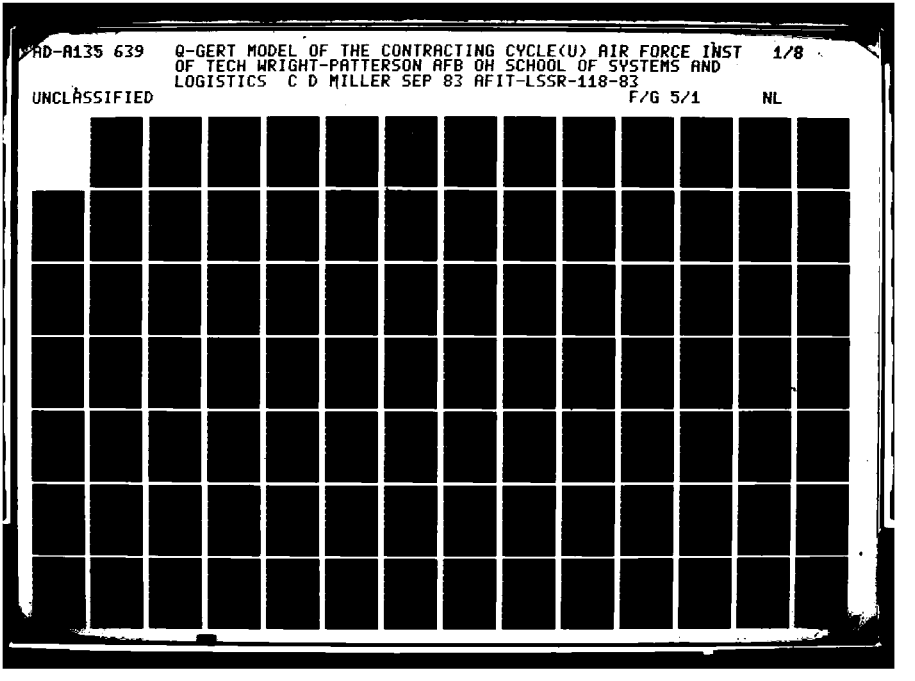
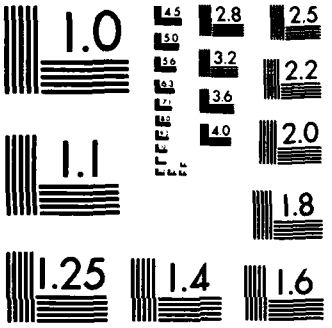
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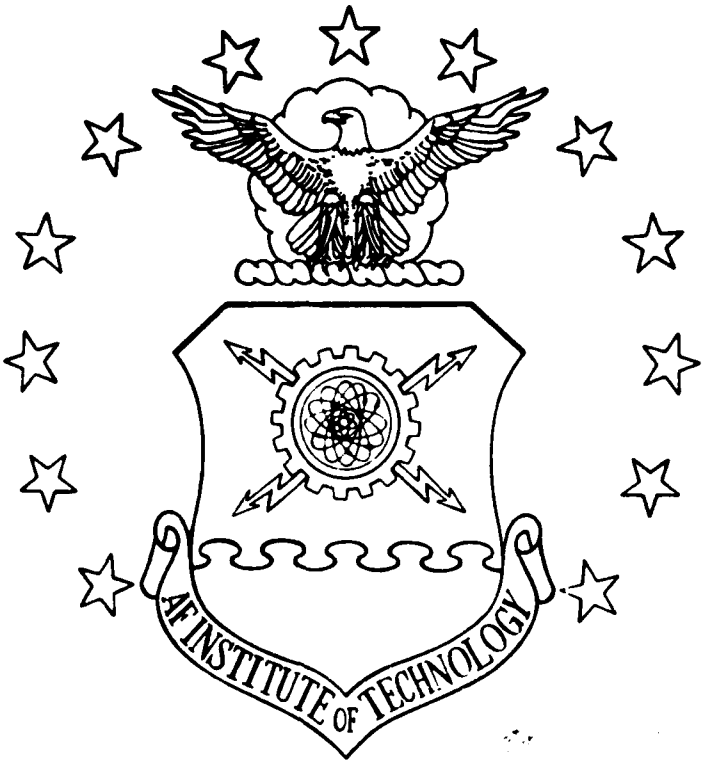
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To improve the efficiency of a Government contracting organization, a manager must predict the consequences of decision alternatives. There are so many variables (workload, resources, experience levels, changing procedures) that predicting, or even measuring, the effect of various decision alternatives is very difficult. The research objective was to construct and test a Q-GERT model of the contracting cycle of an Air Force research and development contracting organization. Data was collected on the contracting procedures used. Twenty-eight contract networks were developed, from the administrative notice to the ten million dollar competitive contract. Each network was divided into many small tasks. Experienced buying personnel provided estimates of a range of time to complete each task. The result was that the model successfully imitated the contracting cycle time from receipt of the purchase request to the contract award. A manager can use the model to test the effect of changes in resources or procedures on the contracting cycle time. The model should be a valuable management tool.

