REVIEW OF PLANT OPERATIONS & BUILDING AUTOMATION

Project # 20160201
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Project Team

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Executive Summary

Overview

Overall, despite years of management turnover and budgetary constraints, Texas Facilities Commission's (TFC) Plant Operations and Building Automation (the program) has generally managed to accomplish its mission of providing a "comfortable, safe and healthy work environment" for state employees in a manner that complies with applicable rules and regulations. However, a number of significant improvements are needed for the program to achieve a higher level of operational effectiveness and efficiency.

With 4 different deputy executive directors and 4 different program directors in 4 years, the program has not seen consistent, sustained leadership to help it address the complex challenges it faces. The program's key challenges include old, ill-maintained equipment, lack of a defined preventive maintenance plan, inadequate staffing, insufficient employee training and a lack of management (analytical) tools to assist with proactive continuous improvement planning. The program is generally reactive rather than proactive, and has a general need to address symptoms rather than root causes to problems.

All these issues have resulted in a program that operates in a crisis management mode. The focus is to keep plant equipment "running" rather than ensuring it is working at its most efficient (including energy efficiency) level.

Accountability Framework

The program does not have an accountability framework to provide management with information for effective decision-making regarding resources, operations and the future. A strong accountability framework would provide clearly articulated specific, measurable, achievable, relevant and time-related (SMART) goals, key performance indicators, and reliable tools to assist management in maintaining and tracking key performance data. The tools would also assist staff in synthesizing information from the key performance monitoring systems into periodic management reports and allowing for the development of smart management solutions. The absence of an accountability framework makes it difficult for the program to determine root causes for problems, identify potential corrective actions, devise specific solutions, and monitor for implementation and compliance. The lack of accountability could be cited as the cause of some of the issues included in this report.

Program management is aware of most of the issues discussed in this report and has indicated it has been impeded by inadequate resources.

Background

The program is responsible for providing central plant operations and building automation controls to buildings, building systems, parking garages, and ancillary facilities managed and/or maintained by TFC. The objective of the program is to provide "a comfortable, safe and healthy work environment" for state employees, thereby contributing to the efficiency and productivity of state government. The program is staffed on a 24-hour work schedule to monitor central plants that

provide chilled water and steam to various buildings. The program is also responsible for 67 stand-alone systems in buildings that do not receive chilled water or steam from the central power plants.

The program had 28 staff, including 1 director, 2 supervisors, 17 plant operators, and 4 building automation specialists as of August 31, 2015.

Summary of Management's Response

Management agrees that, despite years of management turnover, significant budgetary and staffing constraints, and aged equipment that is mostly beyond its useful life cycle, these two agency programs - Plant Operations and Building Automation – have accomplished the critical mission of providing a "comfortable, safe and healthy work environment" for state employees in a manner that complies with applicable rules and regulations. Management also agrees that the program does not have a strong accountability framework and that significant improvements – including SMART goals, key performance indicators, and other tools – are needed for Plant Operations to achieve a higher level of operational effectiveness and efficiency.

The focus of the program, by necessity, has been to keep the plant equipment running as this plant provides critical services to fourteen buildings in the Capitol Complex, including the historic Capitol and Capitol Extension. Loss of service from the plant would disrupt the continuity of operations for agencies housed in these buildings which include the State's key executive, legislative, and judicial functions. Additionally, aged equipment cannot operate at peak efficiency as the unavailability of parts makes it necessary to bypass certain functions that would otherwise increase energy efficiency, albeit not to the current standards of state-of-the art equipment. By design, much of the aged equipment requires manual processes that cannot be adapted for automation. Chronic understaffing creates challenges in ensuring coverage on all shifts in the event of unplanned staff absences or to accommodate staff training that takes place away from the plant. Several years ago, program management established an informal mentoring effort, pairing more-experienced staff together with less-experienced staff during a shift in order to facilitate on-the-job training within staffing and budgetary constraints.

The state of the equipment, and subsequently the state of the program and the circumstances under which the program operates, are directly related to funding levels of the past twenty years or more. The significant physical constraints of aged equipment, inadequate funding for major repair and replacement, and long-standing understaffing cannot be overstated. These constraints have required the triage-type prioritization of limited personnel and financial resources for mission-critical activities over other highly important agency and program needs and activities. Over the past five years, agency and program management have been diligent in identifying individual and multiple linked factors contributing to these constraints and have proactively sought to eliminate or improve these challenges through the following actions:

- *Development of a strategic plan to consolidate and upgrade plant operations throughout the Capitol Complex with funding requested in both the FY2014-2015 and FY2016-2017 appropriations cycles and approved in the FY2016-2017 General Appropriations Act. Implementation of this major strategic initiative will ultimately construct a uniform level of up-to-date equipment running through a uniform set of*

infrastructure and will fundamentally transform the nature of plant operations in the Capitol Complex.

