



WAA-PRO3-45

**THE INTEGRATION OF INDIRECT PURCHASING SYSTEMS AT
CARIBE GE, PUERTO RICO**

99D249I

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May 3, 1999

This project is submitted in partial fulfillment of the degree requirements of Worcester Polytechnic Institute. The views and opinions expressed herein are those of the authors and do not necessarily reflect the positions or opinions of *Caribe GE* or Worcester Polytechnic Institute.



Acknowledgments

We would like to thank the following people for assisting us in the completion of our project. Without their help, during both the PQP and IQP time periods, our project would not have been successful. Thank you so much to: Adrian Peace, James Kinney, Isabel Bernal, Anna Torres, Nydia Lebrón, Todd Wyman, María Garcia, Jossie Fussa, José Santiago, Eva Janet Martinez, Professor Addison, Professor Rissmiller, and Professor Vernon-Gerstenfeld.



Authorship Page

This project was completed during the time period of January – May, 1999 by Benjamin Douglas, Jennifer Stauff, and Peter Tessier. All partners contributed equally to the project in both research and writing. In the initial research, each member concentrated on certain areas so that the team was specialized in several aspects that provided a foundation for the project: Benjamin, who has an interest in psychology studies, examined the psychological effects on employees during corporate changes; Jennifer, a management engineering major, brought knowledge of management and organizational sciences to the exploration of production systems, purchasing systems, and ISO 9002; and Peter, who has worked for GE prior to the project, concentrated on both internal and external mergers. All sources are listed in the reference section and have been noted within the text.



Abstract

This report examines the integration of indirect purchasing activities of the Caribe GE Patillas plant and headquarters in Bayamón. Significant factors in the development of the recommended purchasing system were the former indirect purchasing systems, employees' attitudes towards the merger, and management's preferred system. With help from the General Electric employees, we were able to produce a more efficient purchasing system, and assess the impact the merger of the purchasing systems had on the personnel of the company.



Executive Summary

In the summer of 1998 an internal merger occurred within the General Electric company. General Electric merged its Electrical Distribution and Control (ED&C) division with its Industrial Control Systems (ICS) division to form the new Industrial Systems division. The merger took place to provide customers with a single business for industrial systems, services, and solutions, which make up the combined efforts of the two former divisions. The merger gave customers one company to meet their various needs and allowed the company to operate more efficiently. The Industrial Systems division will be able to enhance new product and process development by taking advantage of the combined resources, talents, and experience of the two former divisions

Our objective for this project was to integrate the indirect purchasing activities of the Industrial Systems plant in Patillas with the sourcing headquarters in Bayamón. The Patillas plant had formerly been part of ICS, while Bayamón had been the headquarters of ED&C in Puerto Rico.

The purchasing activities of the Patillas plant prior to the merger had been suffering from many problems. In Patillas there was no single process in place, and communication between the Patillas plant and Bayamón had been severely lacking. It was taking much longer than necessary to send out purchase orders, and the personnel involved had become very frustrated.

In order to solve these various problems, we implemented a defined purchasing process in Patillas, and we implemented the process through a single employee in Patillas directed to interact with Bayamón. By providing Bayamón with a single contact,



communication has greatly increased, and troubleshooting has become much easier. These changes to the purchasing process have allowed all involved personnel to be properly educated about the correct procedure, and have greatly improved the efficiency of indirect purchasing activities.

The faster time cycles for the indirect purchasing activities, as well as the renewed enthusiasm of the employees towards the new process have provided us with evidence of its success. The progress is currently being monitored by our process control form and will continue to be monitored by the management at Caribe GE. When a breakdown in the process has occurred, the improved communication has been able to quickly resolve the problem, therefore providing us with the confidence that the process will continue to succeed in the future.



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1.0 Introduction

The newly established General Electric (GE) Industrial Systems of Puerto Rico merged the indirect purchasing activities of its Patillas plant with Central Sourcing in Bayamón. GE Industrial Systems was formed when GE's Electrical Distribution & Control (ED&C) division merged with GE's Industrial Control Systems (ICS) division. Bayamón served as headquarters for GE's ED&C division in Puerto Rico, and now serves as headquarters for the new Industrial Systems division. The Patillas plant was part of the former Industrial Control Systems division. The former ICS division was combined with the former ED&C division to present customers with one company that meets their various needs while allowing the company to operate more efficiently. The Industrial Systems division will be able to enhance new product and process development by taking advantage of the combined resources, talents, and experience of the two former divisions.

The goals for this project were: to establish an understanding of indirect material purchasing routines in Patillas and in Bayamón; to process map the Patillas and Bayamón routines to identify commonalities; to develop a process that enables Patillas personnel to place requests on Bayamón; to merge material or service commodities from the Patillas plant with strategic suppliers in the Bayamón plant to leverage the best service and price; to implement transfer of the material requisition process from Patillas to Bayamón; and to establish process control techniques to ensure the new process is operating efficiently.

In pursuing these objectives, which involved the study of former processes and inconsistencies between Bayamón and Patillas, the project team found it necessary to study employees' opinions and feelings towards changes within the company. Changes such as



restructured management and added responsibilities could cause distress and anger in the workplace, and should be avoided. Our expectations were that the overall feelings and opinions of the employees would be negative towards the merger. Because of the merger of the purchasing systems, some employees were displaced, while others had increased responsibilities, causing stress in both instances. This project illustrates how personnel are effected by such a merger and how management must take steps to minimize personal harm while maximizing the company's productivity.

The conclusions and recommendations of this project will perhaps aid any company dealing with an internal or external merger by minimizing the time spent restructuring and creating new processes. We expect that GE will be able to use our final report to assist in the merging process, as well as get a sense of the effects of the merger on employees.

Our first goal for the project was to establish a clear understanding of the former purchasing systems and why the two divisions merged. We then analyzed common components of the purchasing systems in order to assure the project team that their integration would be successful. Along with the technical processes, we analyzed both positive and negative effects felt by employees arising from the merger. The employees' reactions to these changes influenced our decisions regarding the newly integrated systems. We wanted to create a new system that was feasible in all respects, including employees attitudes toward it. The project team also established control devices to ensure that the proposed systems were and are still working properly and efficiently.

This project encompasses both the technical and social aspects of the merger. The technological aspects were within production systems analysis, an important dimension of management science. The societal aspects of the project arose in the study of psychological



effects upon employees arising from the merger. The analysis of these two interlocking dimensions of the problem that Caribe GE asked us to resolve necessitated the integration of the two divisions with a more time and cost efficient system while, at the same time, motivating the work force toward these goals.



2.0 Literature Review

The following literature review describes information that enhanced our knowledge of the purchasing activities of Caribe GE. It includes background information on mergers, production systems and purchasing systems. The review also includes an overview of common employee attitudes during such mergers.

We studied mergers to provide a thorough background concerning the related benefits and problems of such corporate actions. This study also aided our knowledge about mergers, why they occur, and how to prevent possible problems. These problems will be discussed later in this chapter. The project team also studied general production systems to gain a better understanding of the history of the former production systems were being utilized in Puerto Rico. This information provided a sufficient background from which the project team was able to make decisions regarding the integration of the purchasing system that will be used throughout the new division, Industrial Systems.

The effects on employees resulting from the changes to the internal structures and systems of the company are important because they allow us to assess disturbances that create large shifts in employees attitudes. By enhancing our knowledge on employee effects from organizational changes, we were able to create a purchasing process that will minimize these disturbances. We were also able to determine employee morale as well as whether they were capable of handling their new responsibilities. These impacts show the social effects of technological changes within the company.



2.1 GE Division History

Our project concentrates on three divisions of General Electric: the former divisions of Electrical Distribution & Control and Industrial Control Systems, and the newly merged division of the former two, Industrial Systems. The decision to merge the two divisions was made because it was felt that the product lines were sufficiently related, the merger would improve customer satisfaction, and it would improve company efficiency greatly.

GE's Electrical Distribution & Control division (ED & C) served the residential, commercial, industrial, and utility markets by offering many varied information technologies and advanced electronics that are used world wide (GE 1999a). GE's Industrial Control Systems (ICS) provided industrial systems and consumer motors and controls to customers (GE 1999b).

GE Industrial Systems merged the ED & C and the ICS to form a *conglomerate* division that continues to handle products and information from both prior divisions, yet provides the customer with a single contact with which to interact. This merger initially created slightly more work for the corporation due to changes in some job descriptions and requirements, however the conglomerate better suits the needs of the customers and will provide a more efficient business operation (GE 1999c).

2.2 Mergers

A merger in the business world is the absorption of one company into another company or the combining of two companies into a single business entity. After similar companies have merged, they are restructured so they are both controlled under the same management. The companies involved in a merger try to work with each other to achieve the



best outcome for both companies (Alkhafaji, 1990). Mergers are not always external, or involve two separate corporations; some mergers are internal. An internal merger is the combining of two divisions of the same company. Two divisions merge in a very similar manner as two companies would, but the highest level management within the company stays in place and makes decisions regarding the merger.

2.2.1 Positive Aspects

There are many benefits that arise when a company carries out an internal merger. An internal merger can simplify a business operation, thereby making it easier for customers to interact with the company. Prior to the merger, a customer may have purchased many related products through separate businesses within a large conglomerate. In such cases, it might be more practical to simply merge the businesses and allow customers to do all their purchasing from one entity.

Another benefit from an internal merger, from a company point of view, would be a reduction in the amount of personnel. When two businesses become one, less management is needed. Management salaries are often costly to a company, so it can be economically efficient to reduce the amount of management (Benston, 1980).

Economically, mergers can also benefit a business's total available capital. Capital is a very important part of the business world because it provides a business with more purchasing power (Brozen, 1982). Purchasing power can be used to buy new *assets* or even new businesses. When contracts are involved, purchasing power becomes an important part of the bidding process. A company with more purchasing power is able to out bid, and risk less, than a company that has less available capital (Hilton, 1970).



A business's purchasing power may also increase with greater access to credit after a merger. Businesses are able to obtain larger amounts of credit, as their total worth increases. Even companies that have large amounts of capital depend on credit when expensive new technologies are being developed or used (Ravenscraft & Scherer, 1987).

The final major benefit for a company considering a merger could be tax reduction. A merged business will end up paying less in taxes than the combined amount paid by the two former businesses. A tax reduction means a more productive company for a business owner (Goldberg, 1983).

2.2.2 Negative Aspects

The negative aspects of a company merger are normally felt on the employee side. When similar companies, or divisions within a company merge, there is usually a reduction in personnel. Economies of scale will normally mean that fewer management personnel are needed to operate a single business entity, when compared to two separate businesses. Also, all of the purchasing of the newly merged company will often go through one department, as opposed to two, reducing the purchasing personnel. Therefore, there is less paperwork there are and fewer obstacles for the company and customer to face (Williamson 1987).

With the decrease in personnel, comes an increase in responsibility for the remaining employees. As a company reduces the number of employees, the responsibilities of the terminated employees must fall on the shoulders of the remaining employees. Even though there are fewer managers, there may still be as many people left to be managed. The increased volume of purchasing and marketing will also add an additional strain to the unified



departments left dealing with it. So a company merger can greatly effect an employee's job within a company.

