

A Packaged Solution

Ronald Nevinger, Rochester Gas & Electric Corp.

RG&E's kit program streamlines tap-changer repairs.

To facilitate efficient, cost-effective maintenance and repair of the load tap changers (LTC) at Rochester Gas & Electric Corp.'s (RG&E) substations, a parts inventory and maintenance control system was organized by instituting a repair kit program. The program consolidates contacts and other spare parts into customized repair kits tailored to the unique requirements of specific LTCs.

Before the advent of the kit program, RG&E's (Rochester, New York, U.S.) inventory of spare LTC parts was housed in a collection of more than 200 bins, administered by the Strategic Supply Management (SSM) department. The pending overhaul or emergency repair of an LTC required the maintenance engineer, accompanied by storeroom personnel and a field technician or foreman, to select the necessary replacement parts. This time-consuming procedure involved the use of manuals to identify the parts required, removal of the parts from separate bins and the placement of the components in a cardboard box for the repair crew. Outdated, incomplete or inaccurate manuals complicated the process. Missing parts required emergency purchases and overnight shipping of the replacements to prevent disruption of service schedules. These last-minute purchases resulted in higher costs as vendors added to the expense of small quantity parts runs and overtime to fill rush orders. In addition, shippers charged premiums for overnight delivery.

Typically, the same cardboard box would reappear several days later with the worn and unused parts, requiring the maintenance engineer to return to the storeroom and reverse the process. Untagged parts, or used

contacts that could be remanufactured for less than the cost of replacement, were often heaped into a miscellaneous box or discarded. This scenario was repeated 35 to 40 times a year.

The system was adequate in earlier years, when maintenance engineers could take an active role in the process. Today, with a smaller work force operating at a high level of efficiency to reduce overhead, this procedure was no longer acceptable. The Catch-22 of the situation was that, although the engineering and SSM departments agreed that a new, streamlined system was needed, no one had the time to develop it.

Partnering with the Supplier

The genesis of RG&E's parts inventory and maintenance control system was the request from National Manufacturing & Distribution Inc. (National), Hamburg, New York, to partner with RG&E to create an LTC and circuit breaker repair kit program. National manufactures and rebuilds contacts, assemblies and components for electrical apparatus. For more than a decade, RG&E has dealt with National, who has supplied materials and parts that have met or exceeded OEM specs.

National suggested RG&E adapt a kit program that was initially created for another utility in 1995. As part of the program, National identifies all new and used parts in a utility's existing inventory of LTC components. New parts are cleaned, shrink-wrapped in corrosion-resistant packaging and labeled with a bar code. Worn yet serviceable parts are refurbished as required. After identifying and grouping by manufacturer and model every LTC currently in use,



Fig. 1. An open LTC kit showing parts, tools and manual.



Fig. 2. An RG&E technician using the kit to repair an LTC.

National then determines the parts needed to complete a corresponding kit, supplementing the original inventory as necessary. The final repair kits are then assembled, sealed and returned to the utility. The kits include all components, specialized tools, manuals and instructions necessary for the field repair of the equipment.

When a crew is scheduled to perform routine maintenance or emergency repair of an LTC, it takes the kit designated for the type and model of equipment to be serviced. Parts are removed as needed, and the worn or damaged parts are replaced in the kit. After the repairs, the kit is sent back to National for replenishment, where it is resealed and returned to the utility. The utility is charged only for the replacement or remanufacture of the parts used.

National developed the program as a result of discussions with its utility customers. The program was designed to not only meet their common needs, but also to be customized to match special requirements. A key to the program's success is the immediate replenishment of the kits, which provides National with the opportunity to review the entire repair from a parts perspective. From time to time, the condition of the parts reveals specific problems that require unique solutions. The purpose is to make the crew and supervisor comfortable in knowing that when a kit is taken into the field, the crew is equipped to handle the replacement of parts in a reasonable time. By ensuring that a complete set of parts is always on hand, rush orders for parts are eliminated.

Although this approach appeared to be a viable solution, initially RG&E was reluctant to select National as its sole source for spare parts. A trend is growing, however, for the competitive bid standard of past years to be replaced by strategic alliances as industries partner with suppliers to gain reliable supply and cost reduction through volume discounts. This trend, in combination with a favorable business relationship between the two companies and a mechanism in place to ensure pricing remained competitive, outweighed concerns over using National as an exclusive source. An additional factor driving RG&E's decision to develop the repair kit program was the planned relocation of its Jefferson Road operations center to a smaller facility. The company wanted to eliminate the old system's parts bins, which occupied more than 200 storage locations. The new system would provide a more efficient system for inventory and maintenance control.

Team Input Yields a Responsive, Flexible Program

In order to implement the proposed system, a team representing engineering, stores, purchasing and the field technicians worked with the supplier, which adapted its kit program to RG&E's requirements. The team polled field technicians for input on what to include in the kits. Checks and balances, such as referee price quoting, were instituted to ensure that National maintained a competitive price for its product. An administrative system was established to control the sign-out, return and replenishment of the kits. In addition, a training program was started.

To facilitate continual, positive change in the program, field technicians were encouraged to use a suggestion form that is part of the manual supplied with each kit. The form allows technicians to request additional parts, tools lubri-

cants or other items for inclusion in the kit. Also, technicians may suggest equipment-specific procedures and repair tips to help future crews in their work. When the kit is returned to the supplier, the suggestions are reviewed with RG&E, and changes in the kit's contents or the procedures outlined in its manual are made as deemed appropriate.

When the program began in March 1998, National moved the contents of the parts bins to its own facilities and began the process of identifying, evaluating, cleaning and packaging the components. Within a month, the inventory was returned to RG&E in the form of 28 sealed kits.

Initial response to the program has been positive, especially from field personnel. Technicians have found they have everything required to do the job. In those cases where other needs have surfaced, National has satisfied the requests. For example, one comment form suggested including Teflon wheels in a kit to go on a brake assembly in the air compartment. Such a request had never been made before, but the crew discovered during a repair job that these wheels were worn out. The wheels were added to the kit and drawings were updated when the kit was replenished.

Cost Benefits of the Program

By analyzing costs associated with the adoption of the LTC kit program, RG&E has documented significant annual savings. Refurbishing existing parts or purchasing replacements from National has yielded savings per kit of 30% to 50% below the cost of purchasing OEM replacement parts. Expressed in dollars, this saving is approximately US\$1100 to US\$1800 per kit. Replacing 207 storage bins with 28 LTC kits results in a reduction of US\$250 per kit in stockroom storage space. By curtailing the labor hours previously spent in pulling, running and restocking parts, an additional US\$190 savings per kit is realized. Further, the expense of generating purchase orders for individual parts is reduced by approximately US\$150 per kit. Based on an average use of 25 kits per year, the total annual saving ranges from about US\$42,000 to US\$61,000.

The success of RG&E's parts inventory and maintenance control system is best expressed in the following terms: The repair kit program has yielded documented financial savings. Its efficient inventory management system has positioned the company to respond quickly and confidently to any LTC repair or emergency. The program is designed to evolve and adapt to future changes in operational procedures, providing a sense of satisfaction among those who created the program. RG&E, its supplier and its customers realize the benefits. ■

Ronald L. Nevinger is a substation maintenance engineer for RG&E in charge of maintenance and upgrading activities for all substation equipment. He received the BSME degree from Rochester Institute of Technology in May 1988, having previously earned the associate's degree in construction technology from the State University of New York Technical College, Alfred, New York. Nevinger has held a variety of positions with RG&E since he joined in 1981, including substation design, substation engineer and distribution engineer.