- *Coordination with FDC and Fiscal staff to ensure critical equipment replacement has been included in the agency's Legislative Appropriations Requests (LARs) for deferred maintenance projects in FY2014-2015 and FY2016-2017.*
- *Coordination with FDC to ensure that plant equipment replaced in conjunction with funded deferred maintenance projects meets required energy efficiency standards.*
- *Coordination with FDC to leverage existing contract requirements to ensure that when new equipment is put in place, the manufacturer provides basic training on that equipment for Plant Operations staff.*
- *Coordination with FDC going forward to require that contracts for future projects that involve installation of new equipment include comprehensive training of Plant Operations staff on the equipment.*
- *Reallocation of existing personnel slots and funding to increase staffing levels at Plant Operations.*

Improving or eliminating these constraints is directly related to funding provided through the biennial appropriations process. Agency and program management will develop future LARs that document both the magnitude and practical effects of these constraints and that sufficiently seek the full level of funding needed to effectively address them. Within existing funding and staffing constraints, management will implement new initiatives to formalize a framework that will enable and facilitate development and establishment of SMART goals and key performance indicators in this program. These particular initiatives – which have not been a formal initiative of previous agency leadership – will also include the development and implementation of other state-of-the-art tools for analyzing and resolving problems, and for measuring performance and guiding management decisions agency-wide, throughout and across programs and functions. These efforts will be undertaken in conjunction with the Commission workgroup on Strategic Operations and Planning and initial recommendations for the basic framework will be presented at the first workgroup meeting.

Closing

We would like to thank the Plant Operations and Building Automation staff for the cooperation and assistance provided to the audit staff during this audit. For questions or additional information concerning this audit report, please contact Amanda Jenami at 512-463-1438.

Objectives and Conclusions

The overall objective of this audit was to determine the extent to which TFC processes ensure the Plant Operations' and Building Automation's goals are accomplished effectively and efficiently, in compliance with relevant regulations, inter-agency agreements and procedures, and in a manner that provides a comfortable, safe and healthy environment.

The audit focused primarily on Plant Operations' and Building Automation's activities from September 1, 2013 to August 31, 2015. Fieldwork was conducted in September 2015 through October 2015. The detailed audit objectives and conclusions are described next.

Objective 1 – Operational Effectiveness

1.1 Determine the extent to which Plant Operations and Building Automation functions have had stable, continuous leadership.

With 4 different deputy executive directors and 4 different program directors in 4 years, the program has not seen consistent, sustained leadership.

1.2 Determine the extent to which program management engages in long-term planning activities.

The program has not engaged in proactive long-term planning. This may have been partly due to high turnover in the deputy executive director position.

1.3 Determine the extent to which the agency's processes ensure program goals are accomplished in an effective manner. Further, determine the extent to which Facilities Operations management has developed performance measures and targets for key activities.

Program planning is informal. Program management has not set formal (written) (SMART) goals. Program management has not developed key performance indicators and set targets for its key activities. Performance measures and targets for those areas that are critical to the success of the program would go a long way to ensure employees are aware of management expectations and that they (the expectations) are met.

1.4 Determine the extent to which reporting lines are clear and that the agency's organizational structure facilitates easy communication and coordination between divisions.

The program is central to the agency's mission and impacts many of the agency's functions. The agency's siloed organizational structure makes a clear articulation of roles, responsibilities and authorities difficult. The organizational structure makes effective interdivisional communication and collaboration more critical to the success of the program. The interdivisional multi-disciplinary biweekly meetings assist in the

sharing of information about building operation issues, and upcoming maintenance/construction work. However, more needs to be done.

1.5 Determine the extent to which the agency has processes in place to identify and prioritize critical assets and processes (and ensuring they are appropriated adequate resources).

The agency does not currently have a system that allows for cataloguing, inventorying, issue-tracking, risk-classifying and accounting of all key equipment. The current hierarchy of systems is informal and not based on a formal risk assessment.

1.6 Determine the extent to which the program has the knowledge, skills, abilities and resources necessary for optimal goal accomplishment.

The program has the knowledge, skills and abilities to keep the equipment "running" but not necessarily to ensure the equipment is working at its most efficient (including energy-efficiency) level. A benchmark performed as part of this review found the program to be significantly understaffed. The agency's uncompetitive plant operator salaries make it difficult for the program to attract staff of the right caliber.

1.7 Determine the extent to which training and mentorship programs are operating effectively.

The program has not provided its employees with adequate technical training. The mentorship program is informal and has not been successful partly due to a lack of accountability processes that ensure mentors take ownership of the knowledge transfer that is needed.

1.8 Determine the extent to which employee performance management processes are effective and operating. Further, determine the extent to which personnel is supervised.

Without such tools as performance plans, periodic evaluations, and a formal system that seeks to reward good performance, the program does not have effective employee performance management processes in place.

