DKMT Consulting LLC

Consulting Services to Support:

Independence Power and Light
Utility Operations Management Services
Phase I Report

RFQ 19132

Prepared for:

City of Independence Missouri

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July 10, 2020

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Summary

Independence Power and Light (IPL) is a municipally owned electric utility that has served the City of Independence (COI) well since 1901. There are approximately 57,000 customers within the City limits, making IPL one of the top 100 largest municipal electric utilities in the country in terms of the number of customers and revenues.

Significant changes have occurred at IPL in the last three years. It has had four general managers, implemented a new billing system, suffered increased personnel attrition, permanently shut down its Blue Valley generating plant, downsized the organization, and undergone a 6% reduction in electric rates. The way these changes came about has created mistrust between IPL employees, the City Administration, the Public Utilities Advisory Board (PUAB), and the City Council.

The purpose of this Phase I scoping study is not to examine past decisions, but to perform a high-level review of Independence Power and Light's current operations and identify those areas that are performing well and those that face challenges and may offer opportunities. After three weeks of in-depth interviews with employees and stakeholders, our team of experienced utility professionals prioritized areas needing management attention and have recommended future scopes of work to address those challenges.

IPL is a member of Southwest Power Pool (SPP) and owns a transmission system consisting of one 161 kV switching station, three 161/69 kV substations, 25 miles of 161 kV lines, and 51 miles of 69 kV lines. Membership in the SPP imposes obligations on IPL and the City regarding maintaining adequate financial reserves, maintaining cybersecurity standards, meeting personnel training requirements, adhering to FERC accounting standards, and maintaining sufficient generating capacity. IPL is audited by NERC to ensure it meets required Reliability and Critical Infrastructure Protection Standards and should be allowed continued participation in the electricity market. Fines for failure to meet NERC standards can be as much as $1 million per day per violation. IPL meets its SPP capacity obligations through six Combustion Turbine Generators (CTG) located in pairs at its substations and owns a 12.3 percent share of the Dogwood Energy Facility. The Missouri area has the most transmission congestion within SPP, so the location of capacity assets is important.

IPL has several power purchase agreements for capacity. These include:

Plant Name	Fuel Type	Accredited Capacity
Nebraska City 2 (expires 2049)	Coal	57
Iatan 2 (expires 2050)	Coal	53
Solar (expires 2042)	Solar	1
Marshall Wind (expires 2036)	Wind	6.7
Smoky Hills (expires 2029)	Wind	4

IPL's distribution system consists of eleven 69/13.2 kV substations and 795 miles of 13.2-kV overhead and underground lines. IPL has a reputation for excellent reliability among our interviewees, although reliability statistics supportive of this view are not readily evident.

Our team used a structured interview process and a standard utility operations model to identify areas for the review. High-level reviews were conducted across the following areas:

Administration
Asset Management
Business Operations
Construction
Customer Service
Environmental
Generation
Information Technology
Operations
Project and Contractor Management
Quality Assurance
Work Management and Maintenance

Our team found that IPL has a dedicated group of experienced employees that successfully perform their responsibilities to "keep the lights on." In our interviews, IPL's employees communicated a strong desire to see the organization succeed and identified several obstacles they have had to successfully overcome during this period of organizational turmoil.

Compared with other municipal electric utilities, it is not apparent that IPL consistently uses data to drive its operations or planning processes. Neither IPL nor the City appears to have a long-term strategic plan that leverages the benefits of municipal

utility ownership. The zeal to increase particular efficiencies coupled with key personnel retirements are significantly increasing material risks to IPL's capability to provide long term reliable electric service. We believe the lack of strategic planning, communication, and the absence of data-driven management account for most of the challenges facing the organization.

Our team used the following scoring system to communicate the risk level and urgency of issues identified in our high-level review. It is important to remember that these risk levels reflect our judgment comparing IPL's operations to other municipal utilities and organizations. The urgency reflects our opinion as to the timeline IPL should use to address these issues.

Red	Represents a significant area of risk that requires direct action and senior management attention. Management should be directly made aware of the higher risk of these issues and their potential impact on IPL. The condition(s) requires improvement with more than usual management involvement and monitoring until the higher risk is mitigated. A formal management action plan should be developed, and at least some of the countermeasure actions should be considered a "high" priority item. Progress should be reported through enhanced reporting processes.
Yellow	Represents a moderate area of risk that requires management action. Management should develop appropriate countermeasures to remediate the risk and improve the overall functional or control environment. Management action plans should identify countermeasures that would be considered a "medium" priority and be tracked through normal reporting processes.
Green	Represents a lower risk area that is unlikely to result in moderate or significant impacts to the IPL. Management should develop countermeasures OR accept the risk with the formal approval of senior management. Action plan to remediate the identified risks would likely be considered normal management activities and tracked through normal reporting processes.

Review Findings

A summary of our review is shown below.

	Urgency		
	Short Term Risk	**Medium Term Risk**	**Long Term Risk**
Review Area	**0- 3 years**	**3- 6 years**	**> 6 years**
Administration			
Asset Management			
Business Operations			
Construction			
Customer Service			
Environmental			
Generation			
IT			
Operations			
Project and Contractor Management			
Quality Assurance			
Work Management and Maintenance			

Figure 1 Review Summary

We were asked to pay attention to the following issues and have commented on them, as appropriate, in each section.

- **Fiscal Accountability** – especially validating the Rate Model for estimating revenues, looking at the Inputs vs. Outputs and appropriateness of any assumptions used
- **Review of Expenditures** to see if they are appropriate for an operation the size and scope of IPL, particularly the use of Overtime
- **Investment Strategy** -Does Independence make suitable investments in Infrastructure, People, Training, Technology, Cycle Maintenance for a utility of our size and scope of services. Emphasis on capital investment and maintenance of the system.
- **Organizational Efficiency** – review and optimize the IPL Management and organizational structure, staffing levels, equipment/fleet for efficiency and effectiveness for a utility of our size and scope of services.
- **Procedures** -Review, modify or establish appropriate Standard Operating Procedures (SOP), best practices, and performance metrics to institutionalize desired performance improvements

- **Strategic Planning** – develop strategies to ensure the long term success of IPL, to include succession planning, the appropriate mix of generation assets, implementation of digital technologies for meter reading, operation and maintenance activities, investments in technology, and create materials to educate the ratepayers, staff and Council to gain support for these outcomes

The following sections provide an overview of each of the areas we reviewed, area-specific challenges and opportunities, and a Recommended Course of Action to address any identified risks.

Administration

Area Overview

1. Governance
2. Management Oversight and Documentation of Policies, Programs, & Processes
3. Policies, Programs & Processes/Document Hierarchy
4. Services Provided between IPL and City (see Business Operations)
5. Financial Reporting (see Business Operations)

Assessment of the Current State

During our interviews, the Project Team gained an understanding of roles, responsibilities, and the flow of information between IPL's stakeholders. The City Charter was reviewed regarding the establishment and function of the PUAB. Documents that included budgets, monthly financial reports, the delegation of authority, various consultant reports, S&P ratings letter, cost of service studies, fiscal policies, and some meeting videos and minutes were reviewed.

Governance

The governance of the utility follows a hierarchy where the City Council is the ultimate decision-maker and approver of budgets, rates, capital projects, and high-level policy guidance. As defined by the City Charter, the City Council powers relevant to the relationship with the PUAB, IPL, and other utilities include the following:

- *"To adopt the budget, provide revenues, and make appropriations; regulate salaries, wages, and other compensation of officers and employees; and regulate all other fiscal affairs of the city;"*
- *"To appoint or elect and, with or without cause, remove the members of ……the public utilities advisory board, "*
- *'To create, change, and abolish all offices, departments, and agencies of the city government…*

Challenges/Opportunities

IPL is the largest and one of the most complex departments of the COI and, at times, consumes significant City Council resources to provide oversight. As a result, a Rates Review Committee was established to deal with IPL issues. This committee, in conjunction with the PUAB, offers recommendations to the full council.

Partially due to the turnover in IPL leadership, council and PUAB, new financial systems implementation difficulties, and loss of institutional knowledge, there has been a gradual breakdown in communication, role definition, decision making, trust, and the

flow of information between the three major oversight bodies (Council, PUAB, and City management). The basis for making significant decisions is not always apparent to those stakeholders most impacted (AMI project, rate decrease). There appears to be a lack of confidence by decision makers in the information and data provided to support IPL staff recommendations and a growing reliance by the council and the PUAB on information received from various outside stakeholders. As a result, a complete picture of the issues, impacts, and benefits may not be fully understood before decisions are made.

There also appears to be conflicting views as to the City Charter's definition of the PUAB and how the electric utility funds are to be used (*Section 3.17 City Charter "The electric utility shall not be operated for the benefit of other municipal functions, and shall not be used directly or indirectly as a general revenue producing agency for the city…"After providing for depreciations accruals and amortization of bonds, and for reasonable accumulation of surplus, the electric utility shall apply all annual profits to rate reductions."*

There has been some disagreement concerning the role of the PUAB and its advisory relationship to the council. The most recent dispute related to the approval of a loan between the utilities and the city general fund during the COVID emergency.

Section 3.18 "Nothing herein shall be construed to prevent the council from passing any ordinance, resolution, motion or other proposition which, in the judgment of the council, is necessary for the immediate preservation of the public peace, property, health, safety or morals, and which, in the judgment of the council, should become effective prior to consultation with or the receipt of findings and recommendations from the board."

Recommended Course of Action

The City Council and PUAB need to be mutually supportive bodies that provide policy and budget guidance to IPL. The elected and appointed officials must come together in a shared understanding of their roles and the Charter. Also, as representatives of the Independence community, governance should provide opportunities for community participation so that they are representing a diversity of views and the broader population of both residents and businesses. Council and PUAB, working with management, should agree on reports and data to be provided and the frequency of reports, to facilitate information flow and decision making.

Management Oversight and Documentation of Policies, Programs, & Processes

While the City has a general strategic plan, there is no specific strategic plan for IPL. A strategic plan is an essential tool that provides a focus and roadmap for the utility's future by setting goals and priorities, which drive the development of budgets and

capital project plans. A strategic plan provides a means of measuring the progress and success of the utility in meeting its goals.

The continuity of operations and reliability of IPL are highly dependent on the institutional knowledge of the experienced staff. These employees have served the utility well; however, with upcoming retirements, a lack of documented standards, processes, and procedures, the utility is at risk of being able to perform the necessary functions at the level expected by the community, City Council, PUAB, or IPL. Moreover, SOPs and documented processes facilitate consistency and form baselines for continuous improvement.

Challenges/ Opportunities

On June 15, Adam Norris, Assistant City Manager, presented an update on the list of Utility Goals and Priorities to the PUAB. Our review focused on the challenges to achieving some of these goals. Current management, both at the city and utility level, is focused on building credibility with elected and appointed oversight bodies and implementing a management model that better resembles standard utility practices. This structure is a basis from which a five-year strategic plan can be developed and expanded to meet the needs of Independence. Articulating a vision for IPL would start to address low employee morale and provide confidence that the City values IPL efforts. It also provides a clear set of goals for the PUAB and the Council against which to measure IPL's performance.

Maintaining the status quo will continue the loss of experienced staff, instability in the organization, missed opportunities for improved operations, loss of efficiency, and unintended increase in the risk of financial, operational, and regulatory consequences.

Salary inequities or perceived inequities between the city and IPL creates distrust and questions as to the value and productivity of IPL employees, especially union contract provisions for IPL that seem more lucrative to IPL than city employees. There are union contracts that establish salaries, work hours, and pay increases that are not consistent with other areas of the city (*ex: meter readers, mechanics*). As a result, City and IPL leadership are challenged in unifying the utility/city culture.

Recommended Course of Action

The creation of an IPL strategic plan with clear goals and metrics that define success is essential for IPL and the City. A strategic plan articulates the long-term vision of stakeholders and creates a roadmap and focus on the work of the utility. The budget should be designed with transparency and input from IPL departments to support the achievement of the strategic goals. Without a strategic plan, IPL will continue to be

reactionary versus proactive, miss potential efficiency opportunities, lag other utilities in adapting to the changing world, and face uncertainty on how to satisfy the goals of management and policymakers. Several IPL initiatives seem to be at odds with the actions taken by other modern municipal electric utilities.

To be successful, IPL and the City will need to dedicate staff and resources to implement the systems, processes, and consultant recommendations to achieve these goals. Stability and a culture of empowerment and respect will be vital in motivating employees to work toward implementing and supporting the significant changes these systems, processes, and recommendations will bring to IPL.

The **development of industry standard benchmarks** and comparisons with comparable utilities, along with documenting standard processes and procedures for creating budgets, rates, reporting, and metrics, will go a long way in creating transparency into the operations and cost of the utility. Transparent reporting will help build trust with decision makers that IPL recommendations are data driven and well thought through.

In our experience, the intricacies of FERC accounting require specialized expertise, and there is enough work in a utility the size of IPL to keep 1.5 to 2 FTEs fully engaged. We recommend the addition of accounting/financial staff dedicated to IPL as a first step in improving IPL's financial data and reporting. Improved reporting to IPL managers will lead to more reliable financial management and a better understanding of IPL's operations. Consistent, meaningful, and high-quality data is a first step in reporting useful benchmarks and metrics and consequently building trust in the information presented by management.

Systems, Standard Operating Procedures, and training are the backbone of an efficient, well-run organization. There needs to be a dedicated effort to implement systems that not only support the city but also meet the utility's needs. This effort would entail having users of the systems from across the city provide input into system design, workflow, and performance reporting. Development of SOPs to facilitate the training and consistent use of the systems across the utility and city will improve the efficiency but also begin to integrate the utility's common functions with the city. As the systems and procedures sync up across departments, the divisions and distrust will decrease

A **robust communication strategy** for sharing news and getting input from the public, employees, and elected/appointed officials is critical to IPLs success. A communication strategy would not only provide opportunities to keep all stakeholders informed but begin to create a shared understanding of the utility, its operations, goals, and benefits

to the community. Open and regular communication builds trust and opportunities for public and employee input. Employees want to hear what is happening, especially in times of crisis, uncertainty, and change. The community and ratepayers need to know and provide information into the primary strategies of the utility on issues such as resource mix, environmental and economic development goals, rates, and services. None of this will work without a clear plan of who, what, when, and how communications will be delivered. A successful program will result in a well-informed public and employees who are engaged and providing input to guide and inform critical decisions.

IPL's work culture must change if it is to become a more transparent and process-driven organization. IPL has survived on the knowledge of experienced personnel who are nearing retirement and taking the old culture with them. Succession planning should concentrate on finding new employees who will embrace a new way of doing business as part of a city-wide team. Organizational change management should focus on modifying the attitudes of remaining employees to achieve desired goals.

