

Comprehensive Management Review (CMR)

The City of Spring Hill Water and Sewer Department

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MTAS

**Municipal Technical
Advisory Service**

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I. Foreword

The Board of Mayor and Aldermen of the City of Spring Hill requested MTAS to perform a Comprehensive Management Review (CMR). The first functional area for review is the utility department. A CMR is a snap shot of what MTAS observes along with recommendations concerning the observations. Since the Tennessee Department of Environment and Conservation makes periodic visits to the utility and provides written reports of their visit to the utility on a periodic basis, MTAS did not observe daily work functions as part of the CMR process. These reports are a good source of information of the status of the utility department.

The city operates a water and sewer system. The city also sells water to two utility districts. The current water treatment and wastewater treatment plants are fairly new facilities. The wastewater plant is in the process of being expanded to meet changing flow issues. The city is also in the process of adding an additional above ground storage tank. The city has GIS capabilities.

II. Administration and Management

1. *Organizational chart and job descriptions.*

The city is developing a city wide organizational chart along with job descriptions. This is an involved and somewhat lengthy process. MTAS cautions the city to avoid the temptation of developing job descriptions for each individual employee. Job descriptions should be specific in some requirements and functions but still broad enough to cover multiple employees. MTAS's can assist the city in developing job descriptions.

MTAS recommends that the city develop job descriptions for all city positions.

2. *The Management of Utilities.*

a. Staffing

The city utility systems operate under a \$6,027,000 budget (2008-2009) employing a staff of 35 employees with a customer base of approximately 10,000 customers. The billing office maintains and bills for approximately 28,811 enterprise accounts, including approximately 9,081 solid waste accounts. The billing is processed monthly using one billing cycle. Meters are read electronically and bar coding is used in receiving payments.

The following utility and general fund personnel report directly to the city administrator:

- a. Chief water treatment plant operator
- b. Chief wastewater treatment plant operator
- c. City finance director
- d. City recorder

- e. Assistant city administrator
- f. Chief of police
- g. Fire Chief
- h. Public works director
- i. Library director
- j. Parks and recreation director
- k. Solid waste director
- l. City engineer
- m. Planning director

The city should review its management span of control, since most effective managers have approximately 8 subordinates reporting directly to the chief executive. The city's span of management control appears to be about 13 directors and service contractors reporting directly to the chief executive. An effective option for addressing this problem is to appoint a utility director or reassign a qualified staff member with utility director knowledge and experience with utility director responsibilities.

With 35 utility employees, not including indirect administrative support, chief operators are designated for each utility and they report directly to the city administrator, with the exception of the water distribution operator and wastewater collection operator, who report to the public works director.

b. Budget Comparisons

The city utilities employ:

▪ Water treatment plant operators	9
▪ Water distribution operators	14
▪ Wastewater treatment plant operators	7
▪ Wastewater collection operators	3
▪ Utility billing clerks	2

The city's utility operating budgets are as follows:

▪ Water treatment plant	\$1,866,400 including salaries of \$283,600
▪ Water distribution	\$1,547,700 including salaries of \$427,400
▪ Wastewater treatment plant	\$1,682,400 including salaries of \$222,900
▪ Wastewater collection	\$398,700 including salaries of \$93,200
▪ Billing and collection	<u>\$531,800 including salaries of \$326,000</u>
▪ Total	\$6,027,000 including salaries of \$1,353,100

The utility budgets in comparison to the city's general fund, including solid waste, are approximately 48 percent of the general fund budget. Approximately \$255,000 of the salaries in billing and collections are from individuals whose duties encompass both general fund and water/sewer fund functions (such as city administrator, finance director, recorder, public works, and others.)

General fund budgets include:

▪ Police Department	\$3,107,000
▪ Fire Department	\$2,814,300
▪ Streets and Highways	\$1,840,300
▪ Sanitation	\$1,450,800
▪ Parks and Recreation	\$412,900
▪ Library	\$531,000

Each of these departments is supervised by a director reporting to the city administrator. With a utilities budget of \$6,027,000, it would seem reasonable that utilities be supervised by a director reporting directly to the city administrator.

c. Coordination of Utility Services

Coordination of utility services- There is the need for the coordination of utility services:

- a. Utility revenues and expenditures need to be graphed over a period of time to alert management of severe variations from budget. Such variations alert management that there may be a problem and provides an opportunity for investigation and corrective action.
- b. The sufficiency of rates and service connection fees should be monitored and adjusted to reflect operating costs.
- c. The sharing of utility staff and resources need to be coordinated to reduce operating costs.
- d. While the city engineer provides project administration services, utility projects need to be carefully monitored to ensure that standards are being met and that they are in compliance with contracts and agreements.
- e. Engineering services need to be monitored to ensure that they are in compliance with the engineering service agreement.
- f. Utility budgeting and budget control and responsibility need to be more centralized.
- g. Utility billing needs to be carefully monitored by utility personnel and coordinated with the billing office.
- h. Operator training needs to be monitored and provided as required for effective utility operation.