1.9 Determine the extent to which program management has provided Facilities Operations employees with documented policies and procedures to guide them in performing their daily duties. Program management has developed formal detailed written procedures to guide staff in its day-to-day duties.

1.10 Determine the extent to which disaster recovery planning ensures continuity of program operations in the event of a disaster.

The program has not developed a formal up-to-date plan to prepare for, respond to, and recover from a disaster in a manner that minimizes disruption of business operations in the event of a disaster.

1.11 Determine the extent to which formal backup procedures ensure timely recovery of building systems data in the event of a mishap.

Building Automation's disaster recovery plan (last revised in fiscal year 2013) is not up-to-date. It has not been updated for the changes in staff's roles and responsibilities that were effected after the plan was implemented.

Objective 2 – Operational Efficiency

2.1 Determine the extent to which maintenance of key assets/ units has been performed in accordance with the manufacturer's recommended maintenance schedule.

The program does not follow manufacturer's recommended maintenance schedules. The program's current approach to equipment maintenance is discussed in the detailed section of this report (under Preventive Maintenance).

Objective 3 – Regulatory Compliance

3.1 Determine the extent to which mechanisms exist to ensure compliance with applicable regulations.

The program has processes in place to ensure compliance with the Texas Health and Safety Code, Chapter 755.029 and the City of Austin's boiler backflow prevention assembly testing requirements.

Detailed Issues with Management Responses

1. Operational Effectiveness – Accountability Framework

The program does not have an accountability framework to provide management with information for effective decision-making regarding resources, operations and the future. The absence of an accountability framework makes it difficult for the program to determine root causes for problems, identify potential corrective actions, devise specific solutions, and monitor for implementation and compliance. The program is generally reactive rather than proactive, and has a general need to address symptoms rather than root causes to problems. The review found a lack of accountability in a number of areas.

1.1 Accountability Framework - Planning

The program has not developed a formal plan to help shape how its mission will be accomplished. The program has not established formal quantitative goals, performance metrics and targets to help ensure the program mission is accomplished more effectively. An effective accountability framework is dependent on a strong proactive planning process that defines goals, priorities, and key risk mitigation strategies that can then be measured and monitored to ensure achievement of the mission.

Goals

Program management has not developed clearly articulated (SMART) goals. Goals are important because they help focus the program activities to what is important. For example, with utility costs comprising as much as 50% of the agency's general revenue funded appropriations for the year, the program should develop some energy efficiency and water conservation goals to assist in reducing agency utility costs. The agency's Strategic Plan includes "reduced energy consumption and increased energy efficiency" as strategic objectives. An agency strategic goal to reduce energy costs by a stated percentage over a stated period of time could be a concrete mechanism (from agency leadership) to complement the great strides the agency's Office of Energy Management (OEM) has accomplished in the last two years. In addition, it could help script the agency's energy efficiency initiatives, specifically the Commission's Energy Work Group and OEM's Resource Conservation Committee (RCC) efforts. In addition, a specific agency energy efficiency goal would further assist with unifying employees from different operating units.

OEM described RCC's role as that of "coordinating and leading the energy and resource conservation activities between different divisions of the agency." It serves as a conduit between

TFC's Energy Work Group, the Commission and the rest of the agency in matters related to energy and resource conservation.

Key Performance Indicators (KPIs)

Program management has not set key performance indicators and targets for its key activities to provide important guideposts for the program in determining how well it meets the set goals. Good key performance indicators would provide the program with an actionable scorecard that keeps track of those activities as equipment downtime, responsiveness, "nuisance" alarms, and employee training would go a long way in assisting management in managing, controlling and achieving desired results. In addition, key performance targets and indicators assist with ensuring employees are aware of management expectations and that they (the expectations) are met.

Stakeholder Feedback

The program has not formally sought feedback from property managers on a regular basis. Customer satisfaction feedback should be a key performance indicator that helps staff focus on the importance of fulfilling stakeholder expectations.

Recommendations

Improve operational effectiveness by implementing:

(i) SMART goals to focus program activities and ensure accomplishment of the mission.

(ii) A more specific and measurable energy consumption reduction goal including strategies to complement the work of the agency's Energy Work Group and OEM's Resource Conservation Committee's (RCC) efforts initiatives in energy cost-reduction.

(iii) A set of key performance indicators and targets to assist with keeping track of accomplishment of program goals.

(iv) Providing agency management with periodic reports showing variances between actual and target performance.

(v) Formal customer satisfaction feedback from property managers to assist with meeting stakeholder expectations.