The change will not be easy, as the various union contracts have created much of the real and perceived disparities in employee compensation and work requirements, which translate into silos where mini cultures exist across the city. There are no Human Resources (HR) or Organizational Development staff located within IPL to support management or provide training. The HR department has limited personnel and must meet the needs of the entire city, giving them little or no time to provide strategic help to IPL, provide training, or focus on culture change.

The staffing of HR functions needs to be evaluated, as they can be a critical factor in employee management and development success. However, in the interim, external resources should be brought in to develop a culture philosophy and roadmap for change across IPL and potentially the city.

The current **organizational structure** of IPL has evolved through a myriad of issues. Management is planning to reorganize in line with current industry practices. Before a new organization structure can be crafted, processes, operating relationships, pay structures, and competencies need to be evaluated and developed to ensure it supports cultural transformation without compromising essential utility functions.

A detailed analysis of overtime, identifying the frequency, functional areas, and hours is critical to evaluating staffing and costs. The current budgeting process for overtime is not linked to existing labor agreements or the type of work IPL performs. In our experience, some of the provisions for overtime that the City has agreed to are unique

and can quickly drive up overtime hours. IPL is a 24/7 response organization, but to our knowledge does not have a storm response budget that would absorb overtime and other unpredictable costs.

The organizational design should encompass all its responsibilities and be resilient enough to handle a range of contingencies. In engineering terms, the transmission system is designed to N-2 criteria to ensure reliability, yet the organization that supports it is almost at N-0. The N-X nomenclature is used to express how many components can fail before the system fails.

Roles and responsibilities, decision making authority, and performance metrics should be clearly defined and aligned with similar city department jobs where it makes sense. As part of that process, job descriptions and titles should be reviewed and modified to reflect the work being done and matched to appropriate compensation levels. This will begin to move IPL and city departments toward equity in pay, title, and responsibilities in similar positions, reducing the flow of staff to IPL just to earn higher salaries. It can also provide great cross-training and career opportunities for staff to move between departments instead of one direction – to IPL. Lastly, any organization structure changes need to incorporate succession planning to ensure the loss of personnel does not mean institutional knowledge, experience, and leadership leave the organization. Currently, with many employees nearing or at retirement age and perceived organizational instability, this is a high risk to IPL.

Asset Management

Area Overview

Asset Management in the context of this report is a systematic process for developing, acquiring, operating, maintaining, upgrading, and disposing of material and equipment (M&E). The goal is to accomplish this in the most cost-effective manner possible.

Fundamental to effective asset management is identifying and managing the asset's condition. IPL's asset condition monitoring focuses on equipment age, functional testing, observations by experienced IPL workers, and some data. It is, however, unstructured, somewhat limited, and risky.

Asset replacement or upgrade is subject to available funds that are allocated to identified projects by the judgment of IPL management and the City Council.

Challenges/Opportunities

Determining the allocation of capital for asset replacements, refurbishments, or upgrades is a challenge in any capital-intensive industry. It's particularly difficult in a small public utility where close customer interface creates direct feedback concerning rates, reliability, and overall customer satisfaction. A structured asset management program can support managing this interface by creating a robust results-based approach for capital spend and equipment maintenance. Best practices for allocating capital to identified projects usually employ a defined process for considering priorities. Factors considered may include safety, regulatory requirements, reliability, risks, O&M cost, and failure probability and impact. Such a process factually validates and supports justification for CAPEX prioritization and budgeting.

While equipment age is important in identifying asset condition and reliability, it is only one factor in considering the risk of failure. Functional testing provides a snapshot of an asset's current performance, but it does not indicate the underlying potential for failure. Experienced observations and opinions are valuable factors, but are subjective, uncertain, and not always accurate or conclusive to support critical asset management decisions. The use of physical asset condition data can be a valuable addition to the existing IPL program if it is effectively structured and executed (e.g., monitored, recorded, trended, diagnosed, benchmarked, etc.). A comprehensive condition monitoring and analysis program also reduces the risk of unexpected component failure.

Recommended Course of Action

- Asset Prioritization
  - Develop a priority list of critical assets considering issues such as the following:
    - Safety
    - Regulatory compliance
    - System reliability
    - Cost improvement
    - Customer Service
    - Others
  - Conduct a risk analysis for the identified priority assets. Qualitatively determine the likelihood and impact of failure, similar to what the transmission operators do to achieve N-2 reliability. For each priority asset, create strategies for dealing with the risk of failure (e.g., Monitor, Accept, Mitigate). Mitigating actions may include an appropriate level of

condition monitoring, spare parts availability, system redundancy, replace/upgrade, etc.

Addressing the above two recommendations will provide quantitative data and actions that inform asset management decisions for critical assets. The quantitative data will also create a justification for the risk strategy actions.

- Asset Preservation

  Asset Management practices should be consistent throughout the IPL organization.
  - Prepare actionable strategic directives to establish and implement programmatic requirements for asset preservation, including such considerations as condition monitoring, tracking, trending and analyses, and a consistent method for developing and prioritizing asset-related budget requests that facilitates budget allocation decision making.
  - Designate an individual to oversee the implementation of asset management directives.
  - Evaluate state-of-the-art technologies as potential cost-effective replacements for existing assets to improve reliability, cost, operations, and maintenance.

- Condition Monitoring
  - Evaluate implementing a formal condition monitoring program for the utility assets. This may include data collection, recording, trending, and analysis.

- Staffing and Organization Change Management
  - In the course of any IPL organization changes, identify responsibilities for programmatic asset management
  - Effectively engage employees in discussions regarding asset management and program considerations.

Business Operations

Area Overview

1. Financial Management
2. Shared Services
3. Financial Reporting
4. Power Purchase Agreement Administration
5. Timekeeping and Payroll Controls

Financial Management

Area Overview

Financial management encompasses budgeting, financial forecasting, cost management, capital improvement program (CIP) tracking, rates, and revenue sufficiency, and capital planning. Currently, most of these functions are centralized in the City's Finance Department. Finance manages the budget process, and IPL does not provide many of the critical inputs to its budget. There is limited understanding of how the budget is developed, especially concerning labor and overtime costs, and allocated City services costs.

Finance and IPL are responsible for managing those budgets. Implementation problems associated with the new Tyler Munis financial system have caused IPL not to receive monthly budget reports for almost a year. Additionally, the lack of involvement by IPL accounting staff in setting up the new system has resulted in reports that do not meet IPL's needs.

Challenges/Opportunities

Lack of adequate reporting inhibits the ability of management at all levels to monitor budgets, review operating and project costs, determine revenue adequacy for rate making, assess policy, and bond compliance, and provide decision and policymakers with data for effective oversight. Financial reporting as a component of financial management is discussed in more detail below. An overarching concern is a balance between centralized financial oversight and departmental financial resources to support IPL and provide information and analysis to the Finance Director, ACM, and CM, and ultimately to PUAB and City Council.

Recommended Course of Action

As part of creating accountability for managing resources at all levels of IPL, there needs to be a strong support component with a financial and accounting background who can translate financial data into operational outcomes. That person can help supervisors track trends and monitor accounts for changes and variances over time. Because IPL has unique accounting requirements for property accounting and FERC reporting, having experts who can review the reports and identify errors or discrepancies is critical to the integrity of the information. Operations staff are not accountants, but they do understand their functions. To improve their ability to make critical financial decisions, they need a partner with the necessary accounting skills to support them.

Financial forecasting is an essential function for evaluating whether rates can generate the revenues needed to run the utility and supports long term strategic planning. IPL does not have this capability, and therefore is limited in its ability to calculate revenue implications of new rates and long-term impacts.

Recommended Course of Action
Best practices for utilities incorporate robust financial modeling and forecasting functions that provide the flexibility in modeling changing variables impacting the utility. It is a valuable tool for decision-makers and strategic planners for evaluating various risk scenarios, such as economic downturns, weather events, population, and industry changes on the financial health of the utility, which also impacts the financial health of the city.

Organizational Structure - The Finance Director is beginning to implement changes in the accounting organization by dedicating two staff to support the utility for financial reporting and budgeting, as well as implementing a FERC reporting structure. They are doing the best they can to support IPL. However, the workload providing accounting/finance services to all three utilities combined with their lack of FERC accounting experience limits their ability to meet the immediate needs of IPL

Recommended Course of Action
We recommend management take a broader view of financial management from both City and IPL perspectives to define what functions belong in city finance and what functions belong to IPL.

IPL requires information unique to the utility such as property accounting, FERC regulatory reporting, financial forecasting and planning, and Capital Improvement Program (CIP) planning and monitoring.

Financial information should be linked with metrics that measure the effectiveness of each IPL organization. There is an excellent opportunity to gain a fresh perspective with the new staff and processes being implemented, along with other changes at IPL.

Capital project budgeting and management are somewhat contentious between operations, the PUAB, and City Council. The Council approves a CIP budget as part of the annual budget process but also has the role of approving the individual projects when they are ready to move forward.

The PUAB and Council believe that IPL holds funding for approved projects whether the projects are completed or not. Since current revenues versus debt fund most CIP, the operating budget sets aside dedicated appropriations for each project once the Council approves it. What is not clear is what happens to those funds if a project is canceled, rescoped, or delayed. These concerns are not unwarranted. A review of the CIP list shows that there is an "Available Budget" for projects dating back to 2008.

Year	Total Available CIP Budget
2008	$ 312,467
2011	$ 437,133
2012	$ 71,452
2014	$ 263,489
2015	$ 724,366
2016	$ 1,831,257
2017	$ 3,937,707
2018	$ 872,671

Recommended Course of Action

A clear transparent process for the financial management of the CIP list would address the concerns that money that is dedicated to projects not moving forward is not held indefinitely. Every month, IPL should provide updates on CIP projects and the CIP balance to the PUAB and the Council. IPL should also give a breakdown of its fund balance and reserve requirements to provides transparency into the financial stability and profitability of the utility. The COI Finance Manager has initiated reporting to the PUAB on the makeup of the fund balance, and we encourage this to be expanded and provided on a routine basis. Without this process, controversies over fund balances and whether there are available monies for other city items or even whether there are excess reserve balances that should be refunded to customers will continue.

Shared Services

Area Overview

The City and other utilities provide services to IPL for which it charges an allocation of monthly shared costs to the utility. Some of these charges include City management salaries, finance, and IT. The list of services and methodology for allocating costs to IPL and the other utilities is not clear to the recipients of those charges. Our initial review of the source and amount of these charges does not appear to be unreasonable. However, the basis for these charges is unclear. There can be greater transparency so that each of the utility directors understands the services for which they are being charged and can

work with the City to find appropriate processes that help to improve cash flow and reduce costs. Our team was unable to review the basis for these charges.

Challenges/ Opportunities

Because there is not a clear understanding of what services are being provided and costs allocated to IPL, there is no way to measure or benchmark these costs to other utilities. Additionally, the lack of transparency and a clear methodology for allocation inhibits the ability to manage and control costs. A lack of understanding of the value of services and cost-benefit creates distrust and potential risk of duplication of effort between the utility and city. Lastly, without a defensible methodology for allocating shared services costs, the risk of them being disallowed in a rate proceeding before FERC is significant.

Recommended Course of Action

Annually, in the budget process, provide a listing and cost for all shared services between the city and IPL. These services and cost drivers should be reviewed by management for planning purposes, both to identify needed service level increases or opportunities to control costs. An agreed-upon cost-based allocation methodology should be developed that is supported by standard industry practice and meets the needs of both the city and IPL.

Financial Reporting

The ability to provide relevant and useful financial reports promptly is a critical tool for management, whether it is used to monitor a budget or to evaluate the effectiveness of resource utilization.

For the City of Independence (COI) and Independence Power & Light (IPL), monthly reports are prepared by COI Finance staff from COI's enterprise accounting system. These reports provide monthly expenditures by expenditure type and comparisons of spend to date against annual budgets. It is unclear if these reports are currently being prepared for each department within IPL or are only provided as summations at the highest organizational level.

Based on our interviews and observations, the following were noted as shortcomings.

1. IPL management and staff have not been trained in how to produce monthly reports. COI Finance has assigned one individual to prepare monthly reports for presentation to the PUAB, and when the opportunity arises, provide training to

individuals who wish to prepare their reports. It is also unclear as to what extent IPL management is taking advantage of these services.

2. The reports currently being prepared are providing current month expenditure by expenditure type (labor, materials, etc.) and those expenditures year to date. Year to date totals are compared to annual budgets, and this comparison provides a % variance from the annual budget. Because monthly budgets are not prepared, a reader of the report must calculate what percentage of the year has expired to be able to tell whether expenditures are on track. And of course, if there are significant expenditures that occur in one or two months of the year, the comparisons can be misleading as to whether expenditures are on track.

3. The reports are not providing information organized following the FERC chart of accounts. The only time that FERC accounting is used is in the preparation of the City's Annual Report and presented in the supplemental information of the Comprehensive Annual Audited Financial Report (CAAFR). To partially address this and respond to Baker Tilly Management Audit recommendations, Finance has developed a work plan which is currently underway. However, this work plan falls short in meeting IPL management requirements for resource management, benchmarking, and meeting certain requirements for asset and expense reporting for IPL's generation and transmission assets.

Importance of Reporting Using FERC or NARUC Accounts

Most municipally owned electric utilities use an account code structure designed specifically for electric utilities. They use the Federal Energy Regulatory Commission (FERC) uniform system of accounts or the National Association of Regulatory Utility Commissioners (NARUC) uniform system of accounts. These two account structures are similar, and an essential characteristic of both is that they represent an activity-based cost accounting system.

Activity-base cost accounting is vital for several reasons.

1. Common Language—FERC accounts provide for commonality and conformity that owners, regulators, investors, and managers can rely on to understand more fully how dollars are being expended. There are instructions specific to both operating expenses and infrastructure investment. This provides confidence as to the reports being provided and the capability of comparing different entities,

whether they be investor-owned, municipally owned, or member-owned like cooperatives.

2. Assuring that IPL receives appropriate revenues—As an owner of generation and transmission assets participating in the Southwest Power Pool, proper accounting is critical to guaranteeing IPL receives the right amount of revenues for the use of its generation capacity and transmission assets. During our interviews, we were told that IPL had submitted a request for approximately $7.5 million in annual revenues but had to settle for only $5 million, in part because they could not provide the appropriate support for their costs, which weakened their negotiation position.

3. Benchmarking against other utilities—The use of an account code structure and following the rules for regulatory accounting that are common among municipal utilities, allows a utility to compare itself against other similarly sized and organized utilities. As an example, the American Public Power Association prepares an annual report on Financial and Operating Ratios for Public Power Utilities. While IPL participates in this annual survey, it requires considerable effort to organize costs into relevant categories for comparison.