- i. The city's consulting engineer is currently coordinating many of the utility services.

Adequate coordination may not be currently provided where each utility operates and reports independently to the city administrator or other staff. With a utility budget of over \$6 million, substantial investments in employees and facilities, the growing demand for increased service levels, complex state and federal regulations, and increased utility capacity needs, it is essential that the city effectively and efficiently manage, plan, direct, and control the operation and growth of utilities. Such can better be accomplished with the services of an experienced and knowledgeable utility director reporting to the city administrator.

MTAS recommends that the city establish the position of utility director with the authority and responsibility for staffing, budgeting, planning, controlling and directing utility activities and appoint a qualified individual to the position. The director would report to the city administrator.

3. City Engineer.

A review of engineering costs for calendar year 2008 indicated that the city paid \$239,108.66 for engineering services. Although the costs included some design services, most of the fees were for plat reviews, engineering consultation, meetings with various city officials, etc. that could be performed by an in-house engineer. It is the opinion of MTAS that an in-house engineer could perform these services, not including specific design fees, for approximately \$125,000, including salary, benefits and equipment. While the present engineering fees may be reasonable, the city is purchasing services that they could better provide with in-house staff. The city would continue to contract for professional design services.

MTAS recommends the city employ an in- house engineer for utilities, public works, and planning commission reviews.

4. Lack of written utility extension policies.

The city does not have written utility extension policies. The Tennessee Association of Utility Districts has model extension policies that are excellent. MTAS can assist the city in developing utility policies.

MTAS recommends that the city adopt utility extension policies.

5. Deposits

The city collects a \$50.00 non refundable fee for the first time water/sewer customer. Staff reports that customers living in rental units frequently move off and do not pay for utility services. This would indicate the need for security deposits or increased service charge for rental units. If the city switched to deposits then that money would be forfeited by the customer if they left the city owing a utility bill. The deposit should be sufficient enough to cover the last month's utility bill. The city may want to consider a tiered deposit schedule (renter, home owner,

commercial, etc.). Another alternative would be to increase the service connection fees for rental units in an amount that would cover the last month of service.

A review of water and sewer billing vs. water and sewer receivables for 2008 indicates that revenues exceed the amounts billed. This is an indication that there is no problem with collecting receivables or that posted revenues need to be reconciled with billings.

MTAS recommends that the city reconcile receipts with amounts billed on a regular basis and assess the need for deposits or increased service charges for rental customers.

6. Fees for specific jobs.

Currently the city has different fees for specific items, but there is no charge for a turn on or off during business hours or after hours. If a customer requests a service specific for them, the city should determine if the expense incurred performing the work is to be paid by all the customers or should be paid by the customer who requested the work.

All fees need to be reviewed on a regular basis, so that they cover all the expenses incurred. (Employee time with benefits, equipment cost, materials, office time, postage, etc.)

MTAS recommends that the city establish a fee for turn on and off during afterhours and periodically review the adequacy of such fees.

7. License Incentives

The city currently must have staffs, which hold the following licenses of appropriate grade from the State of Tennessee Department of Environment and Conservation: Water Treatment, Distribution, Collection, Wastewater Treatment and Cross Connection.

MTAS recommends that the city develop incentive pay for operators who obtain and maintain required state operator certifications.

8. Centralized customer complaint log.

The customer complaint log is kept at the public works building by the Distribution operator. A customer complaint may come to city hall, the dispatch phone to the call man or a utility department. The person who receives the call forwards the information to the appropriate person who then works the call. A complaint log is then completed and kept at the public works office. MTAS suggests that every location which may receive a customer complaint log have copies of the complaint form. The person receiving the call actually fills out the top part of the form and notifies the person who will work the call. The person who will respond to the complaint picks up the form and completes the bottom part of the form when the customer's complaint has been addressed. Once the form has been completed then it is forwarded to Public Works for records retention. Currently a customer complaint may get lost due to the report not being started when the call is received.

MTAS recommends that the city modify the customer complaint process to insure that a response is made and that adequate records are kept.