Management Action Planned:

Within existing funding and staffing constraints, management will develop and implement a formalized accountability framework for this program that will enable and facilitate development and establishment of SMART goals, key performance indicators, and other tools such as periodic reports, for measuring performance and guiding management decisions for the program as well as agency-wide throughout and across programs and functions (Recommendations (i), (iii), and (iv)). Establishment of applicable energy conservation goals for the Plant Operations and Building

Automation programs will be formalized in conjunction with overall agency energy conservation goals developed by the agency's Office of Energy Management working cooperatively with Plant Operations management and staff (Recommendation (ii)). The end customers of Plant Operations and Building Automation are the tenant agencies in the buildings, not the property managers. While the property managers may receive some feedback from the tenant agencies that relates to the functions of Plant Operations and Building Automation, management will develop an appropriate mechanism to obtain formal customer satisfaction from these customers that recognizes the applicable distinctions between the responsibilities of these two programs and the responsibilities of the building maintenance technicians. This differentiation will be essential to ensure that the appropriate measures are implemented by the relevant program staff (Recommendation (v)).

Responsible Parties: *Executive Director, Deputy Executive Director of Planning and Real Estate Management, Director of Strategic Planning and Policy, Director of Property Management, Deputy Executive Director of Facilities Design and Construction, Director of Energy Management*

Estimated Completion Date: *August 31, 2016 [Recommendations (i), (ii), (iii), and (iv)], April 30, 2016 [Recommendation (v)]*

1.2 Accountability Framework – Communication and Coordination

The program is central to TFC's mission and impacts many of the agency's functions. However, the agency's siloed organizational structure poses challenges – making a clear articulation of roles, responsibilities and authorities difficult. The silos make it that much harder for leadership to foster collaboration and cooperation between operating units. Management is aware of the challenges posed by the organizational structure and has recently implemented interdivisional multi-disciplinary biweekly meetings to assist in the sharing of information about building operation issues, and upcoming maintenance and construction work.

An agency-wide strategic goal to reduce energy consumption by a stated percentage over a stated period of time could be a thematic and concrete mechanism to help unify employees from respective operating units.

Recommendation

Improve operational efficiency by streamlining (as much as possible) the agency's organizational structure, fostering more interdivisional team cohesiveness, and implementing thematic collaborative strategic goals that bring operating units together.

Management Action Planned

Management will streamline the organizational structure of Property Management Services in conjunction with a review of the Preventative Maintenance Program which has undergone multiple organizational changes in the past 2-3 years.

In the short term, the manager of the preventative maintenance program staff and the electricians will report to the Director of Facilities instead of the Director of Property Management Services.

The interdivisional, multi-disciplinary, biweekly meetings to assist in the sharing of information about building operation issues and upcoming maintenance and construction work have been taking place since early 2014 and have made a huge improvement in effective cross-functional communication and coordination between the program areas. The attendees at these meetings represent all the core functions of the agency. Other cross-functional, interdivisional meetings also take place regularly or on an as-needed basis. The development and implementation of collaborative strategic goals will be addressed as part of the initiatives described above.

Responsible Parties: *Executive Director, Deputy Executive Director of Planning and Real Estate Management, Director of Property Management, Director of Strategic Planning and Policy*

Estimated Completion Date: *April 30, 2016*

1.3 Accountability Framework – Integrated Computerized Information Management System

The agency does not have an integrated computerized information system to provide management with an up-to-date list of the program's key equipment/ assets (boilers, chillers, etc.) and the known deficiencies on each individual unit. Currently, equipment data is housed in several different databases, making obtaining complete, accurate, reliable and timely reports a real challenge. Management is aware of this issue and has been working to obtain funding for an integrated workplace management system (IWMS).

In the short-term, an integration of key computerized information systems (including the work order management system and the asset management system, etc.) would greatly reduce data redundancy, and in turn, improve operational efficiency. In the long term, an integrated workplace management system that integrates project management, real estate management, space management and maintenance management, while allowing for cataloguing, inventorying, risk-classifying and accounting of all key equipment would be a great asset. It would make the tracking of milestones, individual equipment, warranty information, equipment performance issues, and the monitoring of recommended versus actual maintenance much more efficient. A clearly articulated preventive maintenance plan (once developed) could be incorporated into such a system. The system would send warranty expiration and planned maintenance reminders to those responsible, among others. A formal risk-classification system (based on building functionality and potential risk impact) would assist with prioritization of response efforts.

The review did not find evidence of periodic management reports. Periodic dash-board type management reports are important for ensuring management is informed of the extent to which the program is accomplishing its mission.

Recommendations

Improve operational effectiveness by:

(i) In the short-term, working closely with the agency's Information Technology (IT) division to integrate (as much as possible) current databases to reduce data redundancy.

(ii) In the long term, implementing an integrated workplace management system; and,

(iii) Designing and providing management with robust dash-board type reports for periodic monitoring.