2.3 *Employee Attitudes*

In all corporations, large or small, the employees' attitudes can affect the quality of the product being sold. If someone is unhappy or is stressed in the workplace, less attention is brought to the product or service being sold. This in itself poses a problem to the company. However, the problem does not usually stop with one person. When one person is distressed, the overall atmosphere of the workplace is poisoned, and the feeling usually spreads until a remedy is introduced into the workplace. In turn, the company affects the employees' feelings towards their job as well as their everyday lives (Post, 1994). If new management or other changes are introduced into a comfortable atmosphere, a normally content employee may become unsettled. By minimizing the negative aspects of the corporation on the employee, a less distressed atmosphere can exist, thereby producing a better product.

2.3.1 *Employee reaction to change*

Most employees feel threatened by change, both physically and psychologically. If a drastic change in their daily lives and work styles is introduced, people feel as though they are losing control. An example of a drastic change in the employee's work life is when an employee is required to change his normal or desired function in the workplace (Cunha & Cooper, 1998). This change usually results in an alteration to the current daily job responsibilities, causing more constraints or demands on the employee. These alterations frequently lead to insecurity, uncertainty, occupational stress, and even trauma (Alkhafaji, 1990). Occupational stress can result in negative shifts in work behavior, and the collapse of



physical and psychological well-being (Cunha & Cooper, 1998). It has been proven that stress can lead to health problems like heart disease, high blood pressure, ulcers and diabetes, as well as anxiety, depression, fatigue, and lowered self-esteem. Occupational stress also has an impact on the level of performance on many tasks as performance drops sharply as stress increases. When under a great deal of stress, employees are more concerned with their own well-being instead of focusing on products and customers (Gurney & Smith, 1998). Thus, productivity and customer service decrease, putting the company in jeopardy of losing business.

Another cause of occupational stress is organizational change in the company. Organizational changes can result in many potential sources of occupational stress. Many authors list among sources of stress: role ambiguity and conflict, change in leadership styles in upper management, and unsatisfactory relationships at work (Cunha & Cooper 1998; Alkhafaji, 1990). These causes of stress can usually be limited through training, reward programs, and service quality initiatives (Gurney & Smith, 1998). However, these programs are usually suspended while managers wait for organizational changes to be complete. This usually occurs because the employees and managers are eager, yet worried about what outcomes will occur from the changes in the workplace.

When a new manager is hired, trust between the manager and employees can be lost. This lost trust can put manager-employee relationships back years, resulting in a 'new' company that appears to have simply hired experienced employees. This is another factor in occupational stress, and can also lead to bad relationships between managers and employees. Bad relationships that include lack of trust harm the company, as the employee might act upon what he feels is correct, even though the manager requested otherwise. One author even goes



so far to say that most companies now do not view people as their most valuable asset (Post, 1994). This puts managers in charge who do not have the 'people skills' required to manage employees.

An effect of a merger can be a drastic change to the lives of employees. However, one professional view is that if managed correctly, a merger can work well with minimal damage to the morale of the staff. Managing a merger correctly includes getting input from all employees, and keeping the work force knowledgeable about changes that are and will be occurring. Threats of job loss, however, still exist. Most mergers will end in some job losses, as well as re-deployment of personnel (Post, 1994). Baldwin, in Saunders, comments that companies will always have to give up extra employees despite the protests. This is, after all, one major reason for mergers: to combine workforces and eliminate redundancies.

2.3.2 Avoiding drastic change to employees

In order to avoid major changes to employees' daily lives, a number of things must occur before and as the merger begins to take place (Alkhafaji, 1990; Chapman et al., 1998). By avoiding such major changes, the employee can be introduced into the new work atmosphere with less anxiety, and more anticipation.

2.3.2.1 Communication and knowledge

Communication and knowledge are two components that will promote an employees' happiness during the merger. On the one hand, if the workers investigate and understand the company that is going to be merged with their own company, they may learn what their future will be with the company (Alkhafaji, 1990; Gurney & Smith, 1998), understand how and why events in the workplace are occurring, and may feel that they can control outcomes in the



work environment (Cunha & Cooper, 1998; Gurney & Smith, 1998). These understandings will help to moderate stress on employees. On the other hand, if employees have no idea that a merger is going to take place, suspicion will arise until the merger is actually announced. Afterwards, without communication from the new company, workers will acquire knowledge largely through rumors and the press, and will not develop loyalty to the merged company. One author thinks that by assisting in the planning of the combination of companies, employees will have more motivation to stay with the company, and will feel more committed to the new company (Alkhafaji, 1990). This helps to keep employees content, and in turn helps the merger take place more effectively (Hassen & Shea, 1997; Early & Erez, 1997).

With an internal merger, communication should also occur between employees and managers in all the merging divisions so that employees may become more knowledgeable with the procedures and methodologies of both divisions (Early & Erez, 1997). If this communication does not occur, the merger will be pointless, as the two divisions will still use their own procedures, and not be as efficient as they could be working together.

2.3.2.2 Teamwork

Teamwork, involving managers and employees from both merging companies, is another element that can help the merger succeed. This kind of teamwork enables all of the parties to emotionally support one another and attempt to do what is best for everyone. Teamwork, will not only help to make the merger easier on the employee, but it will also help in raising productivity in the long run (Hassen & Shea, 1997; Early & Erez, 1997; Chapman et al., 1998). Blinder, in Post, says that the reason Japanese mergers end successfully is that the managers and employees of both companies work as teams. Teams can develop trust between



managers and employees that ends in a shared fate, whether promotions or job losses, for the entire team. Because of this teamwork and trust, the team does not need to worry as much about the negative outcomes of the merger, but instead can move on to create individual and team goals for the short, medium, and long term (Early & Erez, 1997).

2.3.2.3 Utilizing Communication and Teamwork

Combining good communication and effective teamwork will help ensure that changes to the everyday life of the employees remains at a minimum. A problem not foreseen in the merger local to Caribe GE is the two divisions being merged utilize different methodologies and procedures for purchasing. To simply merge the two divisions without communication and teamwork between them caused confusion in communication after the merger of the purchasing system, uneasiness between the employees in each division and a loss of efficiency when they tried to interact due to the contrasting procedures (Early & Erez, 1997; Chapman et al., 1998). By bridging the differences in merging divisions with communication, it is easier for the employees and managers to interact.

Early & Erez mention a study done by Schall, which involves communication difficulties between two divisions of the same company. Individually, the divisions maintained good communication. However, each division's sense of urgency differed dramatically. The first division, the information system department, focused on long-term goals, while the second division, the investment department, focused on short-term, day-to-day goals. This alone caused problems with coordination and insufficient communication when trying to interact. By establishing communication links between divisions using E-mail, teleconferences, and faxes, divisions that may differ in product lines and services can negotiate



common practices to govern their operations in the future. This should not only be done with managers, but teams of employees and managers in both divisions.

2.4 Production Systems

A *production system* is a process that uses resources to transform inputs into desired outputs (Chase et al., 1998). There are numerous aspects of production systems that are involved in all parts and sections of a production process. The intricacies are most often dependent on the choices made by the organization with respect to capacity restrictions, workforce capabilities, and outside influences, such as supplier capacities. Once these decisions are made, production systems can be *modeled* to assist with the technical and situational decisions involved, such as how many parts to make during the month. Production decisions can then be made so that the result will best suit the organization's basic needs and wants, as well as customer demand requirements (Applegate et. al, 1996).

2.4.1 Supply Chain System

The supply chain system was developed from the step by step processes of production used by organizations. The four basic steps in a supply chain are: Forecasting, Aggregate Planning, Inventory Planning & Purchasing, and Production Scheduling (Chase et al., 1998). Each step is linked to the next in a carefully coordinated system that can be used to guide the organization to make educated decisions on production levels, workforce levels, and purchasing quantities. These decisions are usually made with the cost of the production in mind. Therefore the techniques used in the system are geared toward reducing costs and time involved in the production process. The specific portions of the supply chain are dependent



on the management philosophies and operations methods of each particular organization, as well as their capacities.

2.4.1.1 Forecasting

Forecasting is the first step in a supply chain. In this process, several different sources are used to attempt to accurately forecast the product demand for the upcoming time period. The sources and methods used depend on the company's specific situation. Some of the most common sources include historical data, market research, regression analysis, trend projections, and *moving averages* of the demands in past time periods (Nahmias, 1997). Once this data and information has been implemented into the proper models that include all of the desired sources mentioned above, an educated estimate of the demand can be created. These models can be found in most technical books concerning production, planning and control where they are described according to their variables. The models are effective because they find a 'best' solution by taking into account all factors that the organization believes are pertinent to their situation. Most of the models involve a calculation of a moving average from the past few time periods as well as incorporation of other details deemed necessary, such as storage space and work capacities. The specific past time periods used depend on the type of business in which the organization is involved. For example, a ski shop in September would not want to use a moving average for the last four months -- May, June, July, and August-- because the sales during those months are not at all similar to those in the winter time. In this case the ski shop might use the past four winter season sales to project the coming winter's purchase amount. After forecasts are established, the organization can move on to the next step in the process.



2.4.1.2 Aggregate Planning

Aggregate Planning, the second step, is used to establish production rates for the products for the upcoming time period (Chase et al., 1998). This entails establishing exactly how much of a product to make and when to produce it. It is also used to calculate the workforce needed to maintain such production rates. This process uses several different models created with data that is dependent upon the needs of the organization. Along with the data, such as known demand and work hours available, constraints are placed on the models so that all calculated production amounts fit within the capacities of the organization. These capacities may include costs, governmental regulations (i.e. the maximum number of people allowed in a designated work area of a particular size), and warehouse spatial capacities.

2.4.1.3 Inventory Planning

The third step of the supply chain, Inventory Planning & Purchasing, is used to order parts and other materials needed for production. This step, like the others, has specific models that allow an organization to calculate its ideal order quantities, based on the purchasing system implemented. Aside from costs, the storage capacity is the largest and most pertinent constraint in most models. No matter how much money the organization can save by ordering in bulk, if they have no location to hold it, it will be useless to them. The costs involved with purchasing, such as costs incurred by purchases regardless of the quantity ordered, are embedded in the models. This will assist the organization in getting a more accurate summary of the quantities and times to order products that best suit the needs of the organization. Once the purchasing planners have chosen their preferred inventory amounts, they can move to the next step, which is ordering the parts.



2.4.1.4 Production Scheduling

Production scheduling is the final step in the supply chain. This is the final schedule that is used for production based on the established workforce, quantity of materials to be purchased, and known customer demand for the upcoming time period. This schedule will serve as the guide for production throughout the next time period, with any needed buffers built in to compensate for inaccuracies within previous steps (Chase et. al, 1998). The organization takes the known production requirements needed to fulfill all known and forecasted demand and then adds the buffer desired depending on its style of production. The buffer may be calculated based upon such things as severe weather predictions, which may effect sales or changes in the economy. This system does not work in a *Just-In-Time* situation because the organization producing products JIT does not plan out production ahead of time, as its basic principle is to have little inventory and produce only when demand is assured and not predicted. Companies using JIT typically produce specialized, custom made materials that cannot be mass produced. The costs the company would incur from storing unsold products are avoided. These costs can be high, especially if customers do not order the item frequently.

2.4.2 Indirect Material Purchasing

At GE, Indirect Material Purchasing involves any purchasing of materials or services *not* included on the *Bill of Materials* (BOM). Thus any material used in a product or sold as a product would be considered part of direct purchasing. Some examples of indirect purchasing materials are transportation, utilities, waste disposal, maintenance, office supplies, and repairs. By separating direct and indirect purchasing, a company can more accurately analyze the costs involved in making a product and the overall costs of the operations at the firm.