9. Lack of water curtailment ordinance.

The city needs a city ordinance for water curtailment during a water emergency and a water conservation resolution. The MTAS models of these two documents and a reference sheet, accompanying this report. (Exhibit 1, 2, and 3)

MTAS recommends that the city adopt a water curtailment ordinance and a water conservation resolution. See Exhibit 1, 2, and 3.

10. Fire Hydrants.

Currently, the fire department maintains and flow tests the fire hydrants. All the fire hydrant observed by MTAS, were painted white, with no indication of flow volumes available. According to the utility staff there is one fire hydrant with a black bonnet within the system all the rest are white with no color code. (Black indicates out of service). The utility staff says all the hydrants but the one black one will flow 500 gallons per minute with 20 psi. but they do not know the flows for each hydrant because the fire department does the flow tests.

MTAS recommends that the fire department identify flow capabilities on each fire hydrant and color code the hydrants as required by state regulations. The distribution operator should be responsible for the proper installation and operation of the hydrant. The distribution operator could assist the fire department with flow testing and color coding as required.

11. Safety Program.

MTAS observed elements of a safety program throughout the utility department. (Lock out tag out stations, MSDS folders, personnel protection devices, etc.). According to the utility staff the fire chief is the safety officer for the city and has periodically held safety meetings with the supervisors, who then passed the information to the employees.

Along with producing a written safety program, MTAS recommends that the utility department hold periodic safety training for all the employees for items specific to their department, (Chlorine safety, log out/tag out, chemical safety, confined space, blood borne diseases and pathogens, etc.) All safety training should be documented for each employee.

MTAS recommends that the written safety program for the utility department be updated and made available to everyone. After the plan has been updated a refresher class should be held for all utility workers on the plan.

12. Billing.

The meters are generally read by remote read around the 18th of the month. The data is given to the office for downloading and the bills go out on the 30th. With the exception of the two utility customers, receipts are received via a bar coding system, which is efficient. Two clerks are responsible for billing and receipting approximately 29,000 accounts, including the solid waste accounts.

The minimum water bill established by ordinance is \$6.75 for the first 2,000 gallons of water used per month. The minimum wastewater (sewer) bill is \$6.75 for the first 2,000 gallons of water used per month. These minimum bills represent both operating and capital costs for the water and wastewater systems.

Records indicate that there are 22 single water meters serving approximately 1025 residential and commercial units (apartments and small businesses) that do not pay a minimum charge. The minimum charge is paid by the single meter registrant only. It is generally accepted utility policy to charge each customer or unit served the minimum charge for service regardless of whether or not the service comes through a single meter. Most apartments have two baths, a water heater, a kitchen and a yard hose just as do residential homes.

The city is losing approximately \$166,000 per year by not charging each residential and commercial unit served a minimum bill. The minimum bill includes much of the capital costs associated with operating the utilities.

The billing division also bills for garbage service. Users of the service are identified when they sign up for a water meter. The city should make sure that the garbage bills are being properly charged where multiple customers are served by a single meter. MTAS was told that the contract provider makes all the assessments for service and the city bills and collects for the service based on those assessments. Although the solid waste billing practice will be reviewed in the CMR when the public works function is reviewed, it is mentioned here as part of the billing operation.

The city charges the water and wastewater funds an in lieu-of-tax fee based on their property values similar to property tax fees charged to all property owners. In addition, the city should charge the water and sewer funds a percentage of the general government expenses based on their percentage of the total city funds.

MTAS recommends that the city enact an ordinance requiring that each residential and commercial water and sewer customer be assessed a minimum monthly bill, just as are residential home owners and that solid waste billing be monitored by city staff. MTAS also recommends that the water and sewer funds be accounted for separately and that each fund pay a percentage of the general government expense.

13. Licenses.

There are two licensed operators at the water plant, who represent 22% of the plant staff. A plant employee is taking the test May 2009. If he passes, then the percentage of licensed staff goes up to 33%. The current pass rate on the test is around 55%. MTAS strongly believes that it is in the best interest of a city to have multiple licensed employees working at a treatment facility. Listed below are excerpts from TDEC rules regarding licenses at a water treatment plant.

TDEC rule 1200-5-3-.04 (3) states: *“All operating personnel making process control/system integrity decisions about water quality or quantity that affect public health must be certified. A designated certified operator must be available for each operating shift.”*

TDEC rule 1200-5-1-.17 (1) states: *“Because the proper operation and maintenance of water systems is critical to a system’s ability to provide safe water to the public and to comply with these rules, all water supply systems must comply with the provisions of Rule 1200-5-3. A violation of those rules is a violation of this rule as well.”*

In the past a written Standard Operating Plan written by a licensed operator sufficed for those unlicensed operators who made water quality or quantity decisions that could affect public health, when a licensed operator was not present. This may not be acceptable for TDEC and EPA in the near future.