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Q-GERT MODEL OF THE CONTRACTING CYCLE

A THESIS

Presented to the Faculty of the School of Systems and Logistics

of the Air Force Institute of Technology

Air University

In Partial Fulfillment of the Requirements for the

Degree of Master of Science in Logistics Management

By

Christopher D. Miller, AB

September 1983

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This thesis, written by

Mr. Christopher D. Miller

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT
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DATE: 28 September 1983

William C. Pursch
COMMITTEE CHAIRMAN

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CHAPTER I

INTRODUCTION

One important aspect of a manager's job is to make decisions on the use of human, financial, and material resources (19:1). In order to make good decisions, a manager tries to forecast the effect of any decision he makes. He compares alternatives. For example, if an employee leaves the organization, the manager must decide whether to replace the individual. The manager tries to forecast the cost of hiring and training a replacement against the cost of redistributing the work among the remaining employees. The redistributed work may overburden the remaining employees and quality may suffer. A decision like this one is difficult to make in an organization which has clear goals (such as increasing profits). Decisions are even more difficult in organizations with varied goals (7:40).

A manager in a government purchasing organization has many objectives. Some of the more important objectives are:

1. to buy the right item at the right price with the right delivery date,

2. to remedy social and economic problems by requiring Government contractors to comply with contract provisions such as the Davis-Bacon Act, the Buy American Act, and the

Service Contract Act,

3. to comply with rigid budgetary restrictions and public audit procedures,

4. to conduct business in full view of the public,

5. to comply with detailed purchasing procedures,

6. to avoid censure by the public and the press,

7. to prevent fraud, waste and abuse,

8. to operate efficiently, and

9. to operate effectively.

Many of these objectives are conflicting. To prevent non-compliance with laws and procedures, and to show full disclosure to the public, extensive documentation is required. This slows down the contracting process and increases costs. Management tries to balance efficiency and the public's right to know (18:1-9).

The Government shares in the problems of all non-profit institutions. Anthony and Herzlinger (7:40-41) recognize five major problems which arise from the lack of a profit measure in the non-profit organization:

1. No Single Criterion. A non-profit organization has multiple objectives which make the comparison of alternative courses of action difficult, which greatly complicates decision-making.

2. Difficulty in Relating Costs and Benefits. What is

the dollar value of contract documentation? The cost of preventing overpayments for spare parts may be higher than the overpayments, but a Government manager may choose to prevent the overpayments because of fear of public censure. The cost of public censure is hard to quantify.

3. Difficulty in Measuring Performance. The principal goal of a non-profit organization is to render service. The measure of the benefit of that service is much less precise than the profit-making organization's measure of benefit.

4. Centralization of Decisions. An organization with many goals and vague measures of performance cannot delegate important decisions to lower-level managers. The paperwork which must be provided to the top decision-makers in order for them to make decisions, and in transmitting those decisions to the lower levels, is substantial.

5. Difficulty in Comparing Organizations. Profit is the measure of the success of most profit-making firms. Non-profit organizations must use a more subjective measurement. To measure efficiency, non-profit organizations often compare inputs (dollars or people), rather than outputs, because the inputs are easier to measure.

Problem Statement

Because non-profit organizations lack one overriding, easily measured objective, decision-making is very dif-

ficult. The effects of alternative decisions are difficult to predict given the complexity, the detailed procedures, and the many objectives of the non-profit organization. The manager in a non-profit institution needs a method or tool to aid him in predicting the effects of change to his organization.