4. The basis for Rate Design—When a utility prepares an embedded cost of service study to support the design of new rates, it uses the FERC/NARUC categories of accounts to group like costs between customer costs, fixed demand costs, and variable costs.

5. The basis for Performance Measurement—Because FERC/NARUC accounts provide activity-based costing, each major work function can match its costs with the work accomplished. During our interviews, we noted that there is a lack of data being used in making decisions. The ability to match the costs incurred against what was accomplished can provide a powerful tool for managers to improve their process and reduce their costs.

Recommended Course of Action

The current costs being accumulated through CitiWorks and Tyler Munis should be mapped to FERC/NARUC accounts for each of the IPL organizations. A process of defining what data is needed to run the organization should first be undertaken. An extract and reporting routine should be developed and implemented for both monthly and annual reporting.

Power Purchase Agreement Administration

IPL has moved to acquire most of its power supply from power purchase agreements as it has reduced its generation resources. These agreements are monitored by System Operations staff daily to evaluate how they are performing. Staff calculates a power supply cost of service to compare expenses to revenues each day as a part of that review.

Challenges/Opportunities

The oversight and monitoring of these agreements help ensure the reasonableness of power supply costs and performance. However, because there have been retirements and personnel turnover, no one currently on staff has power purchase contracting experience. This could be a risk in the future as these contracts expire and need to be replaced.

Recommended Course of Action

Begin succession planning by training staff on key aspects of power supply negotiations and terms, especially as they relate to SPP to ensure IPL will be able to negotiate replacement contracts that minimize the risk of disruption and provide favorable pricing terms. In addition, institute a contract audit process whereby all supply contracts and shared ownership interests are reviewed regularly, annually, or biannually depending on terms.

Timekeeping and Payroll Controls

As previously stated, a detailed analysis of overtime, identifying the frequency, functional areas, reason, and hours is critical to evaluating staffing and costs. The current budgeting process for overtime is not linked to existing labor agreements or the type of work IPL performs. In our experience, some of the provisions for overtime that the City has agreed to are unique and quickly can drive up overtime hours.

Recommended Course of Action

We recommend a detailed review of timekeeping records to identify the highest cost centers, correlate those to operations or labor agreements, and develop a plan of action to address shortcomings.

Construction

Area Overview

The currently active Substation K project formed the primary basis of DKMT's Phase 1 review of construction activities. The IPL Engineering Department is responsible for construction oversight and interfacing. Oversight involves daily on-site presence to monitor progress and deal with issues that may arise. A T&D superintendent provides some support for construction oversight. However, his authority in engineering matters was not assessed.

Minor projects are handled in-house. Larger projects require competitive bids for both engineering/design services and construction. The engineers (in-house or contracted) develop designs that form the scope basis for construction bids, and the engineers perform technical bid evaluations. Construction contracts are on a "Not-to-Exceed" (NTE) cost basis with liquidated damages for schedule delays.

The DKMT team has not reviewed IPL technical specifications for substations construction and testing. However, we have been advised that they are valid for contractors to perform their work.

Challenges/Opportunities

Except for the System Protection Engineer, all the vital functions of the Engineering Department have staff assigned. The Engineering Department manager and one part-time engineer are responsible for construction oversight. Their responsibilities include all scope documents, the technical aspect of material acquisition, construction, and outsourced engineering oversight. This lean staffing could detract from the manager's overall responsibilities and lead to delays, engineering errors of varying impact, and low morale.

No formal procedures or guidelines describing the engineering process, including approvals or modifications, exist.

Recommended Course of Action

- Review of Engineering Department staffing and potential retirements. Appropriately adjust staff level and establish plans for succession where necessary.
- Develop procedures or guidelines for performing construction-related engineering functions, including contractor oversight.

Customer Service

Area Overview

IPLs Customer Service team has 23 customer service representatives that offer walk-in and telephone service support. The customer service team has a strong understanding of its customer demographics and understands what drives its payment cycles. Tools used by customer service representatives are limited compared with other utilities. The only metric used to measure customer service team performance is monthly collective call hold time with a goal of less than 5 minutes. A dashboard to measure individual representative performance is in development, as are additional training materials.

Challenges/Opportunities

The most common complaint the team faces is inaccurate billing and that rates are too high. The root cause of most customer complaints is incorrect or late meter readings. Anecdotal information indicates meter reading efficiency lags industry standards of approximately 500-meter reads per day per reader.

IPL is in the process of implementing new rates, which typically in and of itself creates challenges for the Customer Service function. The challenges provided from this effort are discussed below.

- As part of the implementation of the new rates structure, there will be two separate structures over the next three years, resulting in an overly complex customer service environment. At Council direction, those customers on current rates will remain on those for up to three years, while all new customers will go on the new rates being implemented. Customer Service representatives will need to be thoroughly briefed on the latest rate structures.

- As part of the new rate structure, IPL is incorporating the full projected cost of fuel (FCA) and purchased power in the base rates (with the Power Cost Adjustment being set to zero) taking effect in October 2020. While this action eliminates monthly fluctuations in customer bills, it makes the fuel or energy component of the bill less transparent. This action goes against industry trends of unbundling rates and providing better transparency and price signals. IPL has indicated that fuel and purchased power costs will be monitored monthly and compared against those costs embedded within the base rates. Changes will be made at least annually. Industry trends include looking at changing the FCA every quarter or semi-annually to minimize financial risk.

Because of these two changes, our team expects customer complaints to increase during this period due to rate confusion and the fact that customer service representatives are not trained to determine a customer's most favorable rate.

The City does own customer service software that was purchased by IPL some years ago to record trouble calls. This software may expand customer service capabilities, although no one has been trained to use it.

Recommended Course of Action

The City may soon revisit its AMI decision. Overlaying an AMI transition on the two-tier rate structure is not recommended, nor is investing in a new system for solely addressing a labor efficiency issue. IPL should work to improve the efficiency of meter reading through rotation of routes among meter readers, hiring part-time readers, assessing penalties for reading errors, or considering flat rate electric/water service. Advances in utility analytical modeling may make it possible for IPL to offer flat rate electric and water service to its customers and eliminate the need for meter readers.

The City should also consider AMI in the context of its proposed broadband offering. The communication infrastructure supporting AMI is usually the most significant cost driver.

We also recommend Customer Service increase the usefulness of its current tools by creating a list of common call reasons and developing a means to transfer that information to a database.

Environmental

Area Overview

IPL has a solid record of environmental compliance. The Environmental Manager has developed a report database linked to his Outlook account that provides 30, 60, and 90 notices of necessary reports.

Challenges/Opportunities

Environmental has identified an opportunity to raise "stop tanks" for the CTG above ground and save approximately $40K per year on contracting costs. This project was added to the CIP list in April 2020. Groundwater is a long-term risk that may require attention once monitoring wells are completed.

Recommended Course of Action

Continue methods of conducting business. Train environmental staff on the maintenance of the report database to ensure its sustainability.

Generation

Area Overview

As of June 2020, nearly all staff left the 58 MW Blue Valley Unit 3 thermal plant. There are no plans to dismantle the unit. IPL continues to maintain essential equipment, such as fire protection systems, with a significantly reduced workforce. On-site buildings will continue to serve as an operations and control center for transmission operations and provide warehousing and other support facilities. All coal ash ponds have been closed and capped. Environmental monitored is being established.

Remaining generation operations are focused on operating six combustion turbine generators with a derated capacity of 94 MW. Over the past two years, the units have responded to Southwest Power Pool (SPP) requests approximately 300 times per year, with a typical run time of roughly 5 hours per request. The natural gas fired "H" units carry the burden for IPL.

CTG	JULY - NOVEMBER 2019 (5 MONTHS)	JULY 18 - JUNE 19	JULY 17 - JUNE 18	JULY 16 - JUNE 17	Start Totals June 2016 - November 2019
H5	71	135	83	82	371
H6	81	108	104	69	362
I3	15	15	5	13	48
I4	14	11	4	14	43
J1	15	18	11	10	54
J2	5	17	8	9	39

Table 1 IPL CTG Starts

While the six CTG units are about 50 years old, IPL management has stated that overall, the material condition is good, and, with proper maintenance, they expect at least ten more years of operation. Burns and McDonald concurred with this outlook in its reports stating that the units should be bore scoped every three years. IPL has implemented this recommendation.

Generation operations have a current staff of 14 hourly personnel and five supervisory staff, including four plant operators (one on long-term disability). Management has voiced a concern that without a longer-term strategic plan, there is uncertainty on the possible organization and crew structure needed to ensure adequate coverage of the

CTGs to meet SPP requirements. There may be labor savings in this area after further analysis.

Generation Operations Challenges/Opportunities
IPL management identified the lack of standard and emergency operating (SOP and EOP) procedures as a key risk to the safe, efficient, and effective operation of IPL's combustion turbine generator fleet.

The asymmetrical use of the "H" units may increase IPL's operating risk exposure. The "I" units are the same type as the H5 unit, given the value of location due to transmission congestion, there may be value in dual fueling the "I" units. If IPL were to partner with another municipality in this effort, it might be a cost-effective way to secure more capacity. Ultimately questions such as this need to be addressed in the strategic planning process.

Risk Impact
A lack of an appropriate set of SOPs and EOP procedures increases the risk of operator error. Increased operator error risk may lead to reduced employee and public safety, increased operating and maintenance costs, and increased likelihood of not meeting SPP requests and obligations. Not meeting SPP requirements may lead to increased power and ancillary services costs to IPL customers.

Challenge/ Opportunity
DKMT was informed by IPL management that there is not a set of standard or emergency operating procedures for any of the six IPL owned and operated gas turbines.

Common industry practice is to use SOP and EOP procedures to guide, facilitate, and standardize operator actions. SOP and EOP procedures also provide a strong basis for crew and operator training and safely responding to adverse or emergency conditions.

Also, DKMT reviewed several "operating instructions," which were provided by management. While a good "first step," the current scope, quality, and style do not meet common industry practice for both style and or human factors approach.

Recommended Course of Action
IPL should create an appropriate set of Standard and Emergency Operating Procedures along with a set of standard Operating Orders for use on the six gas turbine units. In this report Operating Orders includes the set of management expectations for both

daily and emergency operations and would include standards on shift turnover, log keeping, operator rounds, housekeeping, etc.

IPL should perform the following steps to define, develop, and then deploy a set of SOPs, EOP, and Operating Orders.

1. Define the scope – The scope of procedures and instructions should be risk-based with a focus on the safe, reliable, and efficient operation of the CTG systems. The scope should define the Table of Contents for all SOP, EOP, and Operating Instructions. The relative risk (higher, medium, and lower) should be used to guide the resources and timeline to develop and deploy the procedures.
2. Define procedure and instruction style – All SOP, EOP, and Operating Orders must have the same "look and feel" to facilitate effective and efficient use.
3. Develop and Approve the set of SOPs, EOP, and Operating Instructions based on the risk-ranking defined during the Scope phase. The development will, by necessity, require input from IPL management and staff to help assure a useful and quality-based document. IPL should focus first on the higher risk-ranked procedure and instruction needs.
4. Deploy the procedures and instructions continuously (not as a "lump" deployment). This will allow operators to provide feedback as procedures and instructions are deployed.
5. Monitor procedure and instruction effectiveness. Develop a simple set of monitoring mechanisms to determine both the quality and usefulness as well as operator maturity in using the deployed procedures and instructions.

As part of the strategic planning process, develop a long-term strategy to secure future generating capacity for IPL.

Information Technology

Area Overview

The information technology area has been broken down into multiple categories because each category may have different risks.

Corporate Information Technology

This category represents the technology maintained at the City for general technology, including telecommunications, hardware, and software. For most departments, this environment is supported by Tech Services.

Major software applications that impact IPL include the implementation of CitiWorks, Tyler Munis, and CIS Infinity. These products are well established in the municipal government and utility sector. The biggest remaining challenges are building capabilities to capture and report costs at the FERC/NARUC level and provide adequate training to IPL staff so that they can use the full capabilities of CitiWorks and Munis.

Likewise, with CIS Infinity there were initial challenges with the implementation of the software, but it now appears to be stable. The greatest challenge remaining is not necessarily associated with the software but with IPL's ability to provide specifications for the changes in rates that are expected to take effect in October 2020, and to test those rates rigorously.

Operations Technology

This category represents a myriad of applications that are explicitly used at IPL to manage its operations. These applications run from suites of software for outage management, trouble call management, development tools, and others that are maintained in the IPL Data Center to local desktop applications for engineering and design, asset tracking and management, and a myriad of other applications. Technology obsolescence is the most significant risk IPL faces in this area.

Critical Infrastructure Protection

This category of technology represents the hardware, software, and telecommunications used to operate the generation and transmission systems of IPL. Because IPL owns generation and transmission assets that participate in the Southwest Power Pool, IPL is subject to reliability standards (2200 pages) established by the North American Electric Reliability Corporation (NERC) and enforced by the Midwest Reliability Organization. These standards apply to assets that are considered part of the Bulk Electric System (BES) and provide rules and procedures to assure that the BES continues to operate. Among those standards are those that apply to the critical infrastructure that is part of a

network that follows Inter Control Center Protocols (ICCP) between all utilities that participate in the Southwest Power Pool. These include system operating software, system backup, telecommunications networks, energy supply backup, and other components. Failure to follow the appropriate standards and protocols can result in fines up to $1,000,000 per day. To date, IPL has undergone multiple reviews and audits and have not been found to have any significant problems, nor to have received any fines.

Telecommunications

IPL maintains a fiber-optic network running along with the transmission and distribution system that serves to provide a network of communications between all IPL facilities and City buildings. Also, the IPL fiber-optic network offers dark fiber for all facilities of the Independence School District. The IPL telecommunications department also maintains the network for all traffic control signals. The network continues to expand, but there are additional opportunities to expand that network to provide city-wide Wi-Fi, and through third parties, provide various services directly in the "final mile" to the home.

Challenges/Opportunities

While IPL has done an admirable job in managing the IT tools that are used to perform its daily operations, there are opportunities to improve the overall use of information technology. In the near term, the following challenges face IPL as it relates to its information technology.

- Work with City Finance to define and produce useful management reports (See the discussion of FERC/NARUC reporting in Business Operations)
- Fully adopt CitiWorks for Asset Management. This process is ongoing.
- Continue to provide a layer of the electric system to embed in ESRI's ARC/GIS used by Public Works. Although it would be preferable to have all City departments on the same GIS system, the GIS technology (AutoCAD) used by IPL works in conjunction with a suite of products for design, engineering, outage management, and trouble calls. Retaining this functionality is preferable to learning a new GIS system
- Prepare a Technology Plan for IPL operational technology. There is a myriad of applications in use within IPL, some local and others part of a network. Because these tools have been acquired over some time, they may be outdated or no longer supported. In the meantime, technology options have changed dramatically, just in the last three years. We recommend an inventory of applications and their functions be completed. The inventory will inform the development of a technology plan (including telecommunications) for the next three to five years, that will provide a road map to take advantage of

technological advancement, and even in some cases, reduce costs of maintaining the current environment.