The one licensed employee at the wastewater plant represents 14% of the plant staff. The city of Spring Hill does have two additional licensed wastewater treatment operators within the utility department, but they are not working at the wastewater plant. As stated earlier in this report, MTAS strongly believes that it is in the best interest of a city to have multiple licensed employees working at a treatment facility.

The time required to work in a plant prior to applying to take a test is different for a class III and a class IV. The rule excerpts below illustrate this point.

TDEC rule 1200-5-3-.09 (1) states: *“Grade IV Wastewater Treatment Plant Operator*

Certification as an operator in this classification will be made only upon the satisfactory completion by the applicant of the requirements of either subparagraph part (1) (a) 1 or (1) (a) 2 of this rule.

1. An applicant must have a bachelor degree in engineering, chemistry or a related science from an accredited college or university, must have twelve months of operating experience at a Grade III or a Grade IV Wastewater Treatment plant, and must satisfactorily complete a written examination.

2. An applicant must have a high school education or equivalent, must have sixty months of operating experience at a Grade III or a Grade IV Wastewater Treatment plant, and must satisfactorily complete a written examination. Within the discretion of the Board, college course

work in related science or engineering courses satisfactorily completed, or Board sanctioned comprehensive training in chemistry, bacteriology, and the fundamentals of wastewater treatment satisfactorily completed through schools for operators, correspondence courses, or other special training, may be credited toward the required operating experience to a maximum equivalency of thirty-six months.

Grade III Wastewater Treatment Plant Operator

1. An applicant must have a high school education or equivalent, must have twelve months of operating experience at a Grade II wastewater treatment plant or a Grade III wastewater treatment plant, and must satisfactorily complete a written examination. Board sanctioned comprehensive training in chemistry, bacteriology, and the fundamentals of wastewater treatment satisfactorily completed through schools for operators, correspondence courses, or other special training programs may be credited toward the required operating experience to a maximum equivalency of three months.”

Currently there are 10 employees assigned to distribution. Of these employees nine have a distribution license. This is very uncommon for such a high percentage of licensed distribution staff. The City of Spring Hill should be proud that these employees have taken the extra effort to obtain their license. Currently the overall pass rate for licenses in all categories is around 42%.

There are two employees assigned to the collection crew. One has a collection license. There are two other city employees who have collection licenses, but they are not assigned to the collection crew.

MTAS recommends that the city adopt an incentive plan for operators who obtain and maintain their license. The city should assist employees in obtaining proper operator certification as required by state regulation. A list of all employee licenses should be kept in a central location along with renewal dates and continuing education credits for ease of monitoring and reviewing.

14. Office area.

The city is also investigating whether or not to reorganize the water office. This would correct some deficiencies listed in the last audit. The office staff is preparing a Standard Operating Procedure guide for the office.

MTAS recommends that all office policies and procedures be in a written SOP and the office staff should be cross trained in duties and job functions.

15. Records Management system.

MTAS recommends that the city establish a records management system for the utility department.

16. Miscellaneous items:

During the review process MTAS observed the following generalities:

- Overall the employees were proud of what they do for the city.
- Moral appeared good.
- Supervisors had praises for their employees.
- Some employees thought that for the size of the city, the number of employees was less than neighboring cities. (Employee staffing minimal in some areas)
- The employees thought they were doing more now with fewer employees than when the city was smaller.
- The employees were proud of the standards and specifications produced by the city.
- The employees felt that past administrations did not listen to them about utility matters.
- Appreciated being involved in the budget process and receiving monthly budget updates.
- There were very little signs of turf issues within the utility department.
- Lack of equipment or materials did not surface during the interview process.

III. Water Treatment Plant:

The water plant is a surface water treatment plant, whose source is the Duck River. The plant has a design rating of 4.0 MGD with a maximum flow design of 6.0 MGD. The raw water pump station is over six miles from the treatment plant. The plant is staffed seven days a week 24 hours per day. Current average flow is ~ 2.6 MGD. The plant started in operation August 18, 2003. The state of Tennessee has rated this plant as a grade IV surface water treatment plant.

The plant utilizes an up flow clarifier (Superpulsator) operation with Greenleaf filters. The entire treatment process is enclosed within a building. The plant is very clean, neat and organized during the CMR visits.

The plant has a staff of nine people. Two employees have a class IV treatment license. The water plant manager and four employees work the day shift, two employees work from 2:00 pm to 10:00 pm and two employees work from 10:00 pm to 6:00 am. The work schedule for all employees cycles through a pattern of days on and off.