Justification For Research

An example of a complex, multi-goaled, non-profit organization is the Directorate of Research and Development (R&D) Contracting, Aeronautical Systems Division (ASD), Air Force Systems Command (AFSC), located at Wright-Patterson Air Force Base, Ohio. The mission of R&D Contracting is to procure, administer and manage contracts for research and development, support services, and specialized equipment for AFSC Laboratories at WPAFB, the Aerospace Medical Division, the Air Force Human Resources Laboratory, ASD and other activities as directed by ASD (5:124). Figure 1 is an organizational chart showing R&D Contracting under the Deputy of Contracting & Manufacturing for ASD.

Many changes have been introduced recently to the contracting procedures in R&D Contracting to improve the contracting process: (1) a new solicitation package, (2) Fast Track contracting procedures, (3) Short Form Research contracting procedures, (4) Four-Step procurement proce-

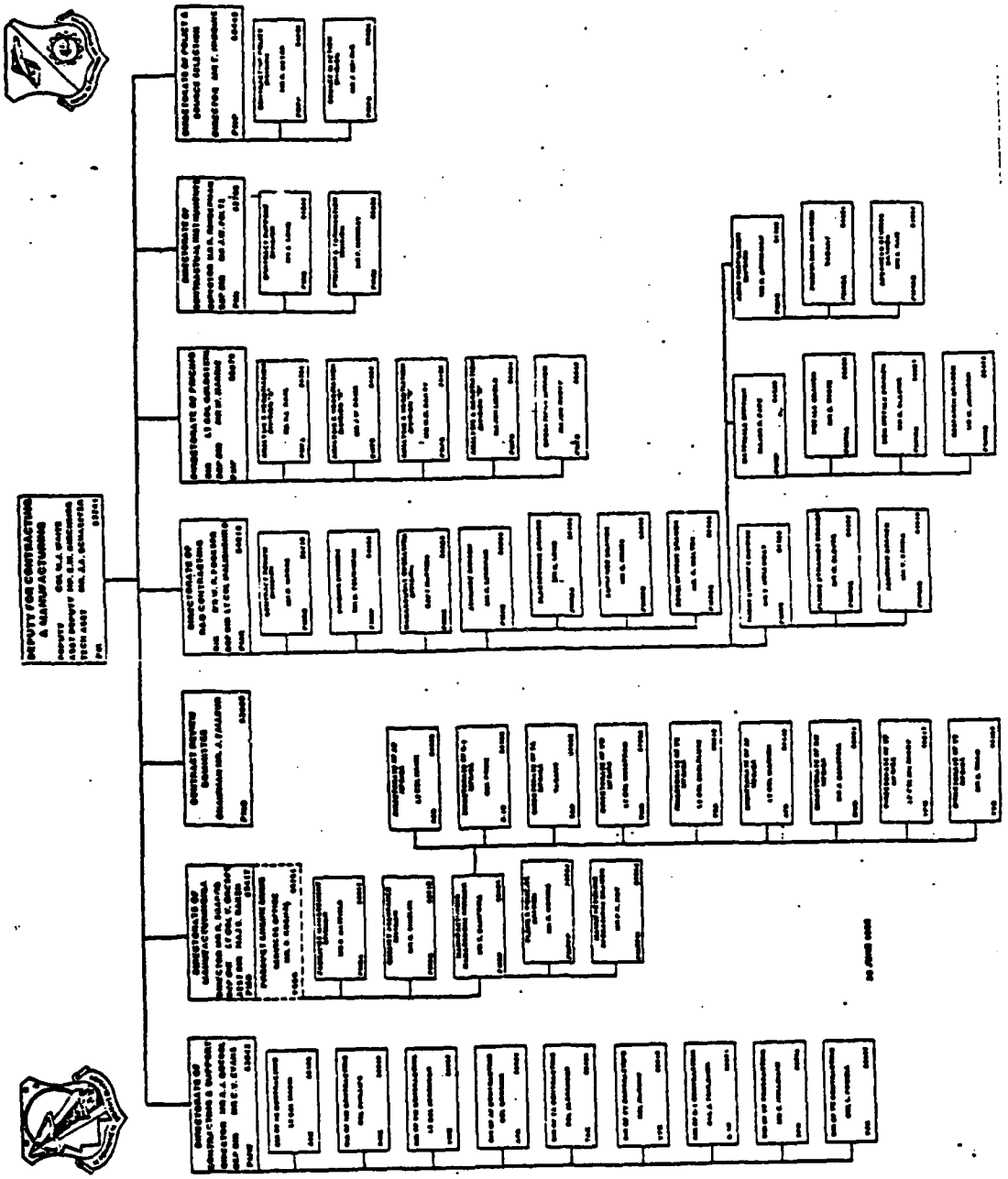


Figure 1

Organizational Chart

dures, and (5) Draft Request for Proposal procedures. This is not a complete list, but is representative of management's desire to simplify and reduce the contracting cycle.

The purpose of the new solicitation package is to reduce solicitation preparation time. The package was developed and administered by the quality circle in R&D Contracting. Despite the grassroots source of this change, many contracting personnel resisted the new procedures. Because the new procedures were just being tested, the old procedures were still in effect on many solicitations. The conflicting solicitation procedures upset many people, and may explain why the new package may be abandoned at the end of FY83 (34).

Fast Track contracting procedures were inaugurated by AFSC in September 1981. The purpose of Fast Track is to reduce the contracting cycle by reducing the number of contracting procedures. Standard buys with few problems are singled-out for Fast Track procedures. These standard buys are given priority status and rushed through the contracting cycle (32:1). Unfortunately, the procedures which AFSC reduced were not required in R&D Contracting. If there is any saving to the contract cycle, it is from giving these low-dollar, simple buys priority-handling (31).

Short Form Research contracting procedures are for use

with non-profit organizations who submit unsolicited proposals. Contracts for the purchase of a unsolicited proposal from a non-profit institution can be accomplished with a one-page, one-signature document. If the submitter of the proposal follows the correct procedures, the contracting cycle can be reduced considerably, but the procedure has a very limited application (20).