Integration of indirect purchasing at the Patillas and Bayamón plants at Caribe GE is the main objective of this project. Combining the purchasing power of the two units is intended to provide a system that will enable Caribe GE to save more time and money than in the former separate processes. The project team found all similarities between the two purchasing processes used at the plants and created a situation where a single front can be presented to suppliers to gain better prices. The unified process is also expected to prevent some unnecessary over-purchasing of quantities due to bulk rates.

2.5 ISO 9002 Standards

The International Standards Organization (ISO) was established for the purpose of composing international standards for several selected industries that operate in global markets. The standards are set up for environmental regulations, production quality regulations, and supplier requirements. Some of the standards involve the organization and cleanliness of a work area, documentation of various processes, and the quantity and quality of chemical emissions from the plant. When a company utilizes these standards and joins the ISO, its customers know that it follows strict quality guidelines and will produce quality work.

General Electric adheres to the ISO 9002 standards for all of its operations. These standards specify the necessary quality requirements that a supplier needs to demonstrate in order to sell its product to Caribe GE (ISO Standards Manual). There are two particular situations in which the standards are applicable. The first is when the specified requirements for a product are stated in terms of an established design or specification (ISO Standards Manual), for example when a product fits into a mold or model and can be duplicated. The standards will ensure that the product is within the model requirements and limits. The need



to continuously conform to the original design ensures that the supplier will produce quality work. The second situation in which the standards are applicable is when the buyer can gain confidence in product conformity to the standards by the supplier's demonstration of its capabilities in production, installation, and service (ISO Standards Manual). Each supplier must pass qualifications in order to be used. Once they have qualified to supply material to the firm, they must be continually reviewed to ensure that the quality and cost of materials, total cycle time, and the cost of the delivery processes meets expectations. The routine reviews are not as lengthy as the initial review. When a new supplier is introduced, it must be properly reviewed to ensure that it meets all defined requirements. This is an issue in our project because many of the purchase requests that are sent from Patillas are not only urgent but are also being requested of new suppliers.

These considerations effected our project because the system that we established must conform to the ISO 9002 standards of quality in addition to the requirement of employee satisfaction. The system must have checks and balances as well as correct and thorough supplier evaluations in order to be totally effective. This quality assurance has a time cost associated with it that was also part of our project. The systems in Patillas show that the requestors are not utilizing the Caribe GE approved vendor list, and instead are searching out new suppliers. This added a great deal of time to the ordering process because the vendor had to be put through the approval process. Once the new system was implemented, the requestors have used the vendor list more often, which in turn, has decreased the ordering *lead times*. Although the system may cut ordering costs drastically, the additional time needed to comply with all parts of the system may prove to outweigh the benefits.



3.0 Methodology

The main goal of this project is to integrate the purchasing systems of the Patillas plant and Bayamón headquarters of Caribe GE so that the procedures used will create a work environment that is efficient, productive, and successful. We have done extensive research in areas involving purchasing systems, ISO 9002, mergers, and the effects that an employee feels during and after a merger. This research helped us devise appropriate steps to take to accomplish the predefined goals.

3.1 Studying Caribe GE Headquarters

Caribe GE is a large and complex manufacturing company. We studied the intricacies of the day-to-day purchasing activities at headquarters. This provided us with sufficient knowledge of Caribe GE's specific routines to accurately proceed with the project. Studying the purchasing system required a week of extensive interviews and background research. Our liaison, Adrian Peace (Manager, Strategic Sourcing/Materials) provided the necessary information regarding which personnel were going to be the most helpful in our research. The personnel included managers and employees in the sourcing department, particularly María Garcia, who is the purchasing contact, also called a buyer, in Bayamón for the Patillas plant. We studied her processes and routines for carrying out the Maintenance Repair and Operation (MRO) worksheet (Figure 8-1) issued in Patillas. MRO is another way of saying indirect purchasing. We also interviewed Jossie Fussa and José Santiago, the other purchasing contacts in the sourcing department in Bayamón, so that we could accurately process map the purchasing routines in Bayamón.



3.2 Understand purchasing routines

We began studying Caribe GE's overall purchasing processes by investigating a 'best practice' purchasing process. Best practice defines a process that is efficient in terms of time and money, and is recommended for use in other plants. Mr. Peace directed us to the Caribe GE plant in Humacao, where we interviewed the Plant Manager, Todd Wyman. Then, through an extensive interview process with the MRO planner, Nydia Lebrón, we were able to understand her procedures. Mr. Wyman and Ms. Lebrón were able to provide us with a good understanding of the 'best practice' systems of the plants that were already integrated with Bayamón. After we thoroughly understood the Humacao routine, we interviewed management personnel in the Patillas plant, noting existing similarities and differences between the two plants. These interviews provided us with the needed information regarding their respective purchasing routines and enabled us to begin mapping the procedures. The interviews also provided an initial opportunity to recognize potential problems with Patillas' routine.

3.3 Develop process maps of purchasing systems

We used process maps of the headquarters in Bayamón, a plant in Humacao, and the Patillas plant in order to fully understand their purchasing routines. This enabled us to compare and contrast the decisions and steps made in each system. These process maps outline, in diagram form, the basic routine that is followed in purchasing indirect materials.

3.3.1 Process Map of Headquarters in Bayamón

A process map already existed for Bayamón's direct material purchasing. This map highlighted the general purchasing process for direct materials, and provided a sufficient guide



for the general indirect material process. The first step we took was to establish which routines of the direct materials process coincided with the indirect materials process. Then, using the knowledge that we had gained from the interviews with the Bayamón sourcing department, we were able to successfully revise the preexisting map for purchasing direct material to illustrate the process used for purchasing indirect material.

3.3.2 Process Map of Plant in Humacao

After learning the basic role of the Humacao plant, we proceeded to interview the MRO planner for Humacao, Nydia Lebrón. Ms. Lebrón represents a *firewall* for all indirect MRO forms, ensuring that all forms are filled out correctly and have the appropriate authorizations and documentation. In the interview with Ms. Lebrón, we learned the specific process that occurs when the Humacao plant is in need of an indirect material. This process, called *Cost Control*, works similarly to a checkbook account and assures Ms. Lebrón that the plant has sufficient funds to make the purchase. This information assisted us in creating a very specific process map of the indirect material purchasing routine that currently exists in Humacao.

3.3.3 Process Map of Plant in Patillas

After meeting with the Materials Manager, Anna Torres, and the Engineering Secretary, Eva Janet Martinez, we learned that one cause of the problems with purchasing is that a *firewall* did not exist in the Patillas plant. Some engineers directed their requisitions through Ms. Martinez, yet others preferred to go directly through the buyer in Bayamón, María Garcia. This posed a problem in mapping the current routine, so the managers and engineers who attended the meeting along with our project team decided to map only those



purchasing processes that went through Ms. Martinez. Even so, it was difficult to actually map out the process due to the varying techniques and routines used by each individual engineer requesting products.

3.3.4 Discover similar material commodities

After we completed the process maps of the two plants and headquarters, we compared them to find all similar steps, choices, and effects of the processes. By identifying the specific locations of the procedural differences in the Humacao and Patillas plants, we were able to more easily identify the weaknesses in the Patillas process. These weak points became the central focus of the changes that we proposed. The quality and efficiency of the system were improved by adjusting the proposed system so that it contained a minimal number of weak points.

3.4 Interview personnel in purchasing

The project team then began interviewing purchasing department employees about their opinions and feelings on the current merger, in order to determine the overall atmosphere that exists at the workplace. We conducted interviews that allowed us to probe, on a one-on-one basis, the problems of personnel directly involved with the purchasing process at each of the plants and headquarters. The employees interviewed included buyers and managers at headquarters, and planners and managers in Patillas and Humacao. The interviews covered the employees' day-to-day activities, the portion of the purchasing process that they maintain, and how they feel their job will change due to the reconstruction of the department procedures. Their input was useful to our project in that it established a clear understanding of how the employees thought their activities would change, and allowed us to make



recommendations that took their feelings into account. The solutions we created were dependent on the employees' capabilities and constraints, because we wanted our suggested solutions to be feasible. We then used our knowledge of mergers and the effects of mergers on employees to keep the atmosphere positive and try to help solve problems that were occurring.

3.5 Develop material requisition process

Using the information gathered from the process maps, we attempted to determine the most efficient purchasing process that General Electric should implement in Patillas. The efficiency of the requisition process is based on both time and cost. We proposed a system of direct communication between the Patillas and Bayamón plants using several methods. Constant contact via telephone and fax assure that the personnel at both Patillas and headquarters are aware of the status of the orders.

One major part of the revision of the system was to analyze the forms used in the requisition process for all plants. We found that they were not as clear, concise, and efficient as they could be. The project team reformatted several of the forms used in the purchasing process so that they were more accurate, complete, and efficient to use. By increasing the ease of use of the forms, the efficiency of the entire process is increased at every plant.

3.6 Establish process control techniques

The process control techniques involve regular and frequent inspections of the new purchasing methods. A form was created to be filled out by employees involved with the purchasing of indirect materials to record the time cycle of the new process. This form, filled



out by the Patillas plant, the Humacao plant, and headquarters in Bayamón, allows for a comparison of the purchasing process for each of the respective plants, and headquarters. Because management considers Humacao to be an efficient plant, its purchasing process was used as an acceptable standard to judge the efficiency of Patillas. When an MRO's time cycle is noticeably slower than average, the problem can be easily traced back to its origin and an attempt to resolve the problem can occur.

The new process should allow General Electric to save money on the labor side as well as on the actual materials purchased. We use the recorded time cycles to show this cost savings in labor due to the implementation of a faster process. Although unlikely, if the changes in responsibilities actually increase the process costs, we are alerted through the MRO Process Control Form. These process control techniques should provide us with valid evidence of the success of the new process in time and in dollars.



4.0 Results

After interviewing the appropriate personnel, we gained a better understanding of the purchasing process at the Patillas plant and Bayamón headquarters. With this knowledge, the project team devised accurate process maps for the pertinent plants for later analysis. We also interviewed several people from the work force about their feelings towards Caribe GE and the internal merger, in order to develop recommendations for change.

4.1 Process Maps

The following process maps present a graphic medium that displays the purchasing processes. These maps simplify comparisons between plants' processes and headquarters' processes by showing the exact process that is being used, step by step.

