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USING MOBILE DISPATCH & AVL FOR ELECTRIC TROUBLE – "TRUCK 54 WHERE ARE YOU?"

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Background

The Potomac Electric Power Company (Pepco) is an Investor Owned Utility (IOU) providing retail service to over 700,000 customers in a service area with a population of approximately 2 million. Pepco's 640 square mile service area includes all of the District of Columbia and major portions of Prince George's and Montgomery counties in suburban Maryland.

In January 1999 an ice storm struck the Pepco service territory affecting service to 60% of the Pepco customers. Following this event Pepco investigated lessons learned. The key opportunities identified for improved customer restoration were communication of crew status, better management of crew assignments, and the ability to track outage restoration progress. Ice storm restoration was slowed down by overloaded voice radio circuits and management of voluminous paper outage tickets.

To address this issue Pepco implemented a Mobile Dispatch System (MDS) and Automated Vehicle Locator (AVL) to manage field crew resources, and automate the exchange of information between Pepco's Control Center personnel and field personnel when outages occur on the electric distribution system. Information traditionally handled via voice radio communications is now done accurately and efficiently by freeing dispatchers and field crews from radio and paper tasks. The use of AVL has increased safety and efficiency by allowing dispatchers and crews to view the locations of crews.

This paper describes in detail the techniques and tools used to analyze existing business processes, develop requirements, and support the overall business change management activities that accompanied technical implementation of the new system.

Defining Requirements

Pepco conducted a series of sessions to define the Project Scope, create the Business Process Model, and develop requirements for the Request for Proposal. The business requirements resulting from these sessions were used directly to support system vendor selection.

The group tasked with this requirement came from many areas of the company and crossed the traditional business structure. The team consisted of representatives from operations, field services, computer services, purchasing, substations, internal audit and a consultant.

The initial goals of the project were to reduce wait time of crews, increase information to customers, increase dispatcher efficiency and improve safety. AVL was selected to address the latter issues. Dispatcher efficiency improvements were anticipated by allowing the dispatchers to view the crews and work in one detailed form (map). Safety is extremely important at Pepco and by the use of AVL crew locations can be utilized to dispatch the closest crew to potentially dangerous situations (wire down, pole struck etc.). The dispatchers wanted a means of establishing a crew's location prior to energizing circuits, AVL provides this capability.

The group developed a list of requirements and submitted a Request for Proposal (RFP) to several vendors. The team using a weighted matrix evaluated the responses. The top candidates were invited to demonstrate their systems. The final selection was made to purchase the Mobility system.

Cross-Functional Project Team Coordination

Following a selection of a vendor product a project team was created for implementation. The project team included personnel from operations, field services, telecommunications, computer services and internal audit. This phase specifically included personnel that would be using the system including dispatchers and field personnel. The "Buy in" from these areas was deemed critical to the project success.

The input from various areas has been very beneficial by allowing input from various people with different points of view. Minor changes were made to the system as a result of the Joint Application Design (JAD) sessions held with the vendor. These changes allowed increased support among the field personnel. When the initial requirements were developed the AVL was intended for dispatchers and management to provide detailed information on the status of restoration and crews. The input of the field personnel resulted in a change to the system to permit field crews to view what crews are nearby, this provides a work improvement when a crew needs materials not on his truck or when he may be energizing a line in a storm to verify other crews in the vicinity.

In addition to this project several members of the team were simultaneously working on projects to replace a legacy outage management system and install GIS at Pepco. Undertaking all these projects at the same time, while increasing the risk to any single project, was deemed essential to an overall systems improvement initiative following the ice storm. Currently all three systems have been implemented at Pepco.

Analyzing Business Processes

Since the business case for this project was based on productivity increases, it was essential that both union and management understand how these benefits will be realized. A "shared stakeholder" approach was used to increase coordination and review overlapping work processes. A Process Creation Team was established with stakeholder teams. The stakeholder methodology was initiated to identify and document processes required for "go live"

implementation as well as sustained support. Stakeholders consisted of representatives from areas directly affected by the new MDS technology or process changes. Teams consisted of supervisors and front line employees which operated under the umbrella of the OMS/MDS/GIS Project Team.