Four-Step procurement procedures separate the time of receipt of an offeror's technical proposal from the receipt of the cost proposal. The Government is permitted to negotiate with only the apparent winner, instead of being required to negotiate with every offeror within the competitive range. This procedure was used only once in R&D Contracting, because these procedures lengthen the contracting cycle (31).

The Draft Request for Proposal (DRFP) procedure was created by AFSC. The purpose of the procedure is to reduce the contracting cycle by giving the potential offerors an opportunity to review the solicitation package before it is formally released. The offerors are expected to suggest improvements to clarify the solicitation, which would lead to better proposals, and shorten negotiations. Because of the expected benefits, the DRFP was made mandatory on all R&D solicitations for one year. Instead of reducing the contracting cycle, the DRFP increased it. The buyers had to

process DRFP's in addition to their normal duties. The offerors usually failed to suggest any improvements to the package, and most offerors alreadv received advanced notice of the Government's solicitation through other means. The DRFP is rarely used today (16).

The projected costs and benefits of many of these changes proved to be inexact. But even when a change appears to be beneficial, the full cost of the change may be hidden from the decision-maker. For example, if a procedure is fragmented into many different procedures, the worker has less opportunity to perform each procedure. The opportunity for learning the procedure well to perform the procedure quickly is reduced (14:132). The manager should weigh the inefficiency of numerous procedures against the benefit of more applicable procedures.

Research Objective

The objective of this thesis is to develop a computer model of R&D Contracting to aid the manager in making decisions which effect the contracting cycle. The model was tested for accuracy, then changes were introduced in the model to determine their effects and to demonstrate the value of the model.

Research Questions

The simulation model was used to answer the following

questions:

1. With a specified workload, what is the optimum ratio of buyers-to-clerk?

2. With a specified number of buyers, what is the optimum level of work for the Procuring Contracting Officer (PCO)?

3. As the amount of workload increases, at what point does the contracting cycle increase significantly?

4. If certain administrative reviews were reduced or eliminated, how much shorter would the contracting cycle be?

The purpose of solving these research questions is to demonstrate the potential usefulness of a simulation model to the managers of contracting organizations.

Sources of Data

There are many Government organizations in the Dayton area which would be as convenient to study, but the R&D Contracting Directorate at ASD is most appropriate for a number of reasons. First, they have demonstrated a willingness to apply student research