4.1.1 Headquarters in Bayamón

The pre-existing process map of purchasing systems in Bayamón made by GE (see Figure 4-1) had to be revised in order to accommodate our ideas. The first step we took was to introduce the expediting process into the current map. A purchase order needs to be expedited when a plant awaiting a product does not receive it in the time allocated or the need for the product becomes an emergency. When this happens, the plant alerts headquarters about the situation. The buyer in headquarters then contacts the supplier and attempts to speed up the shipping process. If the vendor of the materials will not accommodate the needs of the buyer and another acceptable vendor for the requested product exists, the order will be canceled with the old supplier, and placed with the new supplier, and the purchasing process will begin again. If there is no alternative supplier, the buyer will notify the appropriate

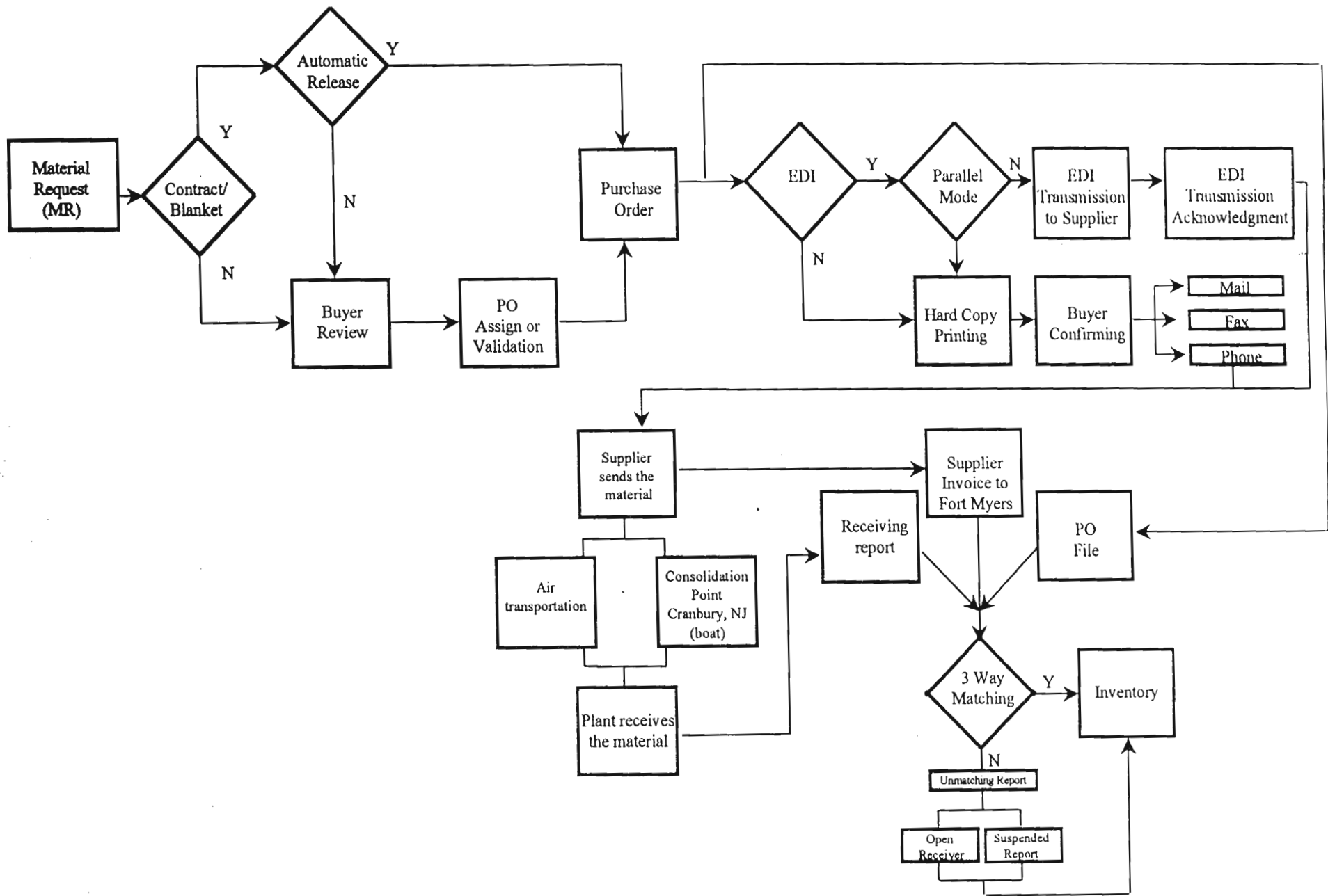


Figure 4-1
26



personnel and continue to attempt to speed up the process. Of course, in the best scenario, the effort to expedite shipment works effectively. The current process map of purchasing systems in Bayamón (Figure 4-2) incorporates these changes.

4.1.2 Plant in Humacao

After meeting with Ms. Lebrón, we were able to create a very specific process map for the indirect purchasing process in Humacao (Figure 4-3). The process begins when an engineer (requisitioner) notices that a specific indirect material is needed in the future. If this item has a total cost less than five hundred dollars, only the MRO form is completed.

However, if the cost is greater than five hundred dollars, the requisitioner is required to attach at least two *quotes* to the requisition form. If two quotes do not exist, or cannot be found, the requisitioner needs to complete a Supplier Evaluation Sheet (Figure 8-2). However, many employees, as well as our project team found this form relatively complicated, thus making the job of the requisitioner harder. We proceeded to change the form to make clear to the requisitioner the parts that must be completed and to make it easier for the buyer to determine why the specific vendor was chosen (Figure 8-3). This form communicates to the buyer in Bayamón the specifics regarding the decision to choose supplier A over supplier B. In this scenario, the requisitioner would check the 'Sole Source' box in the Summary section of the form. The requestor then explains whether it is actually a sole source or if another source could not be found in the time given.

The Supplier Evaluation Worksheet is also required by the buyer if the purchase can be deemed as 'expensive'. This term is used differently from buyer to buyer and usually refers to purchases dealing with tens of thousands of dollars. In this case, the requisitioner at

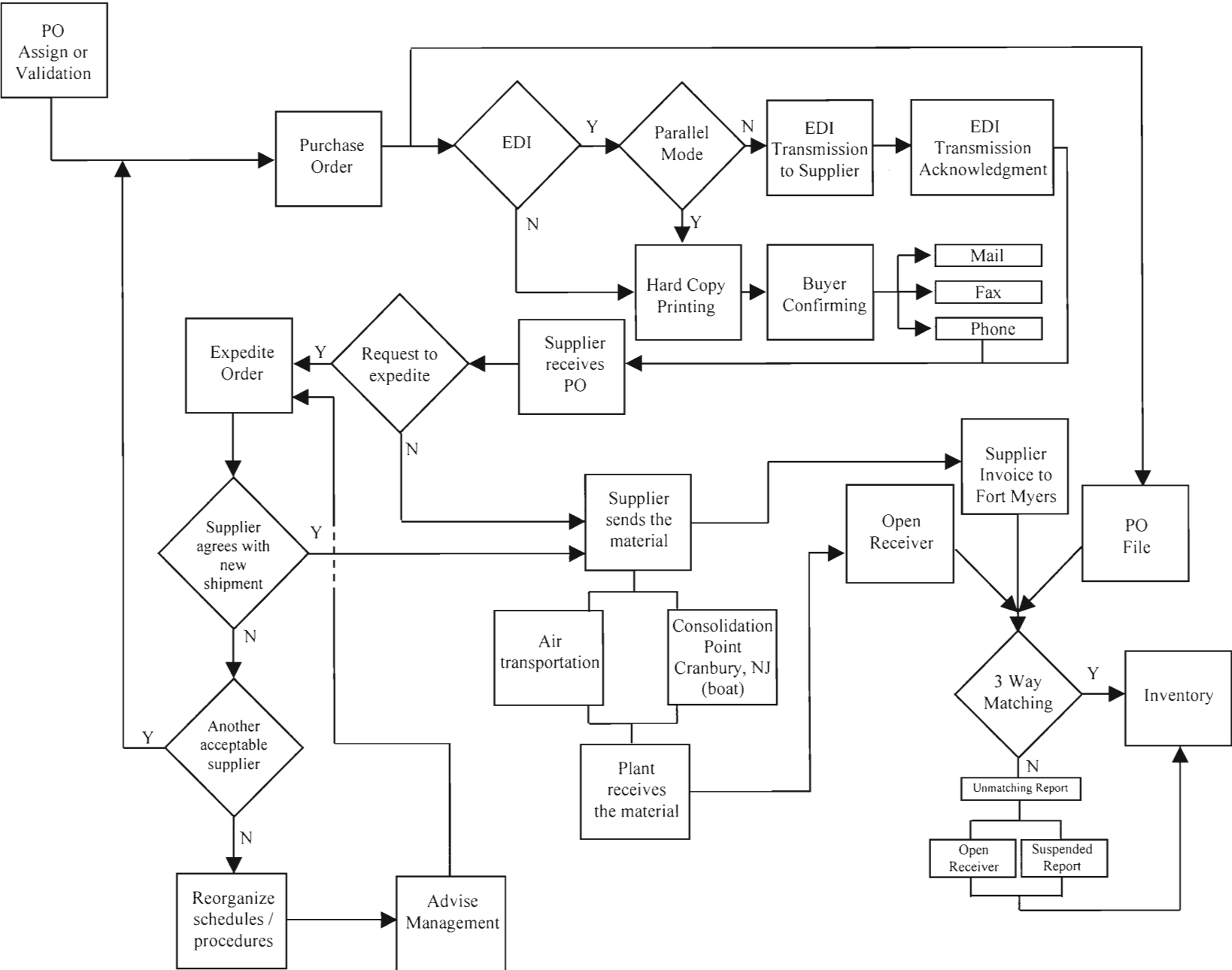
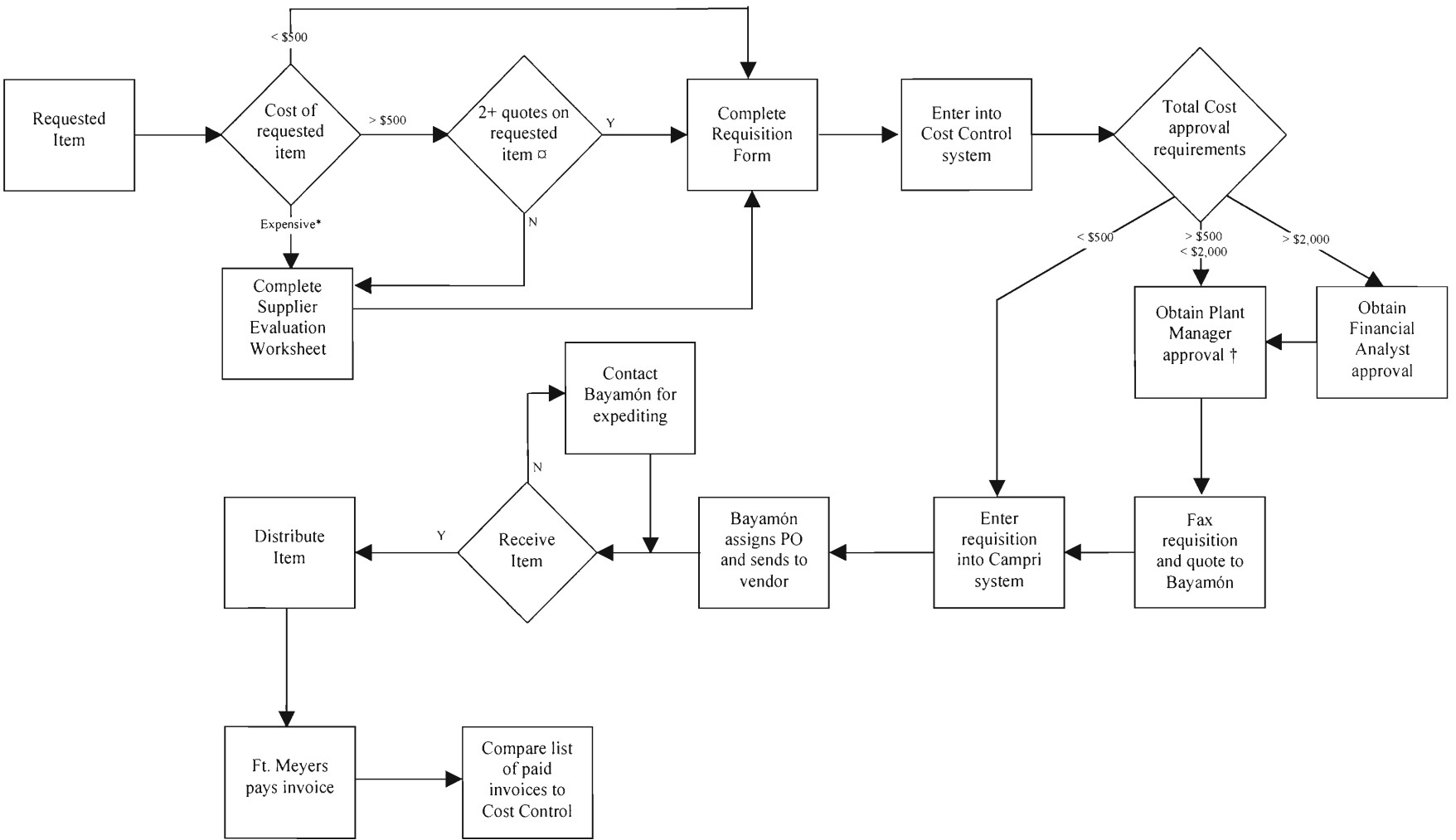