A Process Creation Team Charter was developed with the following objectives:

1. Define End-to-End MDS Business Processes and Interfaces with OMS and GIS
    - Day to Day Operations
    - Storm Operations
2. Identify Use of New Technology
3. Identify Cross-functional Coordination and Hand-offs
4. Investigate and Identify Process Improvements
5. Identify Procedure Changes
6. Provide Training Team with Process Changes
7. Share Process Information

Figure 1-1 below provides the Process Creation Team structure and key process assignments.

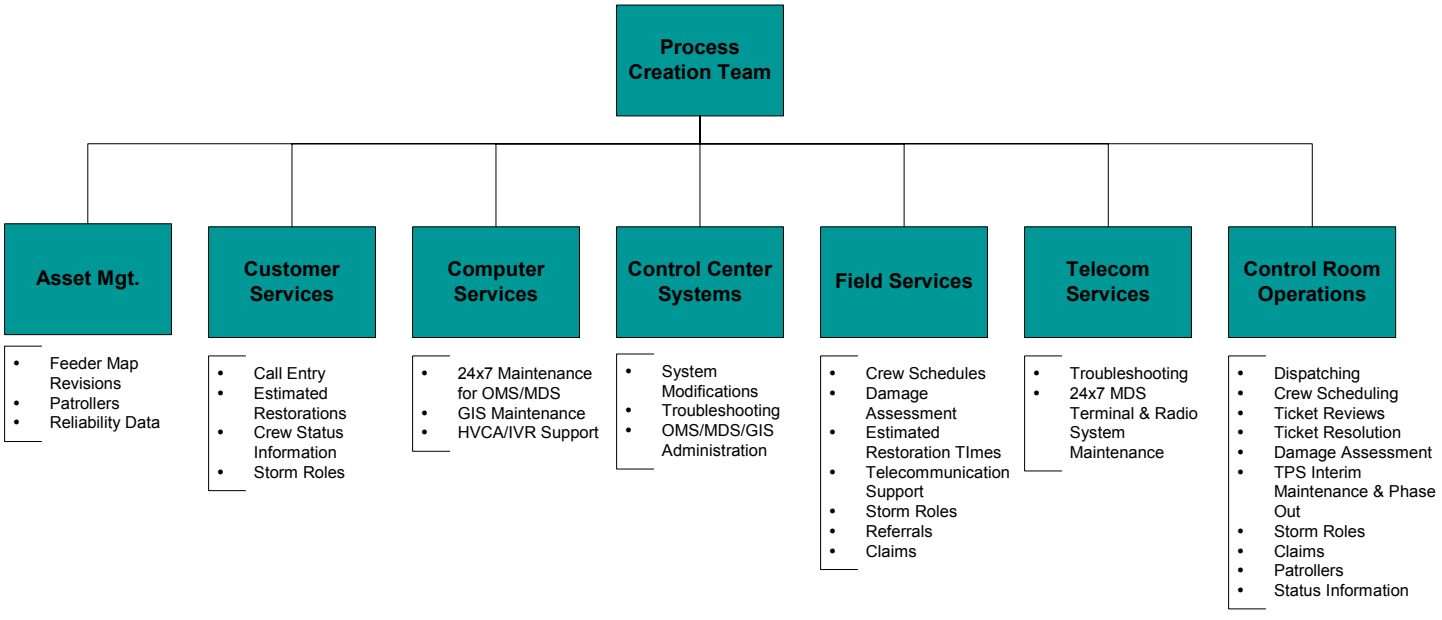

Figure 1-1 Process Creation Team Structure

All Service Restoration business processes were analyzed to understand and document:

1. Functional Area, Function, Process, Sub-Process, and Activity Decomposition
2. Detailed Activity Diagrams (Triggers, Actions, Outcomes)
3. Roles
4. Organizations
5. Handoffs
6. Business Rules
7. Supporting Technologies
8. Supporting Work Procedures.

All information was captured in a business process modeling toolset to allow effective analysis, communication, and maintenance of the business process information. The GEMWorX FlowModeler was used to capture business rules, work documents, job aids and other corporate knowledge related to MDS processes. It links this information directly into the business process model. Users can access this information directly with a mouse click while viewing a workflow step in the process diagram. In addition, the information can be analyzed and reported for an individual process or an entire business area.