- Plan and execute an upgrade to the telecommunications network supporting the BES and ICCP protocols. IPL has already identified this as a future need due to the age of the existing network.

Operations

Area Overview

Operations are segmented into two primary functions: System Operations of the transmission infrastructure; and Distribution Operations, which include the substations, overhead and underground assets.

System Operations

IPL is a NERC Registered Entity as a TO (transmission owner), TOP (transmission operator), GO (generation owner), GOP (generation operator), TP (transmission planner), DP (distribution provider), and RP (resource planner). To fulfill entity requirements, IPL currently has 5 Certified operators assigned to the position, two additional staff members who are NERC Certified, plus one trainee. IPL had its last NERC audit in 2017 and expects another NERC audit in about 2021 or 2022.

Distribution Operations

IPL distribution operations have the following primary functional areas: Trouble Dispatch, Substation field operations; Overhead field operations; and Underground field operations. System Operations issues all distribution electric switching orders.

Both System and Distribution Operations work closely across the organization, with Environmental Health and Safety, Engineering, and Warehouse and Stores.

System Operations Challenges/Opportunities

Risk Impact

Poor NERC audit preparation and performance include economic risk due to Standards violations and fines, the cost of enhanced NERC regulatory enforcement and oversight, as well-as Reputation Risk due to the loss of confidence from the City Council, Utility Oversight Board, and IPL customers.

Challenge/ Opportunity

DKMT found that IPL had not filled the NERC Reliability Program Administrator position left vacant when Jim Nail became Acting General Manager. Currently, the

roles and responsibilities are covered by the Security/NERC Compliance Manager with occasional support from the IPL General Manager.

Based on DKMT experience, the best leading indicator of a good NERC audit outcome is adequate and effective preparation for the audit. IPL supported this point-of-view during interviews, where management stated that the previous audits were successful due to the strong and dedicated skills and leadership of the NERC Reliability Program Administrator.

The organization must provide not only accurate supporting data and documentation for audit data requests but also work with impacted IPL staff to ensure they are ready and confident in their ability to respond to audit interviews.

Additionally, DKMT experience is that the specific NERC Entity roles and responsibilities for meeting NERC Reliability Standards, Requirements, and interpretation is a challenging and difficult task. While IPL, due to their asset base, design, and Entity Roles, may have fewer compliance requirements, the Reliability Standards may have changed since the 2017 NERC audit.

The need for a defined and filled role to maintain up-to-date knowledge of new NERC Reliability requirements or changing Standard interpretation is essential.

Recommended Course of Action
IPL should fill the NERC Reliability Program Administrator roles and responsibilities.

We see two viable options which IPL should consider:

1. Assign a full-time NERC Reliability Program Administrator to the existing (vacant) organization position.
2. Develop a detailed, shared functional approach across existing personnel to cover all NERC Reliability Program Administrator roles and responsibilities. This shared functional model would need to address both technical and independence requirements to fulfill the unfilled position.

We recommend that IPL consider developing a detailed RACI (Responsible, Accountable, Consulted, Informed) Matrix to help assure essential stakeholder requirements are fulfilled as well as all NERC Reliability Program Administrator roles and responsibilities are covered. The existing NERC Standards Workplan and INDN Internal Compliance Program, while out of date, provide a strong starting point for completing a current RACI Matrix.

The completed RACI Matrix should become a living part of the INDN Internal Compliance Program to help assure design and control effectiveness of NERC Reliability Program Administrator duties.

NERC Staffing Challenges/Opportunities

Risk Impact
Lack of adequate NERC Certified System Operators staff includes potential increased Regulatory Risk of non-certified operators performing NERC Entity roles and responsibilities, Safety Risk due to inexperienced System Operators writing and issuing electrical switching orders, Economic Risk due to needing to hire, even short-term, qualified operators, Operations Risk due to increasing the likelihood of procedural violations, and Reputational Risk due to the increased likelihood of enforcement and enhanced regulatory oversight.

Challenge/ Opportunity
DKMT found that while IPL has one person in training to become a Certified System Operator, IPL does not have a formal succession plan for the replacement of at-risk Certified System Operators.

IPL currently has five NERC Certified System Operators with one operator in training. One of the NERC Certified System Operators has notified IPL of his intention to retire in February 2021. However, DKMT was informed that all three NERC Certified System Operators are eligible to retire at any time.

DKMT's experience it that even for experienced internal personnel, it often takes more than one year to prepare for and achieve NERC System Operator Certification. If the plan is to fill the System Operator positions from outside IPL, even those with previous transmission or distribution operations experience will require at least one to two years to become knowledgeable of the IPL system to a competency level to operate IPL's system safely.

Recommended Course of Action
IPL should develop a NERC System Operator succession plan. This plan should include, but not be limited to:

1. The overall succession strategy (internal promotion or external hire)
2. Specific higher-level tactical milestones (using a "T-Minus" timeline to the retirement of an existing Certified System Operator. In other words, "N" months before retirement "X" action needs to be taken. This timeline should include specific activities around transfer or hire of the person, what specific

training and on-the-job opportunities to occur, off-ramps for not meeting expected progress or performance, etc.

3. Assigned owners to milestones with specific dates for completion.
4. Approval by the City Council of any resources required to meet the plan.
5. A performance monitoring process to help assure timely completion of the plan to minimize risk to the operation.

Distribution Operations Challenges/Opportunities

Improvement in the quality of Outage Management System (OMS) data capture is needed to provide City Council, PUAB, IPL management and staff with valuable and actionable information to reduce risk and increase operational efficiency.

Risk Impact

Lack of quality OMS data increases the risk of poor communication to customers and city leadership, and inaccurate reliability performance measurement. These may lead to increased economic uncertainty due to suboptimal asset replacement decisions, increased Reputation Risk due to inaccurate communications to customers, stakeholders, and increased operating risk due to the lack of timely and accurate circuit configuration management.

Challenge/ Opportunity

DKMT found that IPL IEEE electric reliability indices, as reported by APPA in their 2019 Annual Benchmarking Report, do not appear to be correct. This finding is supported by IPL management and staff. It seems that reliability statistics reported to the APPA for at least the last six years are incorrect. These errors may be due to MillSoft software issues. Still, the lack of concern for reliability reporting and the lack of using fundamental reliability statistics in the course of business operations is indicative of IPL's lack of data-driven decision making.

DKMT performed an independent analysis of 2019 reliability data as extracted from the MillSoft OMS application. The results show a significant difference in views of system reliability.

Index	APPA	DKMT	Units
SAIFI	0.84	0.02	*{per year}*
SAIDI	427	31.76	*{min per year}*
CAIDI	506	55.65	*{min per year}*

Table 2 IPL 2019 Reliability Statistic Differences

We agree with IPL management that there is a problem with the transfer of data from MillSoft OMS to APPA. We also recognize that this problem is under review by IPL, MillSoft, and APPA. MillSoft has now included a specific export function to transfer data to APPA that should take care of this issue.

Given the confusion in reliability calculations, it is difficult to state how IPL compares with its peers. Our independent analysis shows IPL as a second or third quartile performer compared to its peer group.

Quality of Data

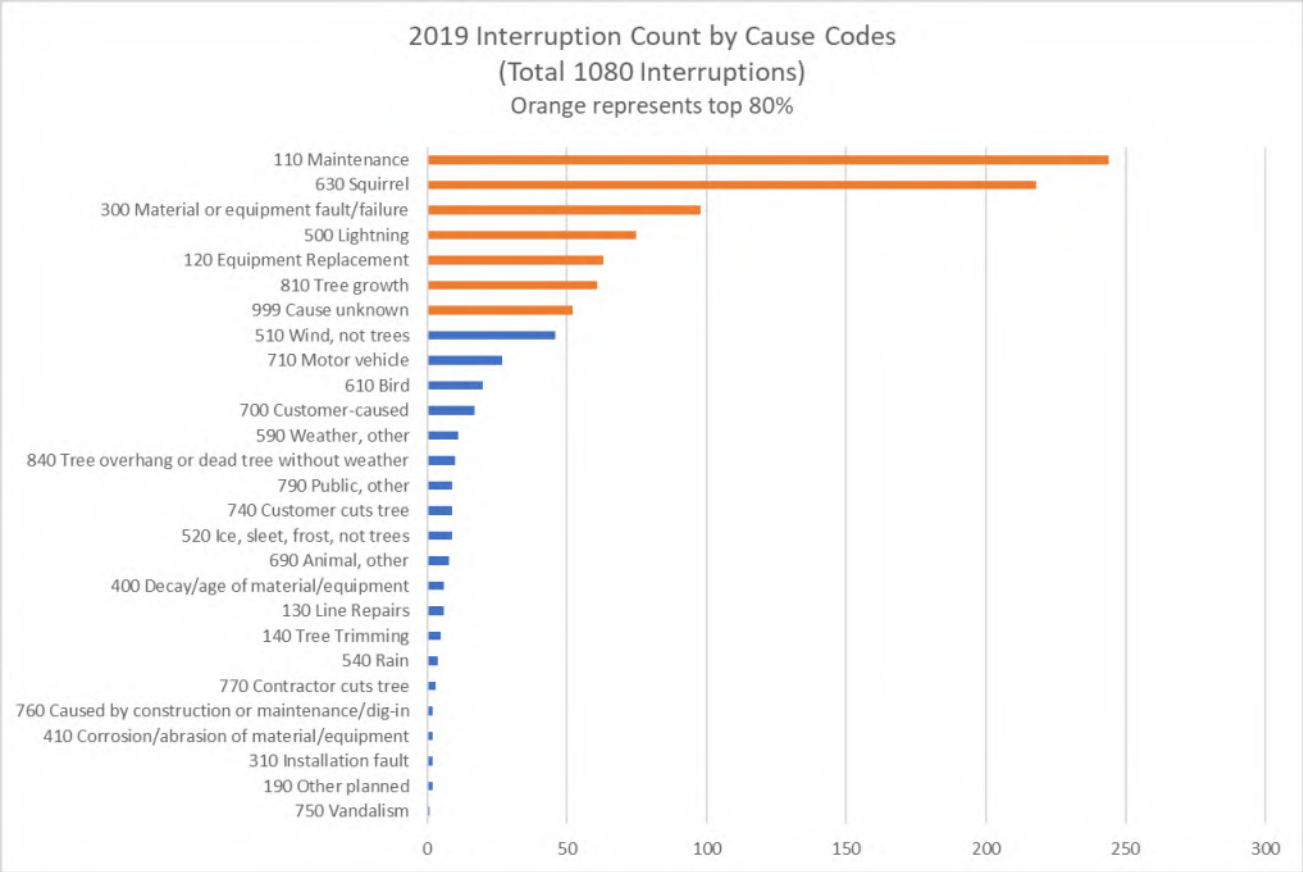
DKMT performed two additional analyses (Frequency of Outage Cause Code and Feeder CAIDI) to gain insight into the quality of data recorded and entered into MillSoft.

Frequency of Outage Causes

The outage cause is a designation provided by the field crew (Journeyman Lineman, Troubleman, etc.) as the primary cause of the customer interruption. Correct cause codes offer essential insight into the organization in several areas:

1. Management – first-order insight into the overall "health" of the system and its ability to effectively and efficiently deliver energy to the customer
2. Operations – Ability to continually improve operations performance by performing time studies for improving response efficiency to specific types, locations, and frequency of interruptions
3. Engineering – Baseline circuit performance information to help improve at the "best bang for the buck" customer reliability and to help optimally deploy capital to maintain or enhance the asset.
4. Customer Service – To provide better outage related information to customers.

The results of the Frequency of Outage Causes are presented graphically in the following Pareto diagram.



DKMT found, based on 2019 MillSoft OMS data, that about 40% of outages resulted from three maintenance and equipment related causes:

- 110 – Maintenance
- 300 – Material or equipment fault/failure
- 120 – Equipment Replacement

We have concluded that the underlying OMS data quality is suspect. Our conclusion is based on interviews with management and staff and DKMT's experience with results from reliability analysis from similar size mid-west utilities. If the data is accurate (e.g., 40% of actual outages are from the above causes), the study would suggest that IPL may have a significant near-term risk of reliable delivery of energy to customers.

Feeder CAIDI

DKMT also estimated feeder CAIDI using the 2019 MillSoft OMS data with a June 2020 circuit customer count (Note: All interruptions in the analysis were cataloged as not being a momentary outage).

Mult	CAIDI Range	Count
0X	CAIDI = 0	9
0.25X	>0 CAIDI ≤ 13.9	20
1.63X	>13.9 CAIDI ≤ 90.7	34
2X	>90.7 CAIDI ≤ 111.3	0
3X	>111.3 CAIDI ≤ 167.0	1
>3X	CAIDI > 167.1	2

	Substation										
Feeder #	B	C	E	F	H	I	J	K	L	P	R
01	30.579		14.843		22.726	28.063		123.846	10.391	17.839	0.000
02				49.157	18.670	36.376	14.207	0.000			
03				17.197							
04	38.031		44.521					0.000	24.044		
05			20.176		0.000	14.664		366.000	24.607	32.236	11.081
06	45.663	17.589		11.244	6.132	0.828	28.277				1.306
07	24.086	12.125	13.568	9.347					0.000		
08			78.737			24.708					
09			73.044		0.000			18.902	46.789		0.000
10	45.680					3.698	4.421	0.000	9.980	13.801	
11		12.880					8.623		172.187	22.934	
12	66.752	3.245			6.707			0.000			
13											58.026
14	50.846	15.469			6.770						
15	63.306									4.468	
16							4.615				
20							15.455				

While the analysis shows only three feeders with significantly higher CAIDI as compared to the other feeders, we are concerned with the number of feeders that appear to have artificially low outage durations. This result may reflect a lack of quality control in the entry of the interruption start times or the time or restoration.

Due to the scope of Phase I, we were not able to definitively determine a root cause of the source or process, which led to the data quality issues discussed above.

Recommended Course of Action

IPL should assure effective outage management governance (policies, processes, controls, job aids, and performance management). To achieve this, we recommend the following:

1. Establish an OMS Program Charter to clearly define the overall process along with clear OMS program stakeholder roles, responsibilities, and authorities
2. Assure clearly defined outage cause codes
3. Establish P-Type (Preventative) and D-Type (Detective) controls for OMS processes
4. Define simple monitoring controls to help assure OMS data quality
5. Establish a simple set of key performance indicators

6. Define an OMS performance dashboard to aid both management and staff in continuously improving OMS Program effectiveness.
7. Develop OMS Program training materials based on the above.
8. Deliver training to stakeholders based on their defined roles and responsibilities.