Figure 4-2



* Expensive is defined by the buyer's discretion
 o 3 Quotes is recommended
 † Plant Managers signature is always recommended

Figure 4-3



the plant needs to communicate with the buyer in Bayamón why the decision was made to use the given supplier. This is done by weighting specific categories that include price, quality, service, delivery, or history, and then explaining why these priorities were used. If filled out correctly, this form will accurately communicate why the supplier is being used. The requisitioner then completes the Material Requisition Form.

After the MRO is completed, Ms. Lebrón enters the request into a Cost Control System. This system keeps track of the budget, and is used to show the appropriate managers that the funds actually exist to buy what is needed. This system is one reason why Humacao is a 'best practice' plant. The process is very new, only used in the Humacao and Palmer plants, and eventually will be implemented in other plants.

After being entered into the Cost Control System, the MRO must go through the proper channels to get signed. In cases in which the request is less than five hundred dollars, the request must only be entered into a computer system (Campri). The Campri system is a type of database that sends a request electronically to headquarters in order to be reviewed and then will create a *Purchase Order* (PO) to be faxed to the appropriate supplier.

When the cost of the purchase is greater than five hundred dollars, the Humacao plant manager, Todd Wyman, is required to sign the request. This process, which only occurs in Humacao, was developed by Mr. Wyman so that he can keep track of most everything that is going through purchasing. After the Plant Manager signs the MRO, the request is faxed to the appropriate buyer in Bayamón with the appropriate quotes and the Supplier Evaluation Worksheet, and then entered into the Campri system by Ms. Lebrón. If the MRO totals more than two thousand dollars, headquarters requires that the plant financial analyst approve the purchase and sign the MRO. The signature is in addition to the other signatures for purchases



over five hundred dollars. After the financial analyst approves this MRO, the buyer in Bayamón receives the MRO, as above.

Once the PO is created and a number is assigned to the request, it is faxed to the supplier and the Humacao plant waits for the product to be delivered. If the product arrives in the time allocated, the product is distributed through the correct channels and Ft. Meyers, the central financial center of Industrial Systems, pays the invoice. The receiver at the plant notifies Ms. Lebrón that the material was received in good condition and in the proper time. Ms. Lebrón then updates the cost control matrix, showing that the PO was received.

4.1.3 Plant in Patillas

At a meeting held at the Patillas plant we were able to map the specific indirect materials purchasing process that was currently in use there (Figure 4-4). The process begins as in Humacao, with an engineer (requisitioner) noticing that a specific indirect material is needed in the future.

The employee chooses a supplier he feels appropriate, either by history with the supplier or other means, and sends the request to the account manager for approval. Once the employee has the account manager's approval for the request, he either faxes the request directly to Bayamón or gives it to the MRO planner to process. If the employee gave the form to the MRO planner, the planner would fax the request to Bayamón and would call Bayamón to confirm the receipt of the fax. If completed correctly, a Purchase Order would be created in the system in Bayamón, and the purchase order would be printed out in Patillas. Otherwise, the buyer in Bayamón contacted the MRO planner, communicating that the form was not filled out correctly. Many times this proved to be inefficient, and this inefficiency will be

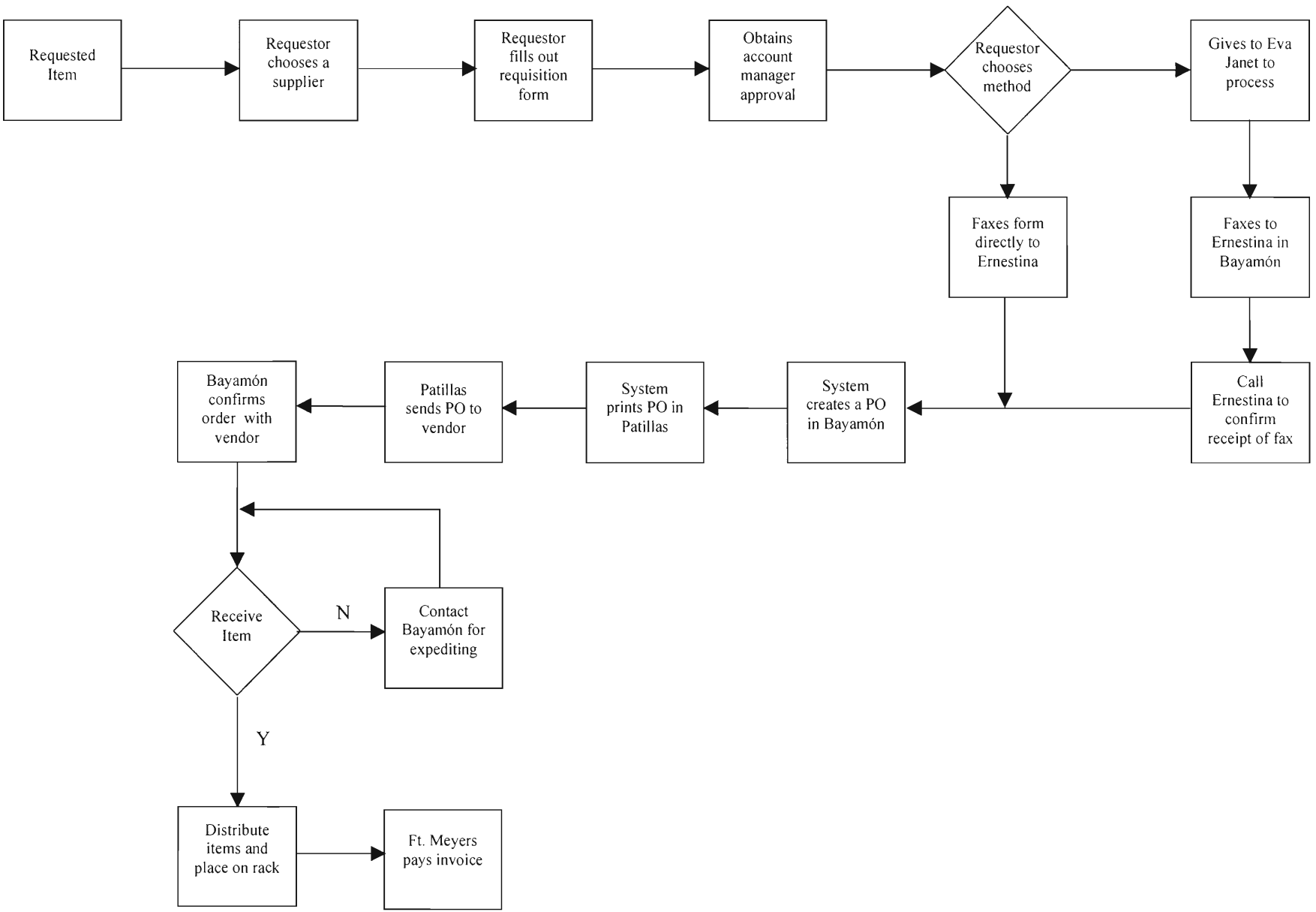


Figure 4-4



discussed in the Analysis of Results section. Once the PO is created, it is sent out to the vendor, and Bayamón confirms the order with the vendor. If the material is received, it is then distributed and the invoice is paid by Ft. Meyers. However, if the material is not received, Patillas contacts Bayamón and requests Bayamón to expedite the material. This expediting process is exactly the same as the process used in Humacao, however, it was used more often than it should have been, and will also be discussed in detail later.

4.2 Current Employee Attitudes

In order to better grasp how to make changes to the processes, we needed to gain knowledge of the employees' opinions of the system. It would be easy to imagine a purchasing system in which no one could possibly handle the tasks assigned to them, so we needed to know their capabilities. It was also necessary to identify sources of frustration with the process, in order to quickly direct our attention to the parts of the process that we needed to address first.

4.2.1 Headquarters in Bayamón

Employees in Bayamón had become very frustrated with the Patillas plant because many problems were arising with the integration of the purchasing activities. In December, Patillas had been introduced to the Sourcing Department at headquarters and the integration had not been thorough. Communication that should have taken place before the merger had not taken place until we arrived. Patillas had not been properly informed as to the 'best practices' that other plants employed or the requirements of the buyer at headquarters. Even with these problems, engineers at Patillas were never told what was wrong with any of their requests, so they kept producing incomplete request forms. Another problem that



headquarters encountered was that most of the requests appeared to be ‘emergency’ orders. These orders needed to be in Patillas ‘yesterday.’ This became very frustrating to the buyer at headquarters as all the orders that were apparently ‘emergencies’ could not possibly be completed when requested. Overall, whenever we mentioned the word ‘Patillas,’ we were given a ‘Good Luck’ from most employees from headquarters in regards to our efforts in the project.

4.2.2 Plant in Humacao

The responsibilities of the employees involved with the indirect purchasing process in Humacao have been well defined and carried out for a couple of years. As a result, the employees have become well adjusted, and easily accept their responsibility. The employees carry out their day to day jobs with no major problems and the process has become a best practice for purchasing.

4.2.3 Plant in Patillas

Because of the lack of communication between the Patillas plant and headquarters, requests were almost never correct, and none of the requesters really knew that they were filling out the MRO forms incorrectly. This caused frustrations for the requisitioners when the materials that they requested did not appear when needed. These employees were never informed that it is virtually impossible to rush all orders headquarters receives, or even that all the orders that they were sending were rush orders and thus incorrect. This produced a communication problem as well since the requisitioners would then ask for the order to be expedited when it could not be expedited, due to the fact that it was incorrectly a ‘rush’ order in the first place.



5.0 Analysis of Results

When analyzing the process maps and employees' attitudes towards the former routines, we found discrepancies in the actual process that Patillas and Bayamón were utilizing, as well as severe communication gaps. In analyzing the communication problems, we took into account what communication actually occurred, and what needed to occur. In analyzing the actual process that was implemented, we studied the gaps in the process compared to a working process, as well as excess steps that were taken in the process.