Existing processes were analyzed further to document: inputs with source, outputs with recipient, process triggers, business rules, work procedures, and technology utilized. Using this business process activity task information, swimlane diagrams were constructed. Swimlane diagrams document detailed tasks of an activity. Tasks for each activity were mapped on horizontal lanes from left to right. It is important to note that swimlanes diagram all internal and external interfaces within a process. Technology used by each task was recorded in a predefined swimlane directly above or below the task that uses the technology.

Key Findings of Business Process Review

The far-reaching changes that the MDS technology brought to Pepco required the continued commitment of stakeholders and leadership. Our key findings and recommendations for moving forward with this technology:

- Establish a process philosophy and maintain process information, technology and procedures to keep up with changes that occur during the remainder of the project and support training

- Demos of system capabilities should be provided to various service centers to provide a visual representation of system capabilities. A "life cycle" demo of and outage call was effective.

- Process issues or questions raised in classes were researched and supported with feedback to attendees and/or process revisions.

- Encourage user suggestions via a dedicated web site, newsletter and user meetings. Provide continual feedback on future enhancements.

- After "go live" conduct process review sessions to make revisions or discuss process alternatives.

Training and Change Management

Business processes, business rules, work procedures, and supporting technologies led directly to identification of the necessary knowledge and skills required for training. The Pepco Training Team was comprised of OMS/MDS/GIS Project Team members as well as representatives from user areas. Designated representatives from user areas were selected to assist with user support at their respective work locations on an on-going basis after training was conducted.

Trainee participants were identified and user requirements were analyzed to develop training requirements for 200 trainees. Training modules were developed to present Pepco process specific training to meet the training skill requirements for each skill set group. A total of 18 training sessions were conducted in six months. Dedicated trainee workstations were set up for class instruction for dispatchers and crews at service centers. Dispatcher and crew training were conducted concurrently with coordinated class exercises. This enabled a more complete understanding of dispatcher and crew responsibilities. Post-class practice environments and practice exercises were available for day-one core users.

The training phases are described in more detail below.

- Phase One

  - Scenario Workshops

    The Scenario Workshop training was developed to focus on identifying the appropriate trouble selection specific criteria, rules and definitions and becoming familiar with components that appear on the MDS Order Restoration Screen.

- Phase Two

  - Reconnect Course

The purpose of this course was to provide instructions on receiving reconnect orders, recording reconnect data and communicating with the dispatcher, supervisors and other users.

- Phase Three

  - MDT Operations Course

    A MDT Operations Course was taught for all overhead and underground personnel. The training schedule was prioritized to support "day one" MDS trouble and emergency requirements.

  - MDT Supervisor Course

    This course will be conducted for Supervisor Distribution positions to enable them to monitor workload and crew performance.

  - MDW/OMS Dispatcher Course

    This course was conducted to support "day one" Control Room Operations dispatch and resolution of outage tickets.

- Phase Four

  - MDT Operations Practice

    - To ensure that operation personnel are sufficiently knowledgeable and comfortable with new technology, trainees will need to practice and keep skills current. Operation personnel that completed the MDT Operations Course were required to perform 40 hours of MDT practice.

  - MDT Observation

    Each Field Service trainee was scheduled to observe the ticket dispatch and completion with MDS Support Representatives at the Control Center. This provided an understanding of the workflow between field operations and the dispatchers.

  - Reinforcement

    Additional information, changes or user tips were continually be provided to users. Training will be provided to users that require additional training. Refresher training will be scheduled.

Where is Truck 54 Now?

An important lesson learned was to involve the end users of the system as early as possible. The input from field crews and dispatchers proved invaluable and allowed improvements to the system not previously considered. Clearly defining the intended uses of the AVL and broad involvement permitted acceptance by the field crews.

Following implementation several unexpected success factors were discovered. The use of the AVL was utilized in many ways. Dispatchers used the AVL information for crew locations to aid crews in finding difficult locations. The productivity of meter orders nearly doubled, far exceeding expectations.