The water plant has a SCDA (supervisor controlled data acquisition) system to monitor plant operations; tank levels and the sewer lift stations. The water plant utilizes a third party vendor, (Labtronix) or annual calibration/verification of laboratory equipment and flow meters. Calibration records and bench sheets are kept to support the monthly monitoring reports sent to the Tennessee Department of Environment and Conservation, Division of Water Supply.

The last Sanitary Survey done by TDEC on the water system was in 2007. The city was rated an approved system. The Sanitary Survey format has changed and the city should be evaluated with this new format in 2009. The city has corrected all the issues which were listed in the 2007 survey.

The water plant has the following written programs:

- Monitoring Plan
- Risk Management Plan for the gaseous chlorine
- Laboratory QA/QC
- Standard Operations Plan
- Emergency Response Plan
- Bacteria Sampling Plan

The plans should be updated as needed. MTAS has given some minor suggestions to the plant manager. The Emergency Response Plan is currently being revised, but apparently does not include any wastewater functions.

The Risk Management Plan (EPA program with a 2,500 pound threshold) is not as detailed as other RMP plans that MTAS has seen. With the quantity of gaseous chlorine stored, the city may also need a Process Safety Management Plan (OSHA program with a 1,500 pound threshold) for the gaseous chlorine.

MTAS recommends that the city hire a risk management professional to develop a detailed Risk Management Plan and determine whether or not a Process Safety Management Program is necessary.

At the Federal level there has been movement to place the use of gaseous chlorine under the authority of the Department of Homeland Security. If this occurs, there may be additional Federal mandates concerning the use of gaseous chlorine.

1. Water Plant Issues:

- a. Compliance with Surface Water Treatment Rule for Total Trihalomethanes (TTHM) and Total Haloacetic Acids (HAA5).

According to the 2007 Water Quality report the TTHM values ranged from 14.2 to 113.9 ppb, with an MCL of 80 ppb. The HAA5 values ranged from 11 to 102 ppb, with an MCL of 60 ppb. The report is for Stage 1 of the rule where all the values are averaged together to calculate compliance. With Stage 2 of the rule the MCLs stay the same but each sample is calculated separately to comply with the MCL in a process called Locational Running Average.

The city should: maintain adequate flushing, looping distribution lines, eliminating dead end lines, decreasing the time of storage tank turn over, baffling in storage facilities, modifying

the treatment at the plant, adding additional treatment at the water plant or other operational changes as determined necessary by the system operator.

Adding additional chemicals at the raw water pump station could increase Total Organic Carbon (TOC) removal in the treatment process. When TOC is removed from the water, the potential of TTHM and HAA5 formation within the distribution system is reduced.

The city should try some trial applications of either an oxidizing or adsorbent agent or both at the raw water pump station.

b. Volume and flow issues from the raw water pump station to the plant.

The plant has not been able to flow 6 MGD from the raw pump station to the plant. The highest volume they have been able to do is a little over 4 MGD. The raw water is pumped to a point on the transmission line then flows by gravity to the plant.

MTAS recommends that the city contact an engineering firm to provide a study to determine flows from the raw water pump station to the water treatment plant. The study should address why a design of 6MGD will only flow 4 MGD.

c. Backwash Basin capacity.

The waste water from backwash the filters enters the backwash storage basins on the plant site. These basins are rather small and must be pumped out on a regular basis. The City may install a connection to the sewer so that this wastewater can be slowly discharged to the wastewater plant. The basins probably will still have to be pumped, but less frequently, if the connection to the sewer works properly. With the slow feed to the wastewater plant it should not upset the wastewater plant, but it will increase the biosolids volume.

IV. Wastewater Treatment Plant:

- a. The wastewater treatment plant is rated at 2.0 MGD. It is an activated sludge system. The plant was built in 2000. The City is in the process of expanding the plant to 5.0 MGD. Current average flow is ~1.9 MGD, with max flow ~4.0 MGD during heavy rain events. The state has rated this plant as a grade III wastewater treatment plant.

The wastewater plant has a SCDA (supervisor controlled data acquisition) system to monitor plant operations and the sewer lift stations. The wastewater plant utilizes a third party vendor, (Labtronix) or annual calibration/verification of laboratory equipment and flow meters. Calibration records and bench sheets are kept to support the monthly discharge monitoring reports and National Pollution Discharge Elimination System report sent to the Tennessee Department of Environment and Conservation, Division of Water Pollution Control and EPA.

The wastewater Plant participates in EPA's blind lab QA/QC program (DMR program) on an annual basis. Currently the lab is following QA/QC checks utilizing standards, spikes and duplicates per TDEC's suggestions.