5.1 Analysis of communication

After looking closely at the many problems that Bayamón and Patillas faced everyday, we decided that communication was a major issue. Without communication, even a 'best practice' process would not survive. Wherever a process occurs, there will be problems. When a problem occurs, there must be communication. Communication is a catalyst for understanding.

One communication problem that occurred in Patillas is that several different purchasing processes existed. When a problem with an MRO form was encountered, and the Patillas plant was contacted, it was difficult to determine the origin of the problem, or contact the original requisitioner. The process of finding the requisitioner and communicating the problem could waste hours of the MRO planner's time in addition to the costs that accumulated by not having the product en route to the plant. This communication problem would slow down orders, frustrating the requisitioner who had not been contacted about the problem. By making all communication go through one contact in Patillas, this issue was avoided. Instead of each engineer being told of problems individually, the one contact was



told of the problem who then would pass on the message to the engineer. Having one channel also provided an opportunity for an initial edit of the material before it is sent. Therefore, the contact is now able to fix some of the problems before Bayamón encounters them, and can convey the common problems to all the requisitioners at once.

The other obstacle was insufficient communication between the MRO planner in Patillas and the MRO buyer in Bayamón. This communication should have taken place before the merger actually began, but was overlooked because of a sense of urgency. The general information that is needed before any MRO can be approved was never made known to the MRO planner, causing repetitious calls to Patillas. The planner in Patillas needed to be informed of the necessary information Bayamón required to complete a request, and the planner could then pass such information onto the requisitioners. Because this communication did not occur, there was no agreement on a common practice and both the Patillas plant and Bayamón headquarters continued using different processes.

5.2 Analysis of process maps

After creating the process maps, we found many significant problems within the processes. These problems were occurring in both headquarters and Patillas. We recognized these issues as problems because they were not occurring in Humacao, where things were considered to be in good condition. Some of the major problems that we encountered were that the suppliers were not being chosen carefully, there was insufficient documentation on the requests and extensive, unnecessary transmissions between the two locations were occurring for every request.



The requestor may not have chosen the best supplier, especially when the requestor was not getting the correct number of quotes. Requestors are supposed to get at least two quotes whenever possible, but because this practice was not being properly monitored, often requests would be sent to Bayamón with only one quote. Another problem was that requestors were permitted to fax requests directly to Bayamón without giving the request to the MRO planner. Many times these requests would be incomplete, and unacceptable because the requestor was unaware of the information that needed to be supplied for the request to be complete. Since there were no initial corrections made to the requests to fully document them before they were sent to the buyers, the delay in the process increased.

The existing process was also much slower than it needed to be. Not only was time being consumed dealing with incorrect requests, but the constant faxing back and forth was taking up a sizeable amount of time as well. For example, purchase orders are created and confirmed by Bayamón, but the existing process was requiring Patillas to send the purchase order to the vendor which required more communication between the two locations. As phone calls and faxes multiply, there is a greater chance for error and confusion between the personnel at each location.



6.0 Implementation of Revised Purchasing Processes

After analyzing the existing processes and communication problems, we were able to produce some appropriate recommendations for General Electric. Upon implementation of the new process we ran into some unexpected obstacles that required us to modify our initial proposals. One such instance came to pass when an essential part of our process faltered due to an employee absence. This made us realize that our process was theoretically complete, yet in reality, back up methods needed to be implemented in order to ensure a successful procedure. The back up plan required other employees to be trained to fulfill an absent employee's responsibilities until the employee was able to return to work. The backup plan was recommended and implemented, until the absent employee returned to work.

6.1 *Proposed Processes*

The analysis of the former Patillas process map, when compared to the Humacao 'Best Practice' process map, illustrated many gaps in the Patillas procedure. The first change we made to the Patillas process was to ensure the correct completion of the MRO Form. This step duplicated that of the Humacao process, and requires finding the correct number of quotes, as well as completing the appropriate documentation such as the Supplier Evaluation Sheet.

The next change that was essential was having the requisitioner acquire the proper approvals for the MRO documentation. This process had been occasionally adhered to in the past, but in fact, needed to be strictly followed. Without the proper authorization, the request could not be completed and filed. These authorizations differed slightly from Humacao. In Humacao, the signatures needed for a request were those of the requisitioner, plant manager,



and when the cost surpasses two thousand dollars, the financial analyst. In Patillas, however, every request requires the signatures of the correct department manager and account manager. Furthermore, the total cost of the request is above two thousand dollars, the additional signatures of the financial analyst and plant manager are required. Requiring these signatures will ensure a safe level of cost control needed for any purchasing department.

A major change in the purchasing process was the addition of an MRO planner to the Patillas plant. Ms. Martinez had always processed some of the MRO worksheets, but had never filtered them. We determined that a firewall should be added to the Patillas process. This firewall worked effectively, taking a lot of responsibility off of the buyer in Bayamón. In the beginning, there was a little confusion because of lack of knowledge about required documentation, however this was quickly remedied, and small problems that occurred were communicated to Patillas and promptly corrected.

As insignificant as it sounds, this additional responsibility to Ms. Martinez' job provided major assistance to the rest of the processes. By the time the forms reached Bayamón, they were more complete, and required less work to fix than ever before, speeding up the overall purchasing process immensely. The added responsibility placed on Ms. Martinez was also dispersed to the requisitioners reporting to her. Before the new process was implemented, Ms. Martinez was often finding quotes and doing some of the documentation for the requests. After the added responsibility of verifying the MRO documentation, her former work of actually completing the documentation was transferred to the requisitioners. Another benefit to having a common firewall is that it forces the requisitioners to conform to the proposed purchasing process. This makes solving problems more efficient, as there is only one contact to filter and communicate the problems.



The fourth change implemented in the purchasing process was the reduction of excess contact between the supplier, headquarters, and Patillas. In the original scenario, there were at least two phone calls and a fax communicated between the three locations for every requisition. In our proposed changes, this communication was reduced to a phone call or fax, and one US postal service delivery. The original form of sending and verifying the order took at least one, but usually two days and sometimes more to complete. The new process is usually completed in one day, and only sometimes takes two to complete, making it much more efficient. These changes can be viewed in the Proposed Patillas Purchase Routine Map (Figure 6-1).

6.2 *Enhance Communications*

Another major recommendation concerns enhancing communication. Since December, when the Patillas purchasing had actually been merged with Central Sourcing, there have been communication problems. One of the major problems previously covered in the literature review, entailed a lack of communication before the internal merger actually took place. This was a major factor in the communication problem. When Patillas was first introduced into Central Sourcing, there was no communication regarding the requirements of a proper MRO. The first step in improving communications involved a meeting with the MRO planner, Buyer, and several managers, to review the specifics regarding the requirements of an MRO worksheet. These requirements helped the MRO planner to successfully act as the firewall in the process.

Another communication problem that was remedied involved defining the actual line of communication between the Patillas plant and headquarters in Bayamón. When a problem

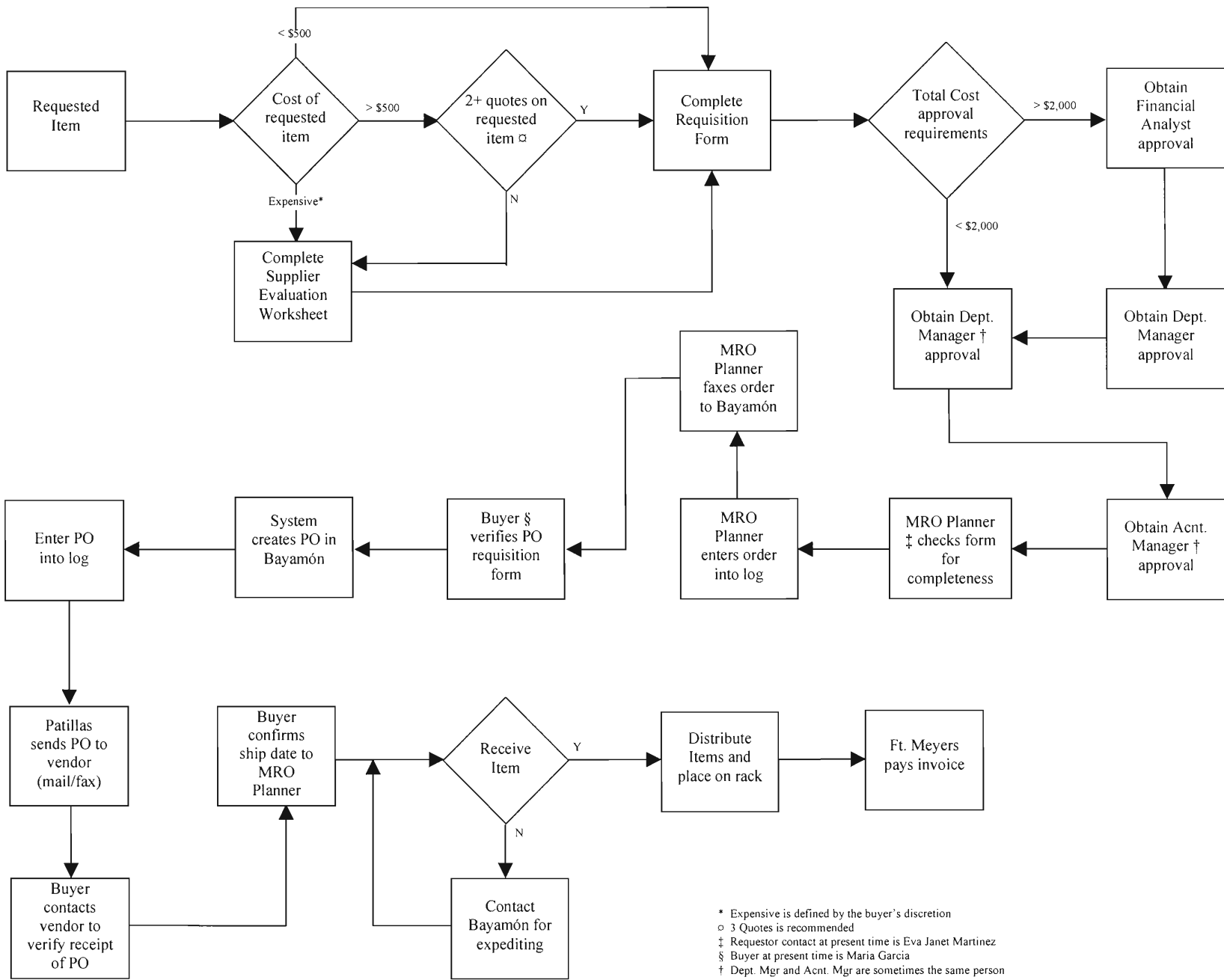


Figure 6-1



was encountered in either the plant or headquarters, the problem was not effectively passed through the correct channels to be fixed, if it was communicated at all. When faced with this situation, the project team met with Ms. Martinez and Ms. Garcia to stress the importance of this communication. This change, and establishing Ms. Martinez as the one contact in Patillas, strongly helped communications and increased problem solving efficiency dramatically.