Management Action Planned

In regards to Recommendation (ii), agency management has developed a strategic initiative to integrate the disparate software programs used to manage the maintenance and operations of over 14 million square feet of gross building area in 82 buildings and 36 parking lots statewide. Each software program does an adequate job of managing its core function but data cannot be transferred between them and must be manually downloaded and uploaded to make the transition. Many tasks also require entry of the same data into multiple programs to accomplish a project. The overall approach is workable but inefficient and subject to errors. Since 1992, there have been at least four audits and two third-party studies that noted critical deficiencies in TFC's information system infrastructure. The findings point to a lack of coordination between the disparate systems that put TFC at risk of making poor decisions based on inadequate or inaccurate information. Most recently, the Sunset Advisory Commission raised this condition as a significant concern in their report on TFC.

To address the physical constraints of these disparate systems that cannot be integrated, the agency's LAR for FY2014-2015 included a funding request for an Integrated Workplace Management System (IWMS) which was not approved and the LAR for FY2016-2017 included a funding request to conduct an assessment for an IWMS which was also not approved. The purpose of the assessment was not to determine or justify the need for an IWMS, but rather for the purpose of building the business model, building the infrastructure, and documenting the workflow to be implemented by the system.

An IWMS is an integrated web-based modular solution that covers five core areas of construction project management; real estate administration and management; space and facilities management; maintenance management; and sustainability. The five core modules operate from a single integrated database using real-time information. Each module addresses a core TFC function and information that is inputted or removed is immediately available to the other modules and their users. There is very little duplicate data entry required that greatly reduces staff time and errors. The system includes business analytics which allows staff to run what-if scenarios, evaluate results, and project future strategic decisions. The system will also automatically inform

staff of problems including increased or abnormal energy consumption, overbilling by vendors, equipment that is not operating properly, and other items that can result in additional cost to TFC. Funding of this request was not approved and Article IX of the General Appropriations Act adopted each biennium prohibits the expenditure of appropriated funds for any capital budget item that was presented during the appropriations process but was not approved. This request for funding both the IWMS and the assessment will be included in the agency's FY2018-2019 LAR for the Commission's consideration.

In regards to Recommendation (i), in the short term, within budgetary and statutory constraints, the agency's IT division will continue to work with programs to reduce data entry redundancy to the greatest degree possible as well as to assist in the strategic planning initiatives described above to design improved reporting capabilities. According to the agency's Chief Technology Officer, the agency does not have data redundancy to eliminate other than duplicated manual data entry into the disparate systems. Program and IT staff have been discussing the requirements for building of electronic interfaces that will eliminate duplicated manual data entry in the work order system (MicroMain) and the procurement system (APS), but a formal project request has not been submitted to IT. Management will ensure a formal project request is submitted to IT by November 30, 2015. Given existing requirements and deadlines for annual security and policy reviews that must be completed by IT, as well as their current project workload, an estimated schedule for this project should be developed by IT by April 30, 2016.

In regards to Recommendation (iii), this will be addressed as part of the initiatives addressed under Item 1.1.

Responsible Parties

Executive Director, Deputy Executive Director of Planning and Real Estate Management, Director of Information Technology (Chief Technology Officer), Director of Property Management Services, Director of Procurement

Estimated Completion Date

November 30, 2015 and April 30, 2016 (Recommendation (i), May 31, 2016 (Recommendation (ii), and August 31, 2016 (Recommendation (iii)

1.4 Accountability Framework – Human Resources

Staff Knowledge, Skills & Abilities

The program has not adequately invested in its human capital. While the program has the knowledge, skills and abilities to keep the equipment "running," it does not have sufficient staff and expertise to ensure equipment is working at its most efficient (including energy-efficiency) level. A benchmark performed as part of this review found the program to be significantly understaffed, when compared to comparable operations. The new executive director is aware of this and has provided funding for 4 additional plant operator positions. However, this may not adequately address the current shortage.

Management finds it difficult to attract the right caliber of staff (i.e. those with commercial building operations expertise) due to the agency's uncompetitive salaries. The program has to hire plant operators with residential experience with the objective of closing the expertise gap with on-the-job training, an approach that has its own challenges.

Employee Training and IT Resources

The program has not developed a technical training program to ensure employees have the skills and knowledge to perform their duties. An investment in technical training (in such areas as safety, chiller and boiler operation, and cooling tower maintenance) would help close the knowledge gap between the plant operators' residential expertise and those of commercial plant operators, bringing all employees to a higher level so staff has similar skills and knowledge. This would help strengthen any weak links in the team, improve employee performance, program productivity, operational consistency, and employee satisfaction. In addition, staff involvement in such organizations as Association of Physical Plant Administrators (APPA) would not only provide management with access to benchmark data but also reasonably-priced technical training.

The agency has not adequately invested in updating its IT resources for the Building Automation analysts. Some of the Building Automation computers are more than 10 years old. The computers do not run business automation software efficiently and cannot support newly purchased software. These old computers can only run so many processes simultaneously before they start to show signs of strain. Updating these computers would expedite Building Automation analysis.

Mentorship Program

The mentorship program is informal and has not been successful partly due to a lack of accountability processes that ensure mentors take ownership of the knowledge transfer that is needed. The mentorship program could yield more positive results with stewardship delegation and employee empowerment.