Revise the IPL Outage Recovery and Restoration Plan

Risk Impact

Lack of an up to date and complete Outage Recovery and Restoration Plan may lead to increased customer restoration times, reduced customer safety and satisfaction, increased employee risk, additional cost, and increased reputational risk.

Challenge/ Opportunity

DKMT reviewed the current IPL Outage Recovery and Restoration Plan and found it a good foundational document for incident management during major storm events. We found, however, the following weaknesses in the Plan.

1. The Plan does not reflect the current IPL organization, titles, roles, and responsibilities, etc. For example, the document references a Storm Assessment Team. This team is not defined within the document, nor does it exist within IPL.
2. IPL does not perform any "desk-top" type exercises or training on the Plan.
3. The restoration priority does not reflect current industry better practice to:
    a. Include in daily operating instructions to have a risk-based assessment of the current day operation (e.g., the stated likelihood of a weather event triggering the Plan). We do understand that there is an informal process for Trouble Dispatchers to "watch" the weather.
    b. Assure the highest priority to restoring IPL "Facilities Essential for Restoration." As IPL implements more technology (application, communication, etc.), utilities have found that they must "re-boot" their communication and process systems before they can efficiently perform restorations
    c. The plan should include priority restoration of elder care/ assisted living facilities. This addition is based on lessons learned from Hurricane Irma.
    d. Document the location/feeder / sub-feeder for elder care/ assisted living/oxygen users so that you can respond as quickly as possible AND verify that they are restored.
    e. There are no clear monitoring controls or measures to help assure Plan effectiveness. This is especially true of the restoration of temporary system configuration changes made during incident recovery.

Recommended Course of Action

IPL should update the IPL Outage Recovery and Restoration Plan. To accomplish this update, IPL should consider:

1. Defining the organization structure to use in the Plan
2. Performing a detailed review of all sections, definitions, process flows, etc. to assure they reflect current industry practice as well-as IPL goals, objectives, and organization structure.
3. Revise and update the Plan to reflect the detailed review and management's expectations for outage recovery and restoration.
4. Design and perform a "table-top" exercise of the revised Plan. The scope of the exercise should assure key Plan attributes are tested in simulated incident conditions.
5. Monitor Plan readiness, especially prior to expected periods of a significant chance of severe weather.

Project and Contractor Management

Area Overview

The IPL Engineering Department oversees contracted engineering and construction services. Day-to-day project management for these services is the contractor's responsibility. However, IPL engineering has overall design authority. It is involved at project construction sites with on the spot or least-cost problem resolution.

Construction schedules are prepared in reasonable detail, and schedule status is updated approximately every two weeks. Bi-weekly site meetings are conducted with representatives from the construction contractor, the engineering contractor and ILP Engineering, IPL T&D, and IPL System Operations. Meeting agenda topics include project progress updates, scope changes, schedule issues, submittals, and requests for information (RFI). Very brief meeting minutes are prepared and distributed to attendees. No performance metrics or regular forecasts for cost and schedule are addressed. The review of cost status is minimal, likely due to the reliance on the Not-to-Exceed (NTE) contract structure. The only periodic IPL assessment of contractor incurred cost is through the review of monthly invoices, which lag the actual charge by more than a month and are not likely structured to align with specific budget line items. Therefore, such reviews are ineffective for monitoring real-time construction costs. The current cost management process is reasonably successful, but alternative contract structures merit consideration.

A project change approval process exists for contract changes. However, procedures or guidelines for project and engineering changes are not in place.

Challenges/Opportunities

Contractor performance is subjectively assessed by site observation, contractor interface, and the quality of work products. The use of NTE cost contracts and schedule liquidated damage provisions appear to eliminate rigorous cost and schedule management efforts. This seems to be working. However, it's crucial to ensure that the NTE cost price and the liquidated damages schedule duration are reasonable for both contractor and IPL. Unreasonably high cost and long schedule targets provide contractors the opportunity to maximize their billings and to benefit from excessive schedule float.

Other forms of contracting may be worth considering.

- Time & Materials (T&M) contracts may result in lower "as-built" cost and would allow for transparency into actual contractor costs. They will also permit IPL to develop a benchmark database of cost and schedule values, which can be used for future bid evaluations and contractor management. However, T&M agreements would require increased oversight by IPL and more detailed cost and schedule data, including planned vs. actual contractor performance reports and forecasts.
- Fixed-price contracts may transfer risk to the contractor, but the contractor also benefits from the actual cost that comes under the fixed price. As with NTE agreements, fixed price contractor estimates include a risk premium, creating a higher price than for a T&M arrangement.
- Another approach to consider is a Target Price arrangement, whereby savings resulting from actual cost under the target price is split between IPL and contractor in an agreed-upon ratio. Usually, cost overruns are also shared.

IPL procures long lead items as the budget allows, rather than as required for site delivery. Substation K recently experienced a three-month delay due (presumably) to steel delivery. However, the target finish date was not impacted. It appears that the contract project schedule completion was set at a somewhat extended duration of 525 days. That created a schedule favorable to the contractor's interest, which is not a problem, so long as the project cost and operational requirements are not affected.

Recommended Course of Action

- Construction and Engineering Contracting
  - Evaluate the use of Target Price and Time & Materials contracting.
  - To minimize competitive procurements for frequently sought services, consider establishing Master Services Agreements with several firms, creating terms and rates, which would apply to task orders issued by IPL.

Task orders could be competed with the MSA terms or perhaps be sole sourced to an appropriate MSA holder.

- If possible, attempt to obtain 3 to 5 bids from qualified contractors with detailed line-item estimates and estimate bases. This bidding will permit a sufficient population for comparison of proposals to improve the award process, and benchmark risk premiums applied.

- Process Guidelines and Procedures
  - To establish consistent and repeatable processes for performing various project and contractor management functions, simple procedures or guidelines should be created. These may address:
    - Engineering review and approval,
    - Change management,
    - Periodic project reports
    - Project review meetings
    - Others

In addition to consistency, these documents could form the basis for continuous improvement as "lessons-learned" are included in document revisions.
It is important to note that procedures may be resisted as workers are used to doing things without procedural "constraints."

- Engineering and Procurement Support for Construction Schedule
  - To avoid delays due to late material and equipment deliveries, design and procurement activities should be accomplished in time to support the construction schedule needs. Procurement requires knowledge of project need dates and perhaps earlier efforts for engineering and procurement activities. Ideally, engineering and procurement activities would be included in an integrated project schedule.

- Project Management Staffing
  - As processes are developed throughout the IPL organization, a best practice is establishing an engineering position for an individual to focus on capital projects, serving primarily as a project management overseer and as a department engineer.

Quality Assurance

Area Overview

IPL does not have a formal quality assurance program or a Corrective Action Program (CAP). Tradecraft knowledge is used to review contractor activities on an ad hoc basis due to staffing levels, contracting practices, and lack of formal procedures. The lack of a corrective action program prevents the identification of opportunities for continuous improvement.

Challenges/Opportunities

IPL is getting by using the "best efforts" of its experienced employees to monitor contractor activities and the memories of individuals to identify opportunities for improvement. This practice is due to the lack of resources and formality that characterizes the way IPL and the City currently conduct business.

Recommended Course of Action

We recommend that as part of its re-organization IPL establish a formal corrective action program and assign someone the responsibility to track corrective actions to completion. A CAP will formalize opportunity tracking, assist with infrastructure planning, and promote accountability. The intent is not to create a bureaucracy but to help promote a culture of continuous improvement.

Work Management and Maintenance

Area Overview

In various interviews, IPL's work management and maintenance philosophy were described as "fix it when it breaks." An exception to this is preventive maintenance performed on the CTGs. The CTGs may be receiving more preventative maintenance than required. CitiWorks is used to develop work tickets. IPL still relies on paper tickets even though it has purchased Toughbook computers for its crews. CitiWorks allows field personnel to draft work tickets on their phones, though some staff continues to call in tickets because the electronic interface is not user friendly. There are no Reliability Centered Maintenance or Predictive Maintenance programs at IPL. Historically, IPL staff physically drove the system to identify system condition concerns, but that function was eliminated with staffing reductions.

Fleet maintenance is carried out by IPL personnel at the IPL garage.

Challenges/Opportunities

Utility infrastructure and equipment seldom fail at convenient times. Lack of preventative or reliability centered maintenance programs denies IPL leadership an

accurate picture of its assets and equipment condition. Over time this will increase lifecycle costs for maintaining the system and could impact system reliability.

There may be an opportunity to use lower-wage mechanics currently servicing other city vehicles on IPL vehicles. This effort would not include specialty vehicles like bucket trucks but could consist of pickup trucks and other standard vehicles.

Recommended Course of Action

IPL should leverage ongoing efforts to catalog all assets in CitiWorks to include a condition inspection. This effort would support the development of an asset management database and identify and record equipment in poor condition. Equipment can then be prioritized for a predictive or reliability centered maintenance program.

Use the IPL garage or conversely allow non-IPL mechanics to use the facility to maintain IPL vehicles and the vehicles of other departments. Converting the garage to a city asset versus an IPL asset may help facilitate this effort.

Levels of Effort Appendix

The following table provides the approximate level of effort required to address the recommended course of action for each area in the report.

Administration

Activity	Estimate Hours
Facilitating the development of an IPL Strategic Plan, establishing goals and metrics, which incorporates Council, PUAB, City and IPL Management and staff input	See Strategic Plan Development
Develop meaningful benchmarks and metrics, identifying objective data sources and reports for the metrics, working with staff to design reports, identifying comparable utilities for comparative benchmarking, working with staff to develop SOP template and content.	40
Identify common systems and SOPs that exist in other departments that can be applied to IPL, document gaps in SOPs and training. Work with staff to create SOP templates and training plan.	30
Creation of a communication strategy in concert with IPL and the City	15
Develop an understanding of the underlying culture of IPL and the city, differences, and areas in need of immediate attention. Create a vision of the ideal culture. Define resources and training to implement the program.	40
Detailed analysis of overtime and its drivers	10
In-depth analysis of common functions between city and IPL to determine where resources are needed, efficiencies can be found, and what should be centralized city versus at IPL.	45

Asset Management

Activity	Estimate Hours
Asset Prioritization- Develop prioritization criteria and process to support prioritization decision making	36
Asset Prioritization- Conduct a risk analysis for the identified priority assets.	40
Asset Preservation-Prepare actionable strategic directives to establish and implement programmatic requirements for asset preservation, including such considerations as condition monitoring, tracking, trending and analyses, and a consistent method for developing and prioritizing asset-related budget requests that facilitates budget allocation decision making.	60
Condition Monitoring-Evaluate implementing a formal condition monitoring program for the utility assets. This may include data collection, recording, trending, and analysis.	40

Business Operations

Activity	Estimate Hours
Identify gaps in resources, define the roles and responsibilities of Accounting/Finance support and central vs. IPL organization structure. Identify responsibilities between IPL and City Finance.	25
Define the requirements for IPL's forecast tool such that they can either develop in house or prepare an RFP.	8
Define CIP development and reporting process, as well as fund balance calculations and reporting	8
Identify all shared services between IPL and the City, review the allocation methodology, and make recommendations for improvements and SOPs.	15
Gain an understanding of the account code structure maintained in Tyler Munis general ledger, including the structure of transactions being provided from feeder systems.	16

Activity	Estimate Hours
The current costs being accumulated through CitiWorks and Tyler Munis should be mapped to FERC/NARUC accounts for each of the IPL organizations.	100
Prepare an initial map and monthly report mock-ups for review with City, PUAB, and IPL management.	24
Review proposed reports with IPL management, PUAB, and Council	24
If required, prepare extract for sample reports and test extract and report data and format.	24
We recommend a detailed review of timekeeping records to identify the highest cost centers, correlated those to operations or labor agreements, and develop a plan of action to address shortcomings.	40
Develop job descriptions, identify training opportunities, and develop an audit program for power supply contracts and partnership agreements	24

Construction

Activity	Estimate Hours
Develop procedure or guidelines for performing construction-related engineering functions including contractor oversight	40

Customer Service

Activity	Estimate Hours
Review the capabilities of unused legacy CS software for current use	8
Identify process enhancements to utilize current CS software more fully	16
Review the state of the art of utility analytics and determine how they could be used to replace meter reading requirements.	40
Review synergies between plans for the broadband project and AMI requirements.	40

Generation

Activity	Estimate Hours
Define and risk-rank scope of SOP, EOP and Operating Instructions	10
Develop standard SOP, EOP and Operating Instruction template	8
Develop approved SOP, EOP, and Operating Instructions. Resource estimate based on a per procedure/instruction basis. Estimate 16 hours per document to draft, revise, and be ready for initial deployment.	16 hrs./document
Develop effective monitoring controls for a set of SOPs, EOP, and Operating Instructions. This will include developing both leading and lagging indicators of procedure maturity of use and overall procedure effectiveness	40
Perform a staffing analysis for CTG operation and maintenance	60

Information Technology

Activity	Estimate Hours
Review Inventory of Hardware and Software and sort by the domain (desktop, IPL network, City network points of presence, telecommunications layer.	16
Prepare diagrams and perform research on current applications.	40
Review software products with major users of each to understand how well they meet their needs, what plans they have, what other products they are considering.	40
Prepare the Technology Plan Document	40
Make presentations of Technology Plan as required.	16

Activity	Estimate Hours
Support IPL planning and executing an upgrade to the telecommunications network to support the Technology Plan and the BES and ICCP protocols.	40

Operations

Activity	Estimate Hours
Develop a RACI Matrix and cross-functional approach	20
Develop a succession plan, procedure, monitoring controls, and performance measures	20
Improve OMS data quality and reporting. Train staff on the new process	80
Improve the IPL Outage Recovery and Restoration Plan	40

Project and Contractor Management

Activity	Estimate Hours
Construction and Engineering Contracting- Evaluate the use of Target Price and Time & Materials contracting. Socialize concept with IPL and prepare white paper evaluating two contracting ideas -	40
Construction and Engineering Contracting Develop a Master Service Agreement Template for IPL	20
Construction and Engineering Contracting-Develop Draft Procedure of Engineering review and approvals, Change Management, Project Reporting, and Project Review Meeting	40 hrs. each
Develop an integrated schedule for procurement and engineering and support for construction schedule	10

Quality Assurance

Activity	Estimate Hours
Develop a Corrective Action Program including organizational position, directive, software tools, and organizational responsibilities	40

Work Management and Maintenance

Activity	Estimate Hours
Review the capabilities and status of CitiWorks to support Reliability-Centered or Predictive Maintenance programs. Identify requirements to automate work planning and maintenance more fully.	40
Perform an analysis of cost savings, if any, through the transfer of IPL garage to the city.	30

Strategic Plan Development (275 hrs.)