6.3 Process Control Techniques

Process control techniques were required to provide evidence that the new process was successful. If the process were failing in any area, our process control would illustrate such failure and allow us to trace the problem back to its origin. Our process control technique included a form (Figure 8-4) to be filled out partially by the MRO planners in both Patillas and Humacao, and partially by the MRO buyers. The MRO planners record the requisition number, the date and time the request was created, the date and time the request was received by the planner, the date and time the request was sent to Bayamón, and the date the requisitioner expected the material. The MRO buyers record the date and time the purchase order was created, the date and time the purchase order was sent to the vendor, and the date the vendor promises the material will be received.

The dates and times recorded on the process control form allowed us to note how much time each step of the process was consuming. If a certain step took longer than was deemed acceptable, we could easily find the reason for the delay by questioning the appropriate employee. The acceptable times were established by comparison to those seen at the Humacao plant. Since they were considered ‘best practice,’ we felt their times for the



requisition process would be a reasonable goal. If the delay was caused by a failure in the process we would then attempt to improve the process to alleviate the problem.

We also chose to have the MRO planner in Patillas note the requests that were considered to be an emergency on the process control form. This allowed us to note if Bayamón was truly dealing with emergencies in a faster manner. Bayamón had also told us that Patillas was sending too many emergency requests, so the form would allow us to illustrate this potential problem as well.

Although the Humacao and Patillas processes differ, our goal was to make the time cycle for the processes approximately the same. After analyzing the initial control forms that were returned to us, we were able to see that the process cycle usually took approximately one day at both the Patillas and Humacao plants. Therefore, it was apparent that major improvements had been made in Patillas and the new process was succeeding.

6.4 New Process Effects on Employees

Initially, many of the employees met the introduction of new responsibilities in Patillas with some resistance. The employees were often defensive of their old practice and questioned why a new practice was needed. However, once the gaps in the old process were portrayed and the benefits of the new process were explained, the employees' attitudes quickly changed. Once it became clear that a new process would in fact make their jobs easier and make their plant more efficient, the employees were willing to implement the new process.

As the new process was implemented, some frustration still existed, as the whole process was not implemented at once. In Bayamón the process was fully implemented immediately, however the process was not fully utilized in Patillas until three days later. This



caused much confusion, and kept many Purchase Orders on hold. However, once a meeting took place with the buyer in Bayamón, and the project team got in touch with the planner in Patillas, the procedure finally was implemented in full.

When the entire new process was finally being utilized, efficiency increased slowly, as employees adjusted to the new practice. Some minor glitches still occurred, but could easily be remedied through the new communication channels that had been created. After meeting with the involved personnel, we found that the process was working efficiently, and everyone was satisfied with the new procedure.

Ms. Garcia in Bayamón was very satisfied with the new routine, as the MRO worksheets that have been received have had fewer and fewer minor problems with little to no major problems as the process was implemented. This actually reduced the occupational stress that Ms. Garcia had been feeling before the changes in the routine occurred, and in turn led to a better atmosphere in the workplace in Bayamón.

Ms. Martinez was happy with the new routine as well. Even though her responsibilities were increased, she handled the added work well, by distributing responsibilities suitably among the requisitioners. In fact, because the new procedure was more efficient, her stress level was decreased with fewer problems occurring with communication, and filling out worksheets. The added responsibilities to the requisitioners was also well received, as it was merely two or three extra minutes in order to fully complete the MRO worksheet. The requisitioners were also satisfied with the little added work, because the process proved to be quite efficient, and with their few extra minutes, the resulting purchasing process took fewer days to complete.



The overall effect the new process on employees was positive. The more efficient process reduced frustration not only with the purchasing routine, but the process also reduced frustration the employees had with each other. The results of the new process showed the employees sizeable improvements had been made, and the employees were enthusiastic about the new process's success. We are confident this renewed enthusiasm will exist while the process continues over the next couple months.



7.0 Conclusions and Recommendations

Upon completion of this project we arrived at several conclusions and recommendations that may help other companies go through the merging process smoothly and efficiently. Our conclusions emphasize the use of communication and teamwork to keep the workers informed of changes, the utilization of existing 'best practice' processes to assist in creating the new processes, and the definition of the new specific processes that will be utilized. With attention to these issues, two merging corporations can increase the chances for a successful merger and achieve the defined goals for the merger.

7.1 Ensure Good Communication

The most important part of a successful merger is proper communication. It is essential for the two merging entities to communicate their requirements and problems. If the employees of one of the business entities involved are not made aware of the requirements that must be fulfilled for the entire company to run efficiently, there is a significant chance that those needs will not be met. To make communication between the two businesses easier, a company should establish a contact in both merging businesses. An established contact removes any uncertainty of who to reach in the event of a problem. The contact should be aware of the requirements each business has for an efficient business operation, and the contact should educate other employees of these requirements. Teams of employees, managers and contacts from both entities should be formed to attend to merger issues in their division of the company. The personnel should then be informed of this team, so that they will know how to voice concerns. This will greatly aid in communication between entities.



It is also very important that constant communication between management and employees occur during the merger process. Management must be aware of how well employees are handling the change in responsibilities and determine if employees are capable of handling their new responsibilities efficiently. If an employee feels overwhelmed or is extremely unhappy with current changes, it is very important that the employee expresses the problem to management. An overwhelmed and frustrated employee is not going to work at the highest possible level of productivity.

7.2 Study Procedures That Already Exist.

When two companies merge processes, it is often helpful to study these other existing processes. By studying the strengths of existing processes, companies may be able to incorporate aspects of the existing processes to improve the new process. The existing processes can also be analyzed for faults, identifying problems in the existing processes. This will insure that such problems will be avoided in the new process, as mistakes should never be repeated.

It is also beneficial for the newly merged company to have a clear understanding of the processes that were in place prior to the merger. If managers are knowledgeable of the previous systems, they will better understand the procedures to which employees are accustomed, and where the largest adjustments in processes must take place. Employees can be more comfortable with organizational changes if their new manager clearly understands their old routines and responsibilities. This knowledge will enhance trust between them, making for a smoother transition.



7.3 *Define A Specific Process*

Another important part of a merger is defining and utilizing a standard operating procedure as quickly as possible. It is more efficient to teach all employees one specific process, than it is to explain the requirements of each individual to the entire team. A universal process is much easier to trouble shoot should any problems arise. If all employees are following the same procedure, and a problem occurs, it will likely be repeated. Repetition of a problem will signal that either employees need better training, or the process needs to be adjusted. A consistent, well defined process makes it clearer for all employees to understand what is expected of them and of their coworkers. These process descriptions are in addition to employees' job descriptions and serve as clarification of each employee's role in the overall function of the work place.

7.4 *Conclusions*

Mergers can be a difficult change to cope with for both employees and the firm as a whole. If managed incorrectly valuable employees may be displaced and entire plants may be closed due to inefficiency. Managers who are attentive to the problems that may occur will gain valuable experience, make substantial contributions to their company, earn the respect of the workforce and keep the company working efficiently. These aspects will also keep the workforce up to speed with their changing responsibilities, and avoid trust problems. The communication between all involved personnel is the essential centerpiece of a successful merger, and if utilized properly communication can ensure a company's success well after the merging process has been completed.



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9.0 Appendices

9.1 *Appendix A - GE History*

Incorporated in New York on April 15, 1892, General Electric is one of the largest and most diversified companies in the world. Its six principal lines of business include: aircraft engines and engine parts, search and navigation equipment, turbines and turbine generator sets, electrical lamps, television broadcasting stations, and securities brokers and dealers. At its inception, GE acquired the assets of Edison General Electric Co, Thomsen-Houston Electric Co., and Thomsen-Houston International Electric Co.

GE currently has over two hundred and fifty manufacturing plants in twenty-six different nations, along with operations in over one hundred countries. The divisions within GE are: Aircraft Engines, Appliances, Capital Services, Lighting, Medical Systems, NBC, Plastics, Information Services, Industrial Systems (formerly Industrial Control Systems, and Electrical Distribution and Control), and Transportation Systems.

The present executive officers are (as of February 13, 1998):

J.F. Welch, Jr.	Chairman and CEO
P. Fresco	Vice Chairman and Executive Officer
E. Murphy	Vice Chairman and Executive Officer
J. Opie	Vice Chairman and Executive Officer

The facilities in Puerto Rico participate in the following: Spectra/equipment, component equipment, switch gear, controls, and electrical vehicle control. The principal



products are industrial and residential starters, relays, and breakers. The headquarters for Caribe GE as well as central sourcing are both located in Bayamón. The nine General Electric plants in Puerto Rico are located in Añasco, Arecibo, Humacao, Palmer, Patillas, Pilot, San Germán, Vega Alta, and Vega Baja. Below is a brief description of the activities that occur in each plant:

Añasco: They produce electric relays, switches, and other control devices. These are the most technologically advanced components for Electrical Control and Distribution (now Industrial Systems).

Arecibo: This plant manufactures industrial breakers. These breakers are fairly large so they do not have very large production volume or mix. They also provide all the plating operations for the other GE plants on the island.

Bayamón: This is the headquarters operation location. It is also central sourcing for the other eight ED&C plants (now Industrial Systems) and will be incorporated with the Patillas plant (formally Industrial Control Systems) so that they can maintain all sourcing for Caribe GE.

Humacao: Its main function is to supply parts for many GE plants on the island.

Palmer: This is the only plant that has a union. Consequently, the relationship between workers and managers is more difficult.

Patillas: Their production consists of electric boards for other General Electric divisions.

Pilot: They fabricate parts and mold casting for several other plants.

San Germán: This plant has a high volume, low mix production of residential breakers. They manufacture the most breakers on Puerto Rico per week.

Vega Alta: This plant manufactures control equipment, switches and relays.

Vega Baja: This plant has a very low volume and a high mix of products. Their output is of low volume. They make several different sizes of industrial breakers, including the largest type made on the island.



9.1.1 Caribe GE Vision Statement

(Original in Spanish)

Nosotros queremos desarrollar y aumentar la participación de nuestra gente a través de la organización en un ambiente seguro y saludable para ser líderes capaces de utilizar la tecnología moderna y mejorar continuamente nuestras operaciones de manufactura; y así lograr liderato en servicio, calidad y productividad en un mercado global de rápido crecimiento.

(Translated to English)

We want to create and add participation from our people via our organization in a safe and healthy environment with leaders capable of utilizing our modern technology and continuously improve our manufacturing operations, and with that obtain leadership in service, quality and productivity in a global market of rapid growth.