TDEC last official visit was approximately 3 years ago. A TDEC employee collected samples for Bio-monitoring in January 2009. The city should expect an official visit from TDEC this year.

- b. The wastewater plant has experienced some minor compliance issues with:
 - *E coli* during or after a rain event. This was probably due to the increased flow through the plant.
 - Nitrogen due to the inability to properly remove solids from the treatment process.

The plant has a staff of seven people. They all work day shift Monday through Friday. The plant is checked by one person Saturday and Sunday. This duty is rotated among the staff. The wastewater manager has a class III wastewater treatment license. None of the other employees at the plant have a license. The City of Spring Hill has two other utility employees, who have grade IV wastewater treatment licenses, but neither is employed at the wastewater plant.

- c. With the expansion of the wastewater treatment plant, TDEC may upgrade the wastewater treatment plant to a class IV wastewater treatment plant, dependent upon the upgrades.

TDEC rule 1200-5-3-.04 (2) states: *“Each person in direct charge at a water treatment plant, a wastewater treatment plant, a water distribution system, or a wastewater collection system shall hold a certificate in a grade equal to or higher than the grade of the treatment plant, distribution system, or collection system he/she operates. The grade of a facility will be established by the criteria set forth in this chapter of rules.”*

TDEC rule 1200-5-3-.08 (4) (a) states: *“A wastewater treatment plant, except Biological/Natural, will be classified either as Grade I, II, III or IV in accordance with the following point totals:*

Grade IV.....76 or more points

Grade III.....56 to 75 points”

TDEC rule 1200-5-3-.09 (2) (b) states: *“The reclassification of a wastewater treatment plant or a wastewater collection system that immediately occurs as a result of this chapter of rules shall raise the operator classification of a certified operator then employed at that plant or system to a higher operator classification equivalent with the new classification of the plant or system. This subparagraph (2)(b) shall apply only to a certified operator whose operator classification, immediately prior to reclassification of the plant or system pursuant to this*

chapter of rules, is at least equivalent with the classification of the plant or system at which he/she is employed.”

The wastewater plant has a SCDA (supervisor controlled data acquisition) system to monitor plant operations and the sewer lift stations.

- d. The wastewater plant has the following written program:
 - Standard Operations Plan

The plan should be updated as needed. MTAS has given some minor suggestions to the plant manager. The Emergency Plan seen by MTAS does not include wastewater. Wastewater plant issues: (Hopefully, the physical constraints of the plant will be corrected in the plant expansion)

1. Flow due to Infiltration and Inflow.

It appears the City of Spring Hill has an infiltration and inflow (I & I) problem. Most sewer systems struggle with I&I on a daily basis. The plant is overloaded hydraulically during moderate and heavy rain events. With a hydraulic overload, the city has the potential to violate their National Pollution Discharge Elimination System Permit (NPDES). The expansion will ease this problem for a period of time. **I & I must be reduced in the collection system.**

If I & I are not addressed within the system; then the expanded plant could reach hydraulic overloading in a relatively short time. TDEC and EPA may determine the city would be required to have an approved Capacity, Operations and Maintenance Plan. TDEC could also place a sewer moratorium on the city, which would state that no new sewer customers would be allowed to tie into the system until the time where I&I volumes and plant flow are reduced to levels deemed appropriate by TDEC.

MTAS recommends that the city establish an Inflow and Infiltration abatement and maintenance program for the wastewater collection system.

2. Sludge (Biosolids).

Bio solids are a problem in most wastewater plants. The plant needs a certain amount of the Biosolids within the treatment process to properly treat the influent. Excess biosolids produced must be removed from the treatment train on a regular basis. The city currently uses a belt press to remove water from their biosolids prior to disposal at a landfill. The city does not land apply biosolids.

To maintain optimum operation, the plant periodically has to run the single press longer than normal to reduce solids within the storage facility or from the operation. The city has considered hiring three additional employees for the second shift to operate the press and

monitor the plant. MTAS does not agree with this approach due to the increased expenses of three full time employees. The plant is fully staffed five days a week on day shift. The weekend only has a single employee who does the minimum required duties in a couple of hours. It may be more prudent, financially for the city to work two employees on overtime during the weekend operating the press and performing required duties during those time periods when excess biosolids need to be removed.

The city should evaluate the bio solids program before and after the plant expansion.

MTAS recommends that the city pay existing employees overtime for week end seasonal monitoring service instead of hiring three additional employees.