Planning for the future of IPL, we recommend key stakeholders participate in a 5-step process to develop a strategic plan for the utility. In our opinion, the city is not taking advantage of all the benefits of municipal utility ownership. If all the city wants is the power to keep the lights on, it could achieve that through sale to KCP&L or contracted operations like the Long Island Power Authority. Modern municipal utilities are used to stimulate economic development, provide a platform for other services, and local job opportunities.

We propose that the process be led by IPL's General Manager and facilitated by DKMT's SME(s) and an Organizational Psychologist. DKMT will be responsible for advising the Council and IPL leadership, project planning, providing subject matter experts, and facilitating all sessions. IPL Leadership and the City Council will provide strategic vision, recommendations on who will need to be involved to ensure success, and final ownership of the strategic plan.

Month One: Getting ready
Deliverable: Common understanding of the effort

1. Strategic Planning Task Force Kick-off meeting with 5-7 key stakeholders
2. Key lessons from IPL's past in implementing change
3. Evaluation of inputs: operating plans, mandates, capability/capacity assessment, SWOT, etc.
4. Strategic plan examples and best practices.

Month Two: Setting guiding principles and strategic direction
Deliverable: Guiding principles, internal/external scan, and strategic direction

5. Strategic Planning Task Force meeting with 5-7 key stakeholders
6. Survey, interviews, focus groups as needed with customers, city council, city administration, etc.
7. Integrate feedback into the plan and develop guiding principles, scans, and strategic direction
8. Communication and change management to impacted staff, customers, city to increase relationships and trust.
9. Develop a draft plan for stakeholder review based on inputs received to date

Month Three: Developing fact-based strategic initiatives and goals
Deliverable: Agreed upon metrics and five-year roadmap

10. Strategic Planning Task Force meeting with 5-7 key stakeholders
11. Develop metrics/scorecard and five-year roadmap

12. Devil's Advocate checkpoint to test the plan
13. Communication and change management to impacted staff, customers, city.
14. Revise the draft plan based on new information and stakeholder input

Month Four: Determining the plan details
Deliverable: Quarterly action plan with responsibilities for a three-year roadmap
15. Strategic Planning Task Force meeting with 5-7 key stakeholders
16. Expand team to include leaders impacted by changes
17. Develop communication and change management plan
18. Validation by all utility leaders who will be responsible for the plan
19. Finalize the plan and develop supporting quarterly action plans

Month Five: Validating the Plan
Deliverable: Ensure buy-in by all stakeholders needed for plan's success
20. Validation by staff
21. Validation with City Council and PUAB
22. Validation with City administration
23. Begin implementing communication and change management plan

Naval District Washington

Regional Dispatch Center

Shift Staffing Analysis

Final Report

N00189-17-P-1163

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20 October 2017

Table of Contents

Executive Summary

Naval District Washington (NDW) provides operational support to naval installations within a 4500-square mile area surrounding Washington, D.C. A partial listing of support provided by NDW includes public affairs, ceremonial, public works, public safety, human resources, information technology and port operations.

Public safety support includes installation based fire, police, and emergency medical services that are dispatched via the NDW Regional Dispatch Center (RDC). Located in the Washington Navy Yard, NDW's Regional Dispatch Center currently provides public safety support to Naval Support Activity Washington, Naval Support Activity Annapolis, Naval Support Activity South Potomac and Naval Air Station Patuxent River. Planning for consolidation of Naval Support Activity Bethesda and Joint Base Anacostia-Bolling into the Regional Dispatch Center is underway.

This report details the results of a shift staffing analysis for the RDC and makes recommendations for increasing the effectiveness of operations and the professionalism of dispatch staff. Quantitative analysis is based on data provided from the RDC's Computer Aided Dispatch System (CAD) and phone records. Quantitative analysis tools included the development of custom financial models, data from other dispatch center studies, and data from the Association of Public-Safety Communications Officials-International (APCO) RETAINS 2 Toolkit.

Interviews with 22 dispatchers and 4 management personnel formed the basis for qualitative analysis. 21 dispatchers were interviewed while on duty September 6th-September 9th, and one dispatcher was interviewed over the phone. This accounted for approximately 92% of the dispatcher workforce.

DKMT Consulting analyzed current staffing practices under two different scenarios. The initial scenario retains RDC's practice of assigning call takers/dispatchers based upon individual installations. The second scenario assumes the RDC upgrades to E911 and integrates its CAD, radio, LENEL, GIS and phone systems to provide ubiquitous and standardized technology; and standardizes dispatch policies, processes, and procedures across all installations.

Upon RDC commissioning, installation based dispatch centers were shut down and some local dispatchers were given the opportunity to transfer to the RDC. The consolidation

process provided these experienced dispatchers with new communications technology and basic familiarization training. Consolidation successfully halved the number of on-shift dispatchers supporting these installations. Dispatchers were assigned to their legacy installations and considered to be subject matter experts. Recently, the RDC has instituted a policy of monthly rotation of dispatchers among the installations to broaden their familiarity with the region.

Dispatchers currently work a "Panama" schedule requiring non-rotating 12-hour shifts. The shift scheme uses 4 teams and two 12-hr shifts to provide 24/7 coverage. The working and non-working days follow a pattern of: 2 days on, 2 days off, 3 days on, 2 days off, 2 days on, 3 days off. During the interview process, dispatchers universally and enthusiastically supported the current schedule. Reasons for this support include the days off during the week, a 3-day weekend every other weekend, child care issues, and commuting issues. Some dispatchers have worked 12-hour day or night shifts most of their working lives and adopted their lifestyles to support it.

The disadvantages of the "Panama" schedule from a management perspective include lack of administration and training time, continuous use of overtime, lack of personnel to fill emergent schedule gaps, and inconsistent performance between teams. NDW has 23 dispatchers on-shift, one in training, and 30 authorized positions.

DKMT analyzed six scenarios based on the RDC's practice of assigning call takers/dispatchers to individual installations. The status quo 12-hour shift scenario and a 10-hour shift scenario, based on a provided draft schedule, were the baseline schedules. Each of these baseline schedules were then analyzed with on-shift training augmentation, and with the creation of a training department with 1 trainer per shift. Trainers were analyzed on shift and with training department personnel working 8-hour day shifts with personnel rotating to an 8-hour night shift once a month.

Scenario	Description	Number of Dispatchers on Shift	Number of Trainers on Shift (GS-8)	Total Annual Dispatcher Labor Cost	Straight Time	Overtime	Sunday & Night
Scenario 1	Annual Total for Dispatchers 12 Hour shifts	24	0	$ 1,383,646.73	$ 1,190,820.80	$ 87,699.56	$ 105,126.37
	Annual Wage Cost per dispatcher			$ 57,651.95	$ 49,617.53	$ 3,654.15	$ 4,380.27
Scenario 2	Annual Total for Dispatchers 10 Hour shifts	32	0	$ 1,794,322.66	$ 1,647,630.40	$ -	$ 146,692.26
	Annual Wage Cost per dispatcher			$ 56,072.58	$ 51,488.45	$ -	$ 4,584.13
Scenario 3	Annual Total for Dispatchers 12 Hour shifts, 1 Trainer each shift	24	4	$ 1,633,797.00	$ 1,409,054.40	$ 99,975.20	$ 124,767.40
	Annual Wage Cost per dispatcher			$ 58,349.89	$ 50,323.37	$ 3,570.54	$ 4,455.98
Scenario 4	Annual Total for Dispatchers 12 Hour shifts, 3 Trainers 8 hr Day Shift, 1- 8 hr Night Shift	24	4*	$ 1,607,336.17	$ 1,409,054.40	$ 87,699.56	$ 110,582.21
	Annual Wage Cost per dispatcher			$ 57,404.86	$ 50,323.37	$ 3,132.13	$ 3,949.36
Scenario 5	Annual Total for Dispatchers 10 Hour shifts, 1 Trainer each shift	32	6	$ 2,152,021.17	$ 1,974,980.80	$ -	$ 177,040.37
	Annual Wage Cost per dispatcher			$ 56,632.14	$ 51,973.18	$ -	$ 5,710.98
Scenario 6	Annual Total for Dispatchers 10 Hour shifts, 4 Trainers 8 hr Day Shift, 2- 8 hr Night Shift	32	6*	$ 2,139,404.54	$ 1,974,980.80	$ -	$ 164,423.74
	Annual Wage Cost per dispatcher			$ 56,300.12	$ 51,973.18	$ -	$ 5,872.28

Figure 1 Summary of Shift Staffing Scenarios

Analysis shows that from an economic perspective the status quo, Scenario 1, has the lowest annual dispatcher labor cost.

RDC staff provided a sample 10-hour shift schedule for analysis. The 10-hour shift increases annual labor cost by approximately $410,000 dollars and lowers the annual wages for dispatchers by approximately $1,600. This is primarily caused by the loss of overtime pay. Disadvantages of the 10-hour fixed shift also include the lack of a full weekend off. This is compensated for with 3 fixed days off each week.

Scenario 3 keeps 12-hour shifts and adds a GS-8 trainer to each team. Advantages are that the shift has an "extra" body to fill emergent vacancies and the trainer can provide on-shift training. Disadvantages are that the trainers do not get to interact as a team dedicated to improving training. A trainer's collateral duty could also be to document and follow up on equipment deficiencies.

Scenario 4 keeps 12 hour shifts and creates 4-person (GS-8) training department. GS-8 personnel would work 8-hour day shifts with rotation to a week of 8-hour night shifts once a month. Advantages are that the training department could be dedicated to improving training material and standardizing procedures across the region. Day shift would allow the training department to have more interaction with RDC management and local installation fire, police, and EMS management. The training department would have the responsibility for supporting the standardization of policies, processes and

procedures across the region. It would also provide an around the clock training capability and a progression path for dispatchers.

Scenario 5 uses the 10-hour shift schedule described in Scenario 2 and adds a GS-8 level 4 trainer to each shift. The trainer would work the same shift schedule as the dispatchers. The trainer could act as an "extra" dispatcher to fill-in for emergent needs and have a collateral duty to document and follow up on equipment deficiencies. Disadvantages are that the trainers do not get to interact as a team dedicated to improving training.

Scenario 6 uses the 10-hour shift schedule described in Scenario 2 and adds a team of six GS-8 level personnel to the staff to serve as a training department. The trainers would spend most of their time working 8-hour day shifts Monday-Friday and rotate to an 8-hour night shift once per month. This would allow the training department to work as a team to improve training and still provide training coverage for the mid and night shifts.

Lack of training and standardization of procedures was one of the first things mentioned by dispatchers during the interview process. RDC has been able to rely on the legacy knowledge of its transferred workforce and the training provided to its new hires by other dispatch organizations. Most new hires have come from local county dispatch centers or have previous dispatch experience. These new hires know what a professional dispatcher training program looks like, and lack of one is a source of job dissatisfaction. DKMT Consulting recommends that NDW RDC pursue APCO accreditation of its training program.

An accredited program would provide a systematic, efficient, and stable process to train new hires and retain the professionalism of experienced dispatchers. A stable training process is needed to train new hires as quickly as possible to address attrition. The past year's attrition rate was almost 42% versus planned attrition of 12%. APCO conducted studies in 2005 and 2009 and determined dispatcher attrition rates of 15% and 19% as national averages[1]. NDW should consider increasing its planned attrition rate for manpower planning purposes.

An accredited program may increase job satisfaction of incumbent dispatchers and reduce the time required to train new dispatchers. Based on our experience with training programs in the nuclear industry, DKMT Consulting believes a well thought out and executed full time training program should be able to train a new dispatcher in two to three months.

[1] APCO RETAINS Follow-up study page 4

DKMT Consulting also analyzed staffing under the assumption RDC upgrades to E911 and integrates its CAD, radio, LENEL, GIS and phone systems to provide ubiquitous and standardized technology; in addition to standardizing dispatch policies, processes, and procedures across all installations. During the interview process, management mentioned they were developing a plan to "functionalize" staffing of the RDC by separating the call taking and dispatch functions. If this strategy were combined with technology upgrades, NDW may be able to achieve greater efficiencies staffing the RDC.

DKMT reviewed several consolidation studies for municipal dispatch centers. A summary of these studies and a duplication of their methodology indicate that updating technology and functionalizing the call taking/dispatch functions could yield significant labor efficiencies for NDW.

			Prior to Consolidation Dispatch Staff/incl Supervisors		After Consolidation/Functionalizatin Dispatch Staff/incl Supervisors		
Studies Reviewed	Population Served	Total Call & CAD Volume	Full Time	Part Time	Full Time	Part Time	Remarks
Cape May Study	648,333	427,167	59	40	21	9	
South Milwaukee Study	48,838	68,305	16	2	8	2	
Manchester by the Sea	40,032	44,531	16	24	13		FTEs Only
NDW RDC	101,815	370,296	27	0	13	0	**Projected**

Figure 2 Potential Staffing Levels Based on Functionalization

Recommendations Summary

[redacted]

Overview

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Installation	Estimated Workday Population
Naval Support Activity Washington	33,692
Naval Support Activity Annapolis	7,904
Naval Support Activity South Potomac (made up of Naval Support Facility Indian Head and Naval Support Facility Dahlgren)	15,024
Naval Air Station Patuxent River	21,603
Naval Support Activity Bethesda	11,796
Joint Base Anacostia-Bolling	11,796

Table 1 Installation Workday Population

This report highlights the results of a detailed shift staffing analysis for the RDC and makes recommendations for increasing the effectiveness of operations and the professionalism of dispatch staff. Quantitative analysis is based on data provided from the RDC's Computer Aided Dispatch System (CAD) and phone records. Quantitative analysis tools included the development of custom financial models, data from other dispatch center studies, and data from the Association of Public-Safety Communications Officials-International (APCO) RETAINS 2 Toolkit.

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Quantitative Analysis

The Dispatch Center provided detailed CAD and call data from the months of May, June, and July 2017 for analysis. It is difficult for management to retrieve data from the current system and compare data across periods of activity. The provided data included 3,916 emergency calls (911), 17,472 administrative calls, and 71,186 CAD elements. For workload analysis purposes, this data was annualized to 15,644 emergency calls (911), 69,888 administrative calls, and 284,744 CAD elements. This understates alarm activity level because it does not include all LENEL data.

There is difficulty in parsing useful data from the LENEL system because queries returned information containing events performed by the servers (e.g., Access granted, Access denied, PIN accepted, Request to exit, etc.); vice only operator-actions.

For example, one building returned 65,535 lines of data for a 28-day period. IT Administrators are not capable of parsing the data to extract only operator actions. (e.g. Alarm Cleared, Alarm Dispatched, Alarm Suspended, etc.)