9.2 Appendix B - Financial Statements

9.2.1 1998 Balance Sheet

At December 31 (In millions)	General Electric Company and consolidated affiliates		G E		GE CS	
	1998	1997	1998	1997	1998	1997
Assets						
Cash and equivalents	4,317	5,861	1,175	1,157	3,342	4,904
Investment securities	78,717	70,621	259	265	78,458	70,356
Current receivables	8,224	8,924	8,483	9,054	--	--
Inventories	6,049	5,895	5,305	5,109	744	786
Financing receivables (investments in time sales, loans and financing leases) - net	121,566	103,799	--	--	121,566	103,799
Other GECS receivables	24,789	17,655	--	--	25,973	18,332
Property, plant and equipment (including equipment leased to others) - net	35,730	32,316	11,694	11,118	24,036	21,198
Investment in GECS	--	--	19,727	17,239	--	--
Intangible assets	23,635	19,121	9,996	8,755	13,639	10,366



1998 Balance Sheet (cont.)

At December 31 (In millions)	General Electric Company and consolidated affiliates		G E		GE CS	
	1998	1997	1998	1997	1998	1997
Liabilities and Equity						
Short-term borrowings	115,378	98,075	3,466	3,629	113,162	95,274
Accounts payable, principally trade accounts	12,052	10,407	4,845	4,779	8,815	6,490
Progress collections and price adjustments accrued	2,765	2,316	2,765	2,316	--	--
Dividends payable	1,146	979	1,146	979	--	--
All other GE current costs and expenses accrued	9,788	8,891	9,708	8,763	--	--
Long-term borrowings	59,663	46,603	681	729	59,038	45,989
Insurance liabilities, reserves and annuity benefits	77,259	67,270	--	--	77,259	67,270
All other liabilities	24,939	22,700	12,613	11,539	12,247	11,067
Deferred income taxes	9,340	8,651	(250)	(315)	9,590	8,966
Total liabilities	312,780	265,892	34,974	32,419	280,111	235,056
Minority interest in equity of consolidated affiliates	4,275	3,682	816	569	3,459	3,113
Common stock (3,714,026,000 shares issued)	594	594	594	594	1	1
Unrealized gains on investment securities - net	2,402	2,138	2,402	2,138	2,376	2,135
Other capital	6,808	3,636	6,808	3,636	2,490	2,337
Retained earnings	48,553	43,338	48,553	43,338	15,075	12,951
Less common stock held in treasury	(18,739)	(15,268)	(18,739)	(15,268)	--	--
Total share owners' equity	38,880	34,438	38,880	34,438	19,727	17,239
Total liabilities and equity	355,935	304,012	74,670	67,426	303,297	255,408

CARRIBE GENERAL ELECTRIC PRODUCTS, INC. Request for Purchase Order

Vendor Name I		Vendor Name I		SHIP TO					
Division of		Division of		<input type="checkbox"/> 020 - PALMER	<input type="checkbox"/> 025 - VEGA BAJA	<input type="checkbox"/> 075 - GEPPPRI			
Street No.		Street No.		<input type="checkbox"/> 021 - HUMACAO	<input type="checkbox"/> 029 - AÑASCO	<input type="checkbox"/> 099 - HEADQUARTERS BAYAMON			
City Tel. State		City Tel. State		<input type="checkbox"/> 022 - ARECIBO	<input type="checkbox"/> 033 - CONTROLS	<input type="checkbox"/> OTHER			
Cert. of Compliance <input type="checkbox"/> Yes <input type="checkbox"/> No		Invoice Terms		FOB	Freight Terms	Date of Order	Shipping Date	Date Required	
Direct all correspondence relative to the order to:		Buyer		Carrier	Charge Acct. No.	Confirming Date	Confirming With		
ITEM	QUANTITY	PART NO.	REV	DESCRIPTION			PRICE	UM	TOTAL
SPECIAL INSTRUCTIONS OR OTHER COMMENTS							AIR AUTHORIZATION INFO:		
REASON FOR PURCHASE							REQ. BY: <input type="checkbox"/> NEXT DAY <input type="checkbox"/> 2nd DAY		
							VIA		
							COST	WEIGHT	
							A/W BILL NO.		
REQUISITIONER (SIGN)							APPROVED BY		
MANAGER (SIGN)		PLANT MANAGER (SIGN)		FINANCE (SIGN)		PURCHASE REQUISITION NO. 02332			

THIS IS NOT A PURCHASE ORDER

Figure 8-1

Requestor _____ Date _____

Product / Service _____ Plant _____

	Supplier Names					
	Weighting Factor					
Price						
Quality						
Service						
Delivery						
History						

Total						
--------------	--	--	--	--	--	--

<p>Summary</p> <p>Reason supplier selected:</p> <p><input type="checkbox"/> Lowest Cost</p> <p><input type="checkbox"/> Most Favorable Delivery Time (explain)</p> <p><input type="checkbox"/> Sole Source (explain)</p> <p><input type="checkbox"/> Custom Made (explain)</p> <p><input type="checkbox"/> Other (explain)</p>	<p>(Explain)</p>
---	------------------

Requestor _____ Plant Mgr. _____ Finance _____

Figure 8-2

Requestor _____ Req. # _____ Date _____
 Product/Service _____ Plant _____

Supplier Names _____

	Weighting Factor	/	/	/	/	/	/
Price							
Quality							
Service							
Delivery							
History							

Total 100 %

<p>Summary</p> <p>Reason this particular supplier selected:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Lowest Cost <input type="checkbox"/> Most Favorable Delivery Time (explain) <input type="checkbox"/> Sole Source (explain) <input type="checkbox"/> Custom Made (explain) <input type="checkbox"/> Repetitive Buy (explain) <input type="checkbox"/> Other (explain) 	<p>(Explain)</p>
--	-------------------------

Requestor _____ Plant Mgr. _____ Finance _____

Figure 8-3

MRO Process Control Form

Please fill out with Date & Time

MR #	MR Created	MR Received By Planner	MR to Bayamón	MR Received by Buyer	PO Created	PO Sent	Due Date	Promise Date	

59 Figure 8-4

Firewall Diagram Map

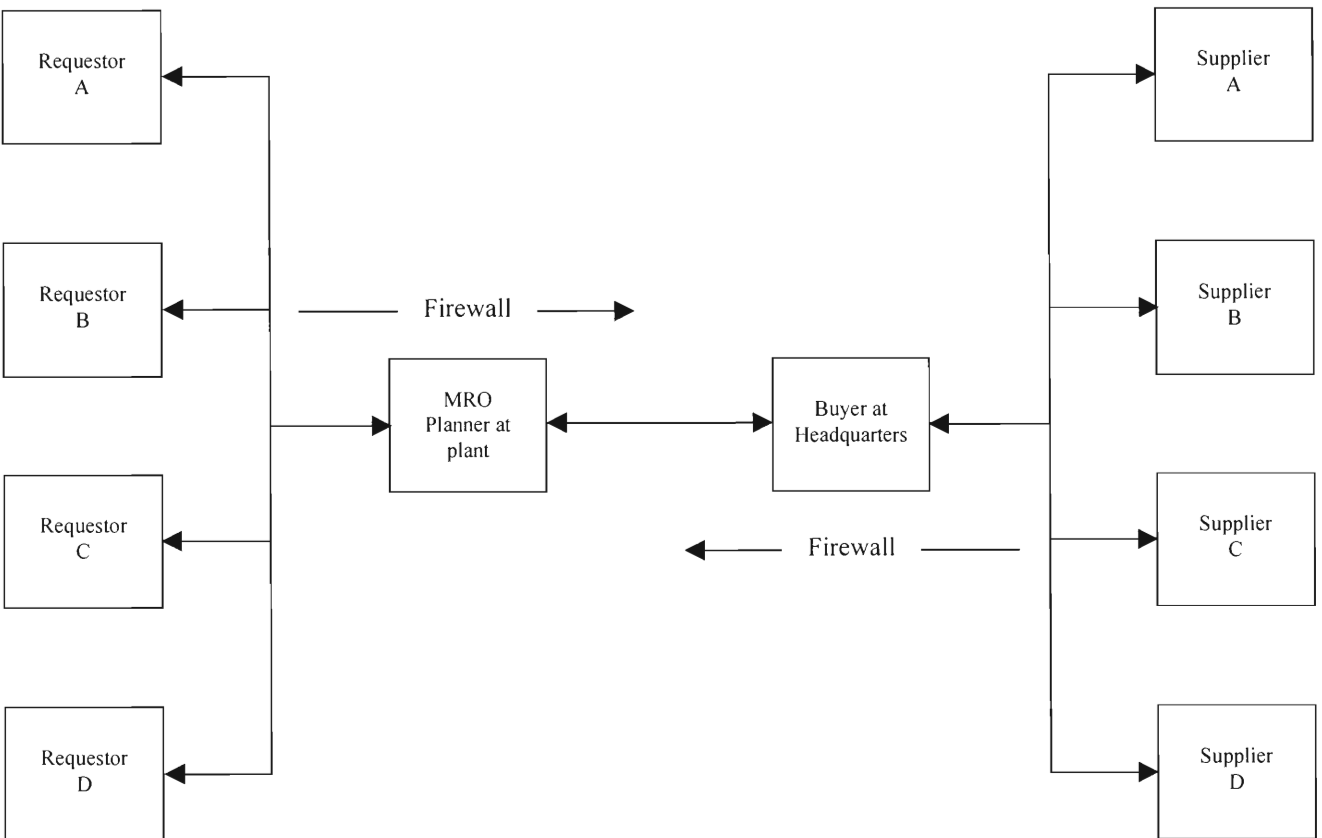


Figure 8-5



10.0 Glossary

Assets: Physical and economical items belonging to a company that add monetary value to its net worth. Some examples are buildings, vehicles, and investments.

Bill of Materials: Form used by companies that detail every item that is needed and purchased so that their product can be produced. This might involve bolts, sheets of metal, plastic or any item that is part of the product.

Buffer: The amount of material that is ordered beyond the required amount so that any slight increase in production demand can be taken care of without placing an emergency order, or causing a delay in production.

Cost Control: System used at various Caribe GE plants which utilizes a spreadsheet that keeps track of all budgets and demonstrates to the MRO planner that the plant has sufficient funds to make the desired purchases.

Firewall: A term used to describe the MRO planner at the individual plants. The planner does an initial evaluation of all requests to assure that they meet all requirements, therefore eliminating some of the delays that could occur later in the process due to insufficient information. The planner stops all incomplete orders from passing and allows proper forms to go to the next step, acting like a filter (See Figure 8-5).

Just-In-Time (JIT): A purchasing philosophy that companies use when there is a constraint on space available for storage. In Just-In-Time, the purchasing department does not order parts until they are needed and requested by the production department to fulfill orders. This purchasing systems maintains minimal inventory costs but sometimes causes an increase in ordering costs and a loss of opportunity to purchase in bulk. This system is useful in computer industries because it assures customers that the most current parts will be used in the assembly.

Lead Time: The total time required to carry out a process. In the purchasing area, this time starts when the order is placed with the supplier and ends when the material is received. In production, the time starts when the part is first placed in the production line and ends when it is shipped to the customer as the final product.



Models: Replicas of a process often stated in mathematical formulas that take into account all desired functions and aspects that a company feels are relevant and that should affect their outcome. The models in the purchasing areas are formulas that forecast how much of a product that a company should purchase now to meet future needs. The models have parts that include all of the information that the company feels will help make their prediction more accurate, such as the history, moving average or market research.

Moving Average: In purchasing, the average of the sales of previous consecutive time periods. The time periods could be months, years, or seasons. The sales totals are added together, and the sum is divided by the number of time periods involved.

Process Maps: A flow chart diagram of the steps taken in a particular process. The chart outlines the actions or choices taken at each step and what action to take next pending on the choices made.

Production System: The process that is required for a company to fully produce materials to sell. This includes all actions taken in purchasing parts, assembly of parts and shipping the final product to customers.

Purchase Order: A form that a company fills out to send to a supplier that identifies what items they are requesting, the quantity of each item and any desired shipping dates. The form is used by both the supplier and receiver as proof that the firm ordered the parts as well as when the order was placed should any confusion arise.

Quote: An offer made by a supplier to sell a particular item at the offered price within a given time range. A quote is similar to a bid at an auction, but the deciding factor as to who is the “winner” is typically the supplier who offers the lowest price or fastest shipping time.