Team Performance Management

The program does not have an effective employee performance management process to communicate management expectations and monitor employee performance. Program management does not have a clear basis for assessing and rewarding performance. The lack of a formal performance-related reward system has resulted in a number of issues, including low motivation and low staff morale, both of which may have created high absenteeism. This, coupled with 10-hour work days, has sometimes resulted in some individuals working 20-hour shifts - a practice that is not safe. The plant operations team does not have regular meetings to help foster team spirit.

Teamwork

Program management has not fostered a cohesive, team environment to assist with open, professional communication and cooperation between team members. Having regular team

meetings and teambuilding exercises would significantly improve employee motivation and trust among the team, while enhancing productivity.

Recommendations

Improve operational effectiveness by:

(i) Increasing staffing levels within the program.

(ii) Developing and implementing a staff development program aimed at increasing staff's technical expertise.

(iii) Encouraging participation in such organizations as APPA.

(iv) Updating program computers to enhance operational efficiency.

(v) Strengthening the mentorship program by implementing controls that ensure mentors are held accountable for the needed knowledge transfer. Stewardship delegation (to Team Leads) accompanied by strong accountability controls could yield much better results.

(vi) Setting and communicating performance expectations on both individuals and teams, and holding people accountable through ongoing communication and feedback.

(vii) Holding regular team meetings; and,

(viii) Whenever possible, performing teambuilding exercises for an improved team environment.

Management Action Planned

The reallocation of four existing personnel slots and funding to increase staffing for Plant Operations was approved by the Executive Director in the summer of 2015. Additional personnel slots and funding will be requested in the agency's FY2018-2019 LAR. In addition to the training discussed in the Summary of Management's Response above, management will ensure the proportionate allocation of the limited training funds currently available agency-wide and consistent with prioritized, mission-critical needs. All computers were already scheduled to be and will be replaced in conjunction with the safety-related project to relocate the Plant Operations control room within the basement of the Sam Houston Building. Within staffing constraints, the informal mentoring program will be continued. The new Operations Manager will be instructed to reinstate the regular team meetings that regularly occurred in the past.

Responsible Parties

Executive Director, Deputy Executive Director of Planning and Real Estate Management, Director of Property Management Services, Director of Facilities, Operations Manager, FDC Project Management

Estimated Completion Date

May 31, 2016

2. Operational Effectiveness – Scheduled Preventive Maintenance Plan

While the agency's Strategic Plan includes "the implementation of timely and cost-effective preventative and remedial maintenance programs to safeguard public investment in constructed assets" as strategic objectives, it (the agency) has not developed a formal preventive maintenance plan on key equipment and building systems, including the agency's chillers, boilers, and cooling towers to help improve the operational efficiency and safety of the equipment, while reducing downtime.

The agency's current approach to preventive maintenance is mostly reactive due to a lack of funding and aging equipment. Discussions with program staff indicated that it annually cleans cooling towers and chillers "on a random basis." In addition, staff indicated that it does not perform preventive maintenance on the agency's boilers. TFC has not developed a formal preventive maintenance plan to maintain key equipment and building systems in accordance with manufacturers' original recommended schedule to ensure optimal operation throughout the equipment's useful life. Failure to maintain recommended equipment maintenance schedules creates many problems including shortened equipment lifespan, unplanned downtime, frequent repairs and replacements, possible secondary equipment or process damage from the primary equipment failure; energy waste, maladjusted or inoperable controls and inefficient use of staff resources. Some of these could be significant enough to adversely affect the program's mission of providing "a comfortable, safe and healthy work environment." Good maintenance practices could generate substantial energy savings.

Preventive maintenance will generally run the equipment more efficiently and minimize equipment failures. Preventive maintenance is one of the most cost-effective methods for ensuring reliability, safety, energy efficiency, and tenants' satisfaction.

Recommendation

Improve operational efficiency, employee safety, and energy efficiency by developing and implementing a formal scheduled preventive maintenance program.

Management Action Planned

Management agrees with the need for improvements in both preventative (scheduled) and remedial (core) maintenance of plant equipment. In 2014, program management had requested inclusion of additional funding during preparation of the agency's FY2016-2017 LAR but the program's request was not approved by agency executives at that time. To address these needs within current staffing and funding constraints, in the summer of 2015, program management and procurement staff began work on a solicitation for contracted services for boiler maintenance, chiller maintenance, and cooling tower maintenance. Similar to the requirements contracts

utilized in conjunction with other maintenance and construction-related activities of the agency, these service contracts will augment the maintenance work performed by Plant Operations staff and will address both preventative and remedial maintenance of plant equipment. The solicitation is currently being finalized and should be posted by mid-November. It should be noted that plant equipment (boilers, chillers, cooling towers, and other related equipment) is repaired primarily by contracted vendors, not by in-house staff. Additionally, any maintenance or repair work done on these items by in-house staff is performed by Plant Operations staff (Technician IVs) and not by Preventative Maintenance staff. Preventative Maintenance staff currently consists of two HVAC technicians and two electricians and this staff is responsible for maintenance of equipment in the buildings (such as air handlers and VAV boxes) that deliver the services provided by Plant Operations. The Director of Facilities is responsible for management of the contracted vendors as well as the Plant Operations staff and, as discussed under Item 1.2, the Preventative Maintenance staff will also be placed under the management oversight of this position.