The table shown below summarizes the synthesis of call and CAD data for May, June and July 2017. Average calls per hour and average CAD entries per hour show that the RDC has a steady weekday workload and that calls drop off dramatically during the weekend. CAD entries also decrease on the weekend, but to a lesser degree. Variance is a dimensionless value that indicates the randomness of a data set. In this context, it is of value in determining the randomness of the dispatcher workload. Low values of variance are indicators of a stable and predictable workload.

Day	Average Calls/Hour	Call Variance	Average CAD Entries/Hour	CAD Variance
Mon	10.71	80.34	33.71	380.39
Tue	12.20	91.15	35.98	502.04
Wed	12.20	82.97	35.95	465.54
Thu	12.75	93.33	37.40	514.99
Fri	11.93	76.93	35.71	570.69
Sat	4.46	8.24	24.49	218.21
Sun	3.70	7.29	22.16	167.82

Table 2 Workload Summary by Day of Week

As shown in Table 2, the weekend variance for calls and CAD entries decreases relative to weekdays and is steady. This indicates that there may be opportunity to decrease the size of the weekend teams when functionalization is implemented. The practice of assigning dispatchers to each installation currently precludes RDC from taking advantage of this opportunity.

The tables on the following pages shows the same analysis by hour of the week. As would be expected at the beginning of the workday, 0800 and 0900 are the most random in number of CAD entries and phone calls per hour.

		Local Hour of the Day											
Period	Call Data	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100
Weekday	Average Call in Hour	2.06	2.00	1.74	1.50	1.80	8.48	14.15	21.55	24.33	22.62	21.79	19.82
	Variance of Calls in Hour	4.92	8.18	5.02	5.15	3.82	7.55	22.38	36.07	60.56	53.19	37.52	45.97
Weekend	Average Call in Hour	2.31	1.88	1.50	2.15	1.65	1.54	5.04	5.08	5.38	4.42	4.54	5.69
	Variance of Calls in Hour	4.14	3.55	2.02	3.50	1.68	1.30	3.40	7.51	9.37	8.73	6.66	8.14
Period	Call Data	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
Weekday	Average Call in Hour	17.62	18.73	19.08	17.85	17.11	15.02	12.18	9.03	7.26	4.38	3.38	3.09
	Variance of Calls in Hour	36.33	35.28	39.95	30.01	24.22	23.52	25.01	13.14	21.89	10.58	7.35	5.50
Weekend	Average Call in Hour	4.85	4.96	5.77	6.00	5.08	4.62	3.92	5.15	4.88	4.15	3.58	3.73
	Variance of Calls in Hour	6.86	8.44	9.54	7.20	10.31	6.81	7.35	6.70	5.39	8.94	6.49	2.28

Table 3 Summary Analysis of Call Data by Hour

		Local Hour of the Day											
Period	CAD Data	0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100
Weekday	Average CAD Events in Hour	22.85	24.30	24.52	17.30	17.52	21.18	47.76	68.08	56.09	54.80	54.85	44.02
	Variance of CAD Events in an Hour	98.04	253.23	96.56	46.52	83.21	172.67	519.85	545.24	505.50	615.42	494.10	486.57
Weekend	Average CAD Events in Hour	24.42	22.42	23.77	21.42	20.12	10.92	28.50	40.62	29.15	20.73	24.15	19.54
	Variance of CAD Events in an Hour	325.37	92.97	50.02	156.01	146.99	120.15	113.38	355.61	614.86	220.04	108.86	149.30
Period	CAD Data	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300
Weekday	Average CAD Events in Hour	41.42	42.97	40.67	33.64	32.26	27.76	36.64	37.38	31.17	26.70	26.64	27.58
	Variance of CAD Events in an Hour	427.08	563.11	713.43	441.03	225.33	218.00	217.07	225.59	215.56	131.91	96.30	194.16
Weekend	Average CAD Events in Hour	20.65	20.27	18.77	18.62	17.92	15.35	24.50	32.73	27.62	26.69	25.23	25.65
	Variance of CAD Events in an Hour	238.48	123.16	99.62	84.25	64.79	164.56	198.74	86.28	148.89	85.66	65.14	157.44

Table 4 Summary Analysis of CAD Data by Hour

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Qualitative Analysis

Interviews with 22 dispatchers and 4 management personnel formed the basis for qualitative analysis. 21 dispatchers were interviewed while on duty September 6th-September 9th, and one dispatcher was interviewed over the phone. This accounted for approximately 92% of the dispatcher workforce. An interview guide was developed to guide discussions with the dispatchers. Not every question was asked of every dispatcher, some dispatchers were more verbose than others. Certain questions elicited more detailed and animated responses.

The Sep 6th night shift Lead dispatcher distributed the questions to the team prior to the interview and required the team to write down their answers. Each dispatcher was interviewed individually.

Interview Guide Questions

1. How long have you been a dispatcher?
2. How long did it take for you to be trained and fully confident of your ability to do the job?
3. What do you like about the current 12-hour shift schedule?
4. What do you dislike about the current 12-hour shift schedule?
5. How do you manage the stress of this job?
6. How would shifting to a shorter (hours) schedule affect you?
7. How would shifting to a longer (hours) schedule affect you?
8. Would a 12-hour schedule with different start and stop time be more beneficial from a commuting standpoint?
9. Do you see yourself doing this job 5 years from now?
10. What do you like the best about being a Regional Dispatcher?
11. What do you like the least about being a Regional Dispatcher?
12. If you could change one thing about the Regional Dispatcher position what would it be?
13. Have you ever been required to back up another dispatcher because they were overwhelmed with responses?
14. Have you ever had to cover two dispatch positions at the same time? (short or long time?)
15. Describe your best day as a Regional Dispatcher?
16. Describe your worst day as Regional Dispatcher?
17. Do you feel your training was adequate prior to sitting in your dispatcher chair?
18. Do you have time to do personal administration and training while on shift?

19. How often do you eat during a 12-hour shift? Do you bring in food, order in, vending machines?
20. Do you always cover the same installations or do you rotate through them all?
21. What would be your ideal work schedule as a dispatcher?

All questions dealing with shift rotation, changing shift start time, or changing from 12-hr shifts were dismissed by all the interviewees. Some indicated that they could possibly change child care or school pickup/drop off arrangements to accommodate a change in schedule. Dispatchers universally and enthusiastically supported the current schedule. Reasons for this support include the days off during the week, a 3-day weekend every other weekend, child care issues, and commuting issues. Some dispatchers have worked 12-hour day or night shifts most of their working lives and adopted their lifestyles to support it.

Responses to the question "Do you see yourself doing this job 5 years from now?" were split between new hires < 5 years and more experience personnel > 5 years. Most of new personnel indicated that they would not be in the RDC five years from now. Reasons varied from career changes to the lack of promotion opportunity.

Responses to question #12, "If you could change one thing about the Regional Dispatcher position what would it be?" produced the most engagement and animated responses. Most responses mentioned training as the first thing the person would change.

Installation Based Staffing Analysis

DKMT Consulting analyzed current staffing practices under two different scenarios. The first scenario retains RDC's practice of assigning call takers/dispatchers based upon individual installations. The second scenario assumes the RDC upgrades to E911 and integrates its CAD, radio, LENEL, GIS and phone systems to provide ubiquitous and standardized technology; and standardizes dispatch policies, processes, and procedures across all installations.

Dispatchers currently work a "Panama" schedule requiring non-rotating 12-hour shifts. The shift scheme uses 4 teams and two 12-hr shifts to provide 24/7 coverage. The working and non-working days follow a pattern of: 2 days on, 2 days off, 3 days on, 2 days off, 2 days on, 3 days off. During the interview process, dispatchers universally and enthusiastically supported the current schedule.

The disadvantages of the "Panama" schedule from a management perspective include lack of administration and training time, continuous use of overtime, lack of personnel to fill emergent schedule gaps, and inconsistent performance between teams. NDW has 23 dispatchers on-shift, one in training, and 30 authorized positions.

DKMT analyzed six scenarios based on the RDC's practice of assigning call takers/dispatchers to individual installations. The status quo 12-hour shift scenario and a 10-hour shift scenario, based on a provided draft schedule, were the baseline schedules. Each of these baseline schedules were then analyzed with on-shift training augmentation,

and with the creation of a training department with 1 trainer per shift. Trainers were analyzed on shift and with training department personnel working 8-hour day shifts with personnel rotating to an 8-hour night shift once a month.

DKMT downloaded GS7-GS11 pay scales for straight time and overtime pay, and incorporated Sunday and night pay adjustments in the financial model. RDC management provided the following distribution of dispatch personnel.

		GS Level									
Staffing Level	Shift	1	2	3	4	5	6	7	8	9	10
GS 7	Day	1				2	1				
GS 7	Night			1			1	1	1	1	
GS 7	Day		3		1	1				1	
GS 7	Night		2		2						
GS 8	Day	0							1		
GS 8	Night				1						
GS 8	Day							1			
GS 8	Night										1
GS 9	Trainer		1								
GS 11	Superviso	1						1			
GS 7	Training	1									
Total	GS 7	1	0	0	0	0	0	0	0	0	0
Total	GS 8	0	0	0	0	0	0	0	0	0	0
Total	GS 9	0	0	0	0	0	0	0	0	0	0
Total	GS 11	1	0	0	0	0	0	1	0	0	0

Table 5 Workforce Pay Dispersion

General Schedule pay bands were correlated to each GS-7 and GS-8 dispatcher. Calculations were then developed for an 80 hour pay period that was then annualized for each staffing scenario. For Scenario 3, 4, 5 and 6 trainers were assumed to be at a GS-8 step 4 pay level. Scenario 2 assumed additional dispatchers were GS-7 step 2 and additional Lead Dispatchers were GS-8 step 7.

Scenario	Description	Number of Dispatchers on Shift	Number of Trainers on Shift (GS-8)	Total Annual Dispatcher Labor Cost	Straight Time	Overtime	Sunday & Night
Scenario 1	Annual Total for Dispatchers 12 Hour shifts	24	0	$ 1,383,646.73	$ 1,190,820.80	$ 87,699.56	$ 105,126.37
	Annual Wage Cost per dispatcher			$ 57,651.95	$ 49,617.53	$ 3,654.15	$ 4,380.27
Scenario 2	Annual Total for Dispatchers 10 Hour shifts	32	0	$ 1,794,322.66	$ 1,647,630.40	$ -	$ 146,692.26
	Annual Wage Cost per dispatcher			$ 56,072.58	$ 51,488.45	$ -	$ 4,584.13
Scenario 3	Annual Total for Dispatchers 12 Hour shifts, 1 Trainer each shift	24	4	$ 1,633,797.00	$ 1,409,054.40	$ 99,975.20	$ 124,767.40
	Annual Wage Cost per dispatcher			$ 58,349.89	$ 50,323.37	$ 3,570.54	$ 4,455.98
Scenario 4	Annual Total for Dispatchers 12 Hour shifts, 3 Trainers 8 hr Day Shift, 1- 8 hr Night Shift	24	4*	$ 1,607,336.17	$ 1,409,054.40	$ 87,699.56	$ 110,582.21
	Annual Wage Cost per dispatcher			$ 57,404.86	$ 50,323.37	$ 3,132.13	$ 3,949.36
Scenario 5	Annual Total for Dispatchers 10 Hour shifts, 1 Trainer each shift	32	6	$ 2,152,021.17	$ 1,974,980.80	$ -	$ 177,040.37
	Annual Wage Cost per dispatcher			$ 56,632.14	$ 51,973.18	$ -	$ 5,710.98
Scenario 6	Annual Total for Dispatchers 10 Hour shifts, 4 Trainers 8 hr Day Shift, 2- 8 hr Night Shift	32	6*	$ 2,139,404.54	$ 1,974,980.80	$ -	$ 164,423.74
	Annual Wage Cost per dispatcher			$ 56,300.12	$ 51,973.18	$ -	$ 5,872.28

Figure 3 Summary of Shift Staffing Scenarios

Analysis shows that from an economic perspective the status quo, Scenario 1, has the lowest annual dispatcher labor cost.

RDC staff provided a sample 10-hour shift schedule for analysis. The 10-hour shift increases annual labor cost by approximately $410,000 dollars and lowers the annual wages for dispatchers by approximately $1,600. This is primarily caused by the loss of overtime pay. Disadvantages of the 10-hour fixed shift also include the lack of a full weekend off. This is compensated for with 3 fixed days off each week.

Scenario 3 keeps 12-hour shifts and adds a GS-8 trainer to each team. Advantages are that the shift has an "extra" body to fill emergent vacancies and the trainer can provide on-shift training. Disadvantages are that the trainers do not get to interact as a team dedicated to improving training. A trainer's collateral duty could also be to document and follow up on equipment deficiencies.

Scenario 4 keeps 12 hour shifts and creates 4-person (GS-8) training department. GS-8 personnel would work 8-hour day shifts with rotation to a week of 8-hour night shift once a month. Advantages are that the training department could be dedicated to improving training material and standardizing procedures across the region. Day shift would allow the training department to have more interaction with RDC management and local installation fire, police, and EMS management. The training department would have the responsibility for supporting the standardization of policies, processes and procedures

across the region. It would also provide an around the clock training capability and a progression path for dispatchers.

Scenario 5 uses the 10-hour shift schedule described in Scenario 2 and adds a GS-8 level 4 trainer to each shift. The trainer would work the same shift schedule as the dispatchers. The trainer could act as an "extra" dispatcher to fill-in for emergent needs and have a collateral duty to document and follow up on equipment deficiencies. Disadvantages are that the trainers do not get to interact as a team dedicated to improving training.

Scenario 6 uses the 10-hour shift schedule described in Scenario 2 and adds a team of six GS-8 level personnel to the staff to serve as a training department. The trainers would spend most of their time working 8-hour day shifts Monday-Friday and rotate to an 8-hour night shift once per month. This would allow the training department to work as a team to improve training and still provide training coverage for the mid and night shifts.

Training

Lack of training and standardization of procedures was one of the first things mentioned by dispatchers during the interview process. RDC has been able to rely on the legacy knowledge of its transferred workforce and the training provided to its new hires by other dispatch organizations. Most new hires have come from local county dispatch centers or have previous dispatch experience. These new hires know what a professional dispatcher training program looks like, and lack of one is a source of job dissatisfaction. DKMT Consulting recommends that NDW RDC pursue APCO accreditation of its training program.

An accredited program would provide a systematic, efficient, and stable process to train new hires and retain the professionalism of experienced dispatchers. A stable training process is needed to train new hires as quickly as possible to address attrition. The past year's attrition rate was almost 42% versus planned attrition of 12%. APCO conducted studies in 2005 and 2009 and determined dispatcher attrition rates of 15% and 19% as national averages[2]. NDW should consider increasing its planned attrition rate for manpower planning purposes.