3. Disinfection with Ultraviolet (UV) lights.

The city has taken the positive step to install Ultraviolet lights as the disinfecting process for the plant effluent. By eliminating the use of chlorine as the disinfectant, the city has also eliminated the necessity of a dechlorination chemical. The plant should have the ability to use chlorine in the return sludge system when there is a filamentous algae problem.

Currently, the plant has one bank UV lights. It would be prudent to have a spare set of bulbs at the plant. If the bulbs in use expire or get damaged then the effluent cannot be disinfected during discharge which may generate a NPDES violation. The city would have to order new bulbs but at the same time get permission from Tennessee Department of Environment, Water Pollution Control to set up an emergency chlorine feed and dechlorination feed for the effluent if the equipment to do this was readily available

The city should have spare UV bulbs on site or the equipment to install an emergency chlorination and dechlorination system.

The expansion may incorporate a multiple UV bank system to meet flow requirements. If so, the city still needs spare bulbs on site.

4. Written Records and Reports.

The wastewater plant has a lot of written material which needs to be “leaned”. Leaned means to reduce the amounts of records to what is essential, make the records easier to find, stop waste of materials and time, save space and better organization of the records and office management. The wastewater plant supervisor is currently in the process of revising records management at the plant.

MTAS recommends that non- essential records to be discarded at the wastewater plants.

5. The city is currently revising the Emergency Operations Plan for the water department.

This plan is a requirement of TDEC requirement of 1220-05-01.17 (7): Within one year after the effective date of these regulations all community water system shall prepare an emergency operations plan in order to safeguard the water supply and to alert the public of unsafe drinking water in the event of natural or man-made disasters. Emergency operation plans shall be consistent with guidelines established by the State and shall be reviewed and approved by the Department.

TDEC Water Pollution Control currently has not listed an ERP as a requirement as show in 1200-5-1 for water systems, but it is in the best interest of the city to develop a plan which includes wastewater.

MTAS recommends that the Emergency Operations Plan include the wastewater system.

V. Distribution System:

The distribution system has 4 above ground storage tanks with a capacity of 2.95 MG. The city is in the process of adding an additional above ground storage tank which will increase the volume stored above ground. When you add the clear well at the water plant the volume of water stored is 3.46 MG. The distribution system has over 155 miles of water lines and over 900 fire hydrants.

The distribution system has two taps with water producing systems, Columbia water system and the Maury County Water system.

1. Meter Change-Out Program:

In 2004, the City of Spring Hill replaced all the water meters in town with radio read meters. Currently, there are over 10,000 meters in the distribution system. The utility staff is in the process of developing a written meter change out program based upon meter longevity and battery life. This program will look at meter age using these three factors: volumes recorded by meter, installation date and battery life. In 2014, 6,000 of the meters batteries will be at the end of their expected life span. This may represent a large expense for the city.

MTAS recommends that this program be completed as soon as possible. The additional expenses should be incorporated into the budget and capital improvement plan.

To aid the department in “aging” meters; the billing software used by the city should have the ability to make queries using the three factors. With a list of aged meters the department can then budget for replacing those meters in a fiscal year.

MTAS recommends that the office staff be trained to make queries on the billing software.

2. *Flushing Program.*

The city has a written flushing list. Flushing according to the list occurs either in the spring or fall, dependent upon the location of the site.

The department utilizes flushing records for this work which appear to meet the TDEC requirement of 1220-05-01.17 (10): *All community water systems having more than 50 service connections shall establish and maintain an adequate flushing program. The flushing program established shall help ensure that dead end and low usage mains are flushed periodically, drinking water standards are met, sediment and air removal and the free chlorine residual specified under Rule 1200-5-1.17(4) is maintained. Records of each flushing are to be maintained by the water system. These records shall include date, time, location, persons responsible and length of flushing. In addition to the above information, the free chlorine residual will have to be measured and recorded on the end of dead end mains after being flushed.*

The City meters the volume flushed to aid in accounting for water volumes.

3. *Standard Operating Procedures (SOP).*

The distribution group has some written SOPs.

MTAS recommends that the SOPS be reviewed and additional ones added.

Once the new SOP has been developed all employees who will utilize it should read the SOP and sign and date a form that they have read the SOP. Copies of the SOP should be in every distribution work truck.

