak flow. The smallest sewers usually are designed to flow half full.

The degree of conservatism with which design peak flows are established will affect the selection of design depth of flow. For ventilation reasons, and particularly to avoid sulfide generation, it is undesirable for sanitary sewers to flow full or nearly full.

For storm sewers, the most common design practice is to have the line just full or lightly surcharged at design flow, but some engineers go further and allow the energy grade line to rise to within approximately 1 ft (0.3 m) of the gutter invert.

K. INFILTRATION

In many existing sanitary sewers infiltration is a major cause of hydraulic overloading of both the collection system and treatment plant. To handle this excess flow it may become necessary to construct relief sewers and expand existing treatment facilities. Other expenses also are incurred because of this unwanted flow, such as:

(*a*) higher pumping costs;
(*b*) caveins and structural failures in sewers and pavements resulting from soil washing into the sewer; and
(*c*) higher maintenance costs resulting from soil deposits in sewers, additional root penetration into leaky joints. etc.

Infiltration can enter through faulty joints, cracked pipe, or at manholes. Another source that sometimes is beyond the control of the designer is the house sewer. In many cases these connections are responsible for a major portion of the infiltration in the sanitary sewer. The designer, therefore, should recommend and advise the proper authorities that requirements for house sewers be specified by ordinance.

A more detailed discussion of infiltration and related matters is found in Chapter 3.

1. Infiltration-Exfiltration Test Allowance

Specifications governing sewer design and construction should set forth a maximum infiltration or exfiltration allowance. Infiltration specifications are generally in the range of 250 to 500 gpd/in. diam/mile (0.230 to 0.460 cu m/day/cm diam/km). Tests and allowances should include service connections or stub lines extended from the main or lateral sewer to the curb or property line. However, for lateral sewers with many stubs and wyes, the allowance should be increased 50 gpd/in. diam/mile (0.046 cu m/day/cm diam/km). Specifications should require that all visible or detectable leaks be repaired under any circumstances.

2. Infiltration-Exfiltration Testing

It cannot be over-emphasized that proper engineering inspection and field testing are absolutely necessary if infiltration is to be kept within allowable limits.

A rigorous infiltration or exfiltration test is recommended after completion of construction. Under soil and groundwater conditions that insure a water table above the top of the sewer, an infiltration test is sufficient; where the water table is below the invert, an exfiltration test is required.

Flow can be measured by means of weirs or other devices (see discussion in Chapter 7), but the measurements to be valid must be made with the water table at or near its maximum height to indicate the probable maximum infiltration. It also is important that the pipe walls be saturated thoroughly when the infiltration tests are conducted.

Exfiltration is measured by filling a reach of sewer to provide internal pressure and observing either the drop in head or the quantity of water required to maintain the reach in a full condition. The exfiltration test procedure must specify an elevation head, usually expressed as height of water above the top of the pipe at the upstream manhole.

Exfiltration and infiltration tests are not directly interchangeable. One report (7) covering limited tests suggests that the relation between exfiltration and infiltration varies with the head, and another (8) presents formulas for infiltration based on head and other factors. Type of soil, backfill methods, and pipe embedment materials may cause radical variations in exfiltration rates.

It must be anticipated that tests made shortly after completion of construction of the sewer usually will give results considerably lower than those which would be obtained months or years after construction.

In some areas, air pressure tests are being used in place of exfiltration tests (9) (10).

L. DESIGN FOR VARIOUS CONDITIONS

1. Open Cut.—Inasmuch as the load on a sewer built in open cut is a function of the bedding, trench width, backfill material, and superimposed load on the ground surface, consideration must be given to all these elements. Chapter 9, devoted to loads on pipes, presents details of this phase of design.

2. Tunnel.—A thorough knowledge of tunnel construction methods should be acquired before designing sewers for tunnel placement. This

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