Responsible Parties

Director of Property Management Services, Director of Facilities, Operations Manager, Director of Procurement

Estimated Completion Date

March 2016

3. Operational Efficiency – Disaster Recovery Planning

The program has not developed a formal plan to prepare for, respond to, and recover from a disaster in a manner that minimizes disruption of business operations in the event of a disaster, as required by the agency's Continuity of Operations Plan (COOP). The COOP aims to ensure that the agency's mission-critical functions are adequately addressed. It details an established order of succession to ensure a seamless command structure.

Building Automation's disaster recovery plan (last revised in fiscal year 2013) is not up-to-date. Since the implementation of the plan, there has been some changes in staff's roles and responsibilities regarding database backups. The plan has not been updated to reflect the changes. Best practices suggest periodic review of the disaster recovery plan because business processes evolve and changes in management and roles occur. To stay relevant, disaster recovery plans should be an integral part of all business analysis processes.

Electronic backups of the data for HVAC, security, and fire are performed. The data is copied externally to a network attached storage drives located elsewhere. However, the program has not established an alternate site, with hardware configuration setup where the agency can relocate business activities following a disaster. The type of site will depend on program needs. There are multiple types of backup sites (including cold sites, warm sites, and hot sites). The type the agency needs is determined based on cost and the level of risk management is willing to accept.

Management has a project to look into securing an alternate site. However, it (management) acknowledges the need to address issues with the current operating site first. Management indicated it plans to update the equipment at the current operating site first before turning its efforts to establishing an alternate site.

Defining specific backup roles reduces recovery time, ensures successful failover and failback, and eases the transition of establishing the business back to pre-event state.

Recommendation

Improve disaster recovery planning by bringing the disaster recovery plan up to date and clarifying roles and responsibilities.

Management Action Planned

Building Automation's disaster recovery plan will be updated to reflect changes in staff's roles and responsibilities regarding database backups. Management will ensure that electronic backups of the data for HVAC, security, and fire that are currently performed will continue and that the data continues to be copied externally to a network attached storage drives located elsewhere. The primary responsibility for establishing an alternate site, with hardware configuration setup where the agency can relocate all agency business activities following a disaster, is appropriately a function of the Risk Management program in coordination with agency and program management and will be addressed in conjunction with an update of the agency's Continuity of Operations Plan (COOP).

Responsible Parties

Director of Property Management Services (Building Automation's disaster recovery plan will be updated to reflect changes in staff's roles and responsibilities regarding database backups); Executive Director, Deputy Executive Director of Risk Management (designation of alternate site, update of COOP)

Estimated Completion Date

December 1, 2015 (Building Automation's disaster recovery plan will be updated to reflect changes in staff's roles and responsibilities regarding database backups); May 31, 2016 (designation of alternate site, update of COOP)

4. Operational Efficiency – Control Room Processes

Opportunities exist to streamline control room processes and reduce the incidence of missed alarms. The control room is a 24-hour operation that is performed over three shifts. Each shift has an average of 6 staff – a control room operator and 5 field technicians. Currently, the on-duty control room operator's main duties are to monitor 13 different computer screens for alarms signaling abnormal events such as temperatures that are outside preset parameters, and fires in buildings and equipment. In some cases, the control room operator is able to resolve alarm

conditions remotely. Otherwise, he has to dispatch a field technician to the building where the alarm condition was generated. Parallel to his alarm-response duties, the control room operator is required to manually log temperature and pressure data every two hours in nine different log sheets and manually record all event information while also entering the same information in the computer. He is also required to physically inspect the boilers and chillers within the building and log temperature data every hour and keep track of the field technicians by manually logging their location while ensuring the key and vehicle chain-of-custody log is properly completed. Depending on the level of alarm activity, these duties can be overwhelming, resulting in some missed alarms. The double-logging of alarms and event information seems duplicative – it takes away from the more critical alarm monitoring and responding duties.

In addition, the review found some overlap in the duties of the control room operator and field technicians. The field technicians are responsible for performing visual inspections of the buildings and equipment and manually recording the same data the control room operator is logging. The practice of manually logging such data is not only inefficient, it is more susceptible to human error than the use of digital hand-held scanners that automatically transmit the data to an electronic log within a database. The data would also be easier to maintain.

While the level of automation has increased over the years, some key equipment (like boilers) still have to be started manually – a practice that is inefficient.