3. *Cross connection.*

The city has a State approved cross connection program with three staff members who are licensed to check cross connection devices. The elements of the program are determined by TDEC requirement of 1220-05-01.17 (6): *Pursuant to Section 68-221-711(6) the installation, allowing the installation, or maintenance of any cross-connection, auxiliary intake, or bypass is prohibited unless the source and quality of water from the auxiliary supply, the method of connection, and the use and operation of such cross-connection, auxiliary intake, or bypass has been approved by the Department. The arrangement of sewer, soil, or other drain lines or conduits carrying sewage or other wastes in such a manner that the sewage or waste may find its way into any part of the public water system is prohibited.*

All community water systems must adopt an ordinance or policy prohibiting all of the above and submit a copy of the executed ordinance or policy to the Department for approval. All

Community water systems shall develop a written plan for a cross-connection control program to detect and eliminate or protect the system from cross-connections. The written plan must be approved by the Department.

After adoption and approval of the cross-connection ordinance or policy and plan, each community water system must establish an ongoing program for the detection and elimination of hazards associated with cross-connections. Records of the cross-connection control program must be maintained by the water supplier and shall include such items as date of inspection, person contacted, recommendations, follow-up, and testing results.

(a) Public water systems must develop and implement an ongoing cross-connection program. Cross-connection plans and policies shall present all information in conformance with the “Design Criteria for Community Public Water Systems” as published by the Department.

(b) The public water system shall ensure that cross-connections between the distribution system and a consumer’s plumbing are surveyed and/or inspected and determined not to exist or contain a significant risk or are eliminated or controlled by the installation of an approved backflow preventer commensurate with the degree of hazard.

The city does not charge the individual customer for the annual checking of the cross connection device. There are roughly 1,600 devices within the city water system.

MTAS recommends that the city consider charging each customer who has a cross connection device a fee to recoup some of the expenses incurred by the city.

VI. Collection System:

The collection system has over 100 miles of sewer pipe and 11 active lift stations which are checked daily through the week. Most of the stations are monitored through the SCADA system.

1. *Infiltration and Inflow (I&I) program.*

As mentioned in the section on the wastewater plant I&I is a major problem in the City of Spring Hill. The city does not have a written active program to reduce I&I. An I&I program is an expensive and time consuming program. MTAS is concerned that if the City of Spring Hill does not start a program within a short period of time the newly expanded wastewater plant would be overloaded hydraulically.

MTAS strongly recommends that the city budget for reduction of I&I within the collection system.

MTAS has a publication entitled “*Managing Infiltration and Inflow in Collection Systems*” which can aid the city in this process. A copy of this publication is accompanying this report. (Exhibit 4)

VII. Summary of Recommendations

1. Develop job descriptions for all utility positions.
2. Establish the position of utility director.
3. Employ an in-house engineer.
4. Adopt utility extension policies.
5. Charge utility deposit fees or increase the service connection fees to cover lost revenues from renters.
6. Establish a fee for turn on and turn off during after- hours and periodically review the adequacy of such fees.
7. Develop incentive pay for operators who obtain state certifications required by the state. Maintain all operator certifications at a central location for ease of monitoring.
8. Modify the customer complaint process to insure that a response is made and that adequate records are kept.
9. Adopt a water curtailment ordinance and a water conservation resolution.
10. The fire department should identify flow capabilities of each fire hydrant and color code the hydrants as required by state regulations. The water department should provide assistance.
11. Update the written safety program and review with the staff.
12. Enact an ordinance requiring that each residential and commercial water and sewer customer be assessed a minimum monthly bill and staff monitoring of solid waste billing.
13. Graph revenue and expense over a period of time to highlight any deviations.
14. Office policies and procedures should be in a written Standard Operating Procedures Manual and the office staff should be cross trained in duties and job functions.
15. Establish a records management system and discard non essential records at the wastewater treatment facility.
16. Employ a risk management professional to develop a detailed risk management plan and determine whether or not a process safety management program is necessary.
17. Have an engineer provide a study to determine why the raw water pump station designed to flow at 6 million gallons per day can only flow at 4 million gallons per day.

18. Establish and budget for an inflow and infiltration abatement and maintenance program for the wastewater collection system.
19. Evaluate the bio solids program before and after the wastewater plant expansion.
20. Instead of hiring additional staff for week end and seasonal monitoring service of the wastewater system solids press, consider paying existing staff on an overtime basis.
21. Have spare UV bulbs on site or the equipment to install an emergency chlorination and dechlorination system.
22. Include the wastewater system in the Emergency Operations Plan.
23. Continue the water meter replacement program.
24. Train the office staff to make queries on the billing software.
25. Review existing standard operating procedures and add new procedures as needed.
26. Charge customers with cross connection devices a fee for required periodic inspections.
27. Change the water and sewer fund a percentage of general government expenses.

VIII. Exhibits

Exhibit 1- Water Curtailment Ordinance

Exhibit 2- Water Conservation Resolution

Exhibit 3- Managing Infiltration Inflow in Wastewater Collection Systems