An accredited program may increase job satisfaction of incumbent dispatchers and reduce the time required to train new dispatchers. Based on our experience with training programs in the nuclear industry, DKMT Consulting believes a well thought out and

[2] APCO RETAINS Follow-up study page 4

executed full time training program should be able to train a new dispatcher in two to three months.

Accredited training programs usually require that a Systematic Approach to Training (SAT) process used to support a training program. As applied to RDC, the SAT process involves the continuous evaluation of training needs through employee performance and emergency response operational performance.

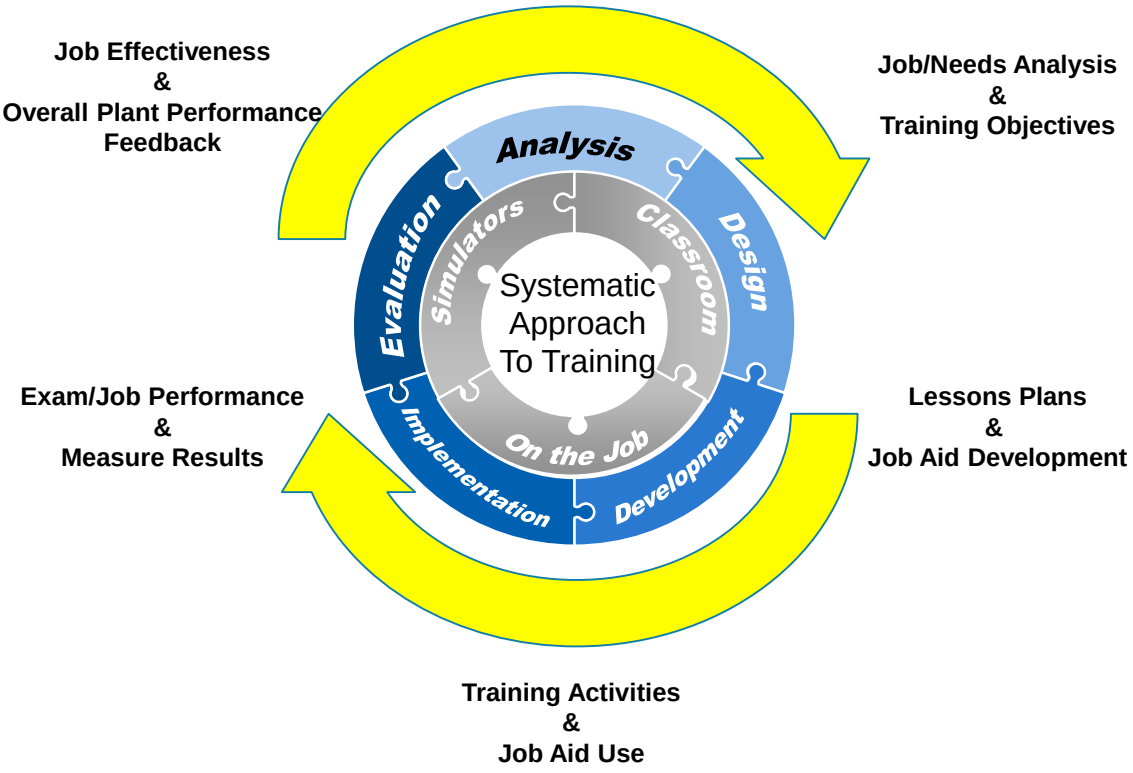

Figure 4 Systematic Approach to Training Process

The Systematic Approach to Training is a 5-step process designed to continuously evaluate and improve employee and operational performance.

Analysis Phase

Analysis identifies hazards and requirements of the job/task and examines the current differences between desired and actual performance. In the analysis phase, the end goal is to know IF and WHY training is needed as an intervention to solve a performance problem.

Design/Development

Design and Development are the second and third phases of the SAT process. The design phase uses the results from the analysis phase to design the overall structure of the training. That analysis may point to classroom training, on the job training, computer based, simulator, or tabletop training as being the most appropriate venue. The Development phase consists of the creation of the training materials and assessment tools.

Implementation

Training is delivered and learning is assessed. In many cases, pilot training sessions are conducted to fine tune the training material and delivery method. An assessment of trainee knowledge is conducted at the end of the training session. This may be a written test, oral exam, or a demonstration of a specific task. It is important to note that this assessment does not mean the training program has successfully improved employee or site operational performance, it only means that the employee has mastered the training session.

Evaluation

Training program effectiveness is subject to evaluation during the evaluation phase. Continuous improvements are made to the training program as required based on employee job performance observations and monitoring the operational performance of the site. Not all operational performance problems are related to personnel training, however, those that are can be eliminated through detailed analyses.

APCO International has published APCO ANS3.103.2.2015 Minimum Training Standards for Public Safety Telecommunicators to catalog required knowledge and skills for training programs for call takers and dispatchers. It outlines initial and recurring training requirements to develop an accredited program.

In addition to quickening the pace of qualification for new hires, a well-developed training program can backstop employee performance evaluations and provide demonstrable evaluations of dispatcher performance.

One trainee was interviewed during this study. She had been in the training program for 4 months and had no idea of how her training performance was being measured and where she had progressed on the qualification curriculum. Accreditation of the training program would address these issues.

RDC management shared a 9 page" NDW Trainer Plan" that includes a Remedial Training for Legacy Dispatchers checklist with detailed tasks and evaluation criteria of successful or unsuccessful. The plan could be used as an outline for developing an accredited program, but would need a comprehensive comparison with the ANS 3.103.2.2015 training standard.

Functionalized Staffing Analysis

DKMT Consulting also analyzed staffing under the assumption RDC upgrades to E911 and integrates its CAD, radio, LENEL, GIS and phone systems to provide ubiquitous and standardized technology; in addition to standardizing dispatch policies, processes, and procedures across all installations. During the interview process, management mentioned they were developing a plan to "functionalize" staffing of the RDC by separating the call taking and dispatch functions. If this strategy were combined with technology upgrades, NDW may be able to achieve greater efficiencies staffing the RDC.

The methodology used to determine functionalization labor requirements follows the logic used in the APCO RETAINs 2 Toolkit. The analysis is broken into 3 areas, workload, employee availability and staff needed.

Line	Element/Description	Call Taker 2 Minute Average		Dispatcher 4 Minute Average	
	Workload	Total Call Volume		Dispatch 911 Volume	
A	Total Call Volume per Year	Based on Model		Based on Model	
B	Minutes per Call	2		4	
C	Calls Per Hour (60/B)	30		15	
D	Workload in Hours (A/C)	Calculated		Calculated	
	Employee Availability				
E	Net Available Work Hours (From Table 4 above)	1573		1573	
F	Agent Occupancy Rate (Assumes available working time/half hour)	0.75	0.90	0.75	0.9
G	True Available hours per Person (E*F)	1180	1416	1180	1416
	Staff Needed				
H	FTE Base Estimate (D/G)	Per Model	Per Model	Per Model	Per Model
I	Turnover Rate (assumed to be 10%)	0.9	0.9	0.9	0.9
J	**FTE's Required H* (1+(1-I)**	**Per Model**	**Per Model**	**Per Model**	**Per Model**

Figure 5 Functional Analysis Framework

For the purposes of this analysis DKMT included Bethesda and Joint Base Anacostia Bolling. Figure 6 shows a comparison of a functionalized organization versus the current method of assigning dispatchers to each installation. While this example implies NDW RDC only needs 18 dispatchers for the current workload, it was mentioned earlier that LENEL has not been included in the statistics nor has Anacostia or Bethesda call volumes. None of this data was available to inform the analysis. However, this analysis clearly shows the advantages of functionalization by reducing the number of dispatchers from 18 to 11. The inclusion of other data may only change the number of dispatchers but not the advantages of the functionalization staffing model.

Functionalized				Joint Base Anacostia-Bolling	Naval Support Activity Washington	Naval Support Activity Annapolis	Naval Support Activity South Potomac	Naval Air Station Patuxent River	Naval Support Activity Bethesda	Total
Line	Description	Call Taking	Dispatching 911							
	Workload									
A	Total Call Volume	370296	15,664	42901.5	122536.1	28746.4	54641.5	78569.0	42901.5	
B	Minutes per Call	2	4	3	3	3	3	3	3	
C	Calls per Hour	30	15	20	20	20	20	20	20	
D	Workload in Hours	12343	1044	2145	6127	1437	2732	3928	2145	
	Employee Availability									
E	Net Available Work Hours	1816	1816	1816	1816	1816	1816	1816	1816	
F	Availability percentage	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	
G	Availability per Person	1452.8	1452.8	1452.8	1452.8	1452.8	1452.8	1452.8	1452.8	
	Staff Needed									
H	FTE Base Estimate	8.50	0.72	1.48	4.22	0.99	1.88	2.70	1.48	
I	Turnover Rate (15%)	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	
J	FTE's Required	10.00	0.85	1.74	4.96	1.16	2.21	3.18	1.74	
	Total Dispatch FTEs		11	2	5	2	3	4	2	18
	Total Supervisors		2							2
	Total FTEs		**13**						**Total FTEs**	**20**

Figure 6 Navy Functionalization vs Current Practice

DKMT reviewed several consolidation studies for municipal dispatch centers. A summary of these studies and a duplication of their methodology indicate that updating technology and functionalizing the call taking/dispatch functions would yield significant labor efficiencies for NDW.

Studies Reviewed	Population Served	Total Call & CAD Volume	Prior to Consolidation Dispatch Staff/incl Supervisors Full Time	Prior to Consolidation Dispatch Staff/incl Supervisors Part Time	After Consolidation/Functionalizatin Dispatch Staff/incl Supervisors Full Time	After Consolidation/Functionalizatin Dispatch Staff/incl Supervisors Part Time	Remarks
Cape May Study	648,333	427,167	59	40	21	9	
South Milwaukee Study	48,838	68,305	16	2	8	2	
Manchester by the Sea	40,032	44,531	16	24	13		FTEs Only
NDW RDC	101,815	370,296	27	0	13	0	**Projected**

Figure 7 Potential Staffing Levels Based on Functionalization

Collective Bargaining Agreement

A review of the CBA identified the lengthy grievance procedure as an obstacle to more quickly making organizational changes and administrating disciple. A review of the GS-7 and GS-8 position descriptions indicated they were very generic. Lack of demonstrable

performance standards works against management in the grievance process and undermine efforts to improve workforce professionalism.

Recommendations

Appendix

--10 hour Shift Schedule

--Trainer Plan

--Call and CAD Data

--Interview Summaries

Jul 2019 - Naval District Washington DC

At least one schedule, beginning on Jan 1, 2019, is *unpublished*

Sun	Mon	Tue	Wed	Thur	Fri	Sat
	Jul 1 **0600-1600** *unpublished* Ingrid Spera 06-16 Victoria Thompson 06-16 Misty Jones 06-16 Carolyn Harrison 06-16 Corlia Green 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Thomas Smith 14-00 Ericka Odemns 14-00 Dispatcher 14-00 Deborah King 14-00 Darlene Kaufman 14-00 **2200-0800** *unpublished* Jody Sees 22-08 Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08	**2** **0600-1600** *unpublished* Ingrid Spera 06-16 Victoria Thompson 06-16 Misty Jones 06-16 Carolyn Harrison 06-16 Corlia Green 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Thomas Smith 14-00 Ericka Odemns 14-00 Dispatcher 14-00 Deborah King 14-00 Darlene Kaufman 14-00 **2200-0800** *unpublished* Jody Sees 22-08 Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08	**3** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Ingrid Spera 06-16 Victoria Thompson 06-16 Keith Vaughn 06-16 Dispatcher 06-16 Misty Jones 06-16 Carolyn Harrison 06-16 Corlia Green 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 Thomas Smith 14-00 Ericka Odemns 14-00 Dispatcher 14-00 Deborah King 14-00 Darlene Kaufman 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08 Jody Sees 22-08 Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08	**4** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Keith Vaughn 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08	**5** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Keith Vaughn 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08	**6** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Keith Vaughn 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08
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Sun	Mon	Tue	Wed	Thur	Fri	Sat
			Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08			
21 **0600-1600** *unpublished* Ingrid Spera 06-16 Victoria Thompson 06-16 Misty Jones 06-16 Carolyn Harrison 06-16 Corlia Green 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Thomas Smith 14-00 Ericka Odemns 14-00 Dispatcher 14-00 Deborah King 14-00 Darlene Kaufman 14-00 **2200-0800** *unpublished* Jody Sees 22-08 Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08	**22** **0600-1600** *unpublished* Ingrid Spera 06-16 Victoria Thompson 06-16 Misty Jones 06-16 Carolyn Harrison 06-16 Corlia Green 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Thomas Smith 14-00 Ericka Odemns 14-00 Dispatcher 14-00 Deborah King 14-00 Darlene Kaufman 14-00 **2200-0800** *unpublished* Jody Sees 22-08 Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08	**23** **0600-1600** *unpublished* Ingrid Spera 06-16 Victoria Thompson 06-16 Misty Jones 06-16 Carolyn Harrison 06-16 Corlia Green 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Thomas Smith 14-00 Ericka Odemns 14-00 Dispatcher 14-00 Deborah King 14-00 Darlene Kaufman 14-00 **2200-0800** *unpublished* Jody Sees 22-08 Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08	**24** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Ingrid Spera 06-16 Victoria Thompson 06-16 Keith Vaughn 06-16 Dispatcher 06-16 Misty Jones 06-16 Carolyn Harrison 06-16 Corlia Green 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 Thomas Smith 14-00 Ericka Odemns 14-00 Dispatcher 14-00 Deborah King 14-00 Darlene Kaufman 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08 Jody Sees 22-08 Linda Scranage 22-08 Samantha Reamy 22-08 Robert Quinn 22-08 Dispatcher 22-08	**25** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Keith Vaughn 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08	**26** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Keith Vaughn 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08	**27** **0600-1600** *unpublished* Dispatcher 06-16 Dispatcher 06-16 Tim Beaudoin 06-16 Brittany Bodnar 06-16 Keith Vaughn 06-16 Dispatcher 06-16 **1400-0000** *unpublished* Andre Campbell 14-00 Tanya Butler 14-00 James Buck 14-00 Stephanie Bratton 14-00 Dispatcher 14-00 **2200-0800** *unpublished* William Campbell 22-08 LaShondra Felder 22-08 Amanda Ferguson 22-08 Cheryl Finneyfrock 22-08 Michael Silver 22-08
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*** Indicates time starts on following calendar day**
*** Events and Time Off follow default Split Time of Day of 06:00**

NDW TRAINER PLAN