Recommendations

Improve operational efficiency by:

(i) Streamlining control room and field technician routines; and,

(ii) Automating the collection and recording of temperature (and other) data with the use of hand-held digital scanners would free up time which would allow the operators to focus on the more critical task of monitoring and responding to alarms.

Management Action Planned

Control room and field technician routines will be reviewed and streamlined within existing physical constraints of aged equipment, staffing levels, and funding. Some processes are antiquated due to the age and original design functionality of the equipment. Also, the manual logging system serves as training for newly hired staff to assist them in becoming familiar with how the equipment and systems function on-site; periodically breaks the monotony of being seated continually at a desk monitoring multiple computer screens in the control room; and provides physical observation (sight, smell, and hearing) of the equipment as a supplement to the monitoring and alarm systems. Additionally, due to staffing constraints, supervisors have not been assigned to the afternoon and evening shifts for a number of years; these shifts have designated team leads instead. The manual logs serve a vital function and are of critical importance for review by the supervisor each morning at the beginning of the daytime shift. Management agrees that the procurement of digital equipment to automate the collection and recording of data would be beneficial and will determine whether such a system can be purchased and implemented within current budgetary constraints or will need to be included in the agency's FY2018-2019 LAR.

Responsible Parties: *Director of Property Management Services, Director of Facilities, Operations Manager*

Estimated Completion Date: *March 1, 2016*

5. Regulatory Compliance

The program has processes in place to ensure operations are performed in compliance with the Texas Health and Safety Code, Chapter 755.029, and the City of Austin's boiler backflow prevention assembly testing requirements. The review was able to confirm compliance with the City of Austin's boiler backflow prevention assembly testing requirements for calendar year 2015. However, the program could not provide evidence of compliance for calendar years 2014 and 2013. The program is not in compliance with the agency's data retention standards, which require programs to maintain such data for at least 3 years. In addition, program management could not provide the review with an accurate complete inventory of all of the agency's active boilers – which is a concern. Without an accurate listing of boiler inventory, it is difficult to ensure all agency boilers meet requirements.

Both these inspections are critical for employee and tenant safety. Texas Department of Licensing and Regulation's (TDLR) inspections (for compliance with Texas Health and Safety Code, Chapter 755.029) are aimed at ensuring active boilers are in a safe condition for operation. The City of Austin's annual backflow prevention assembly tests are aimed at ensuring that backflow prevention assembly is adequate to protect potable water supplies from contamination and pollution.

Recommendations

Improve regulatory compliance by:

(i) Performing an inventory of the agency's boilers and update boiler records; and,
(ii) Maintaining City of Austin's boiler backflow prevention assembly testing reports for at least 3 years.

Management Action Planned

In addition to ensuring that operations continue to be performed in compliance with the Texas Health and Safety Code and City of Austin's testing requirements, management will ensure continued compliance with records retention requirements for the City's testing reports. Boiler records will be updated to ensure all lists are complete. Additionally, the Texas Department of Licensing and Regulation (TDLR) is the official repository of all boiler records and these records are all available on the TDLR website.

Responsible Parties: *Director of Property Management Services, Director of Facilities, Operations Manager*

Estimated Completion Date: *December 1, 2015*

Scope and Methodology

The overall objective of this audit was to determine the extent to which TFC processes ensure agency Plant Operations' and Building Automation's goals are accomplished efficiently and effectively, in compliance with relevant regulations, inter-agency agreements and procedures, and in a manner that provides a comfortable, safe and healthy environment.

The audit focused primarily on Plant Operations and Building Automation activities from September 1, 2013 to August 31, 2015. Fieldwork was conducted in September 2015 through October 2015.

The audit was based upon standards as set forth in Texas Government Codes, agency policies and other sound administrative practices. The audit was performed in compliance with the Institute of Internal Auditors' "International Standards for Professional Practice of Internal Auditing."

Additionally, we conducted this performance audit in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. Our evidence-gathering methods included the following:

- We reviewed applicable laws, rules, and established procedures.
- We reviewed the agency's Strategic Plan for fiscal years 2015 – 2019.
- We reviewed reports regarding inspections performed by external entities.
- We conducted interviews with staff.
- We observed Plant Operations' and Building Automation's procedures.
- We benchmarked processes against a comparable peer organization.

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TFC Mission Statement

The Texas Facilities Commission (TFC) mission is to support state government through strategic planning, asset management, design, construction, maintenance, and leasing of state facilities and the reallocation and/or disposal of state and federal surplus.

Office of Internal Audit's Mission Statement

Our mission is to assist the agency in achieving its operational goals by using innovative and disciplined methods to objectively evaluate the effectiveness, efficiency, and integrity of agency operations and governance processes and making recommendations to improve operational performance and governance processes.

To obtain a hard copy of this TFC Audit Report, please e-mail Amanda.jenami@tfc.state.tx.us or call 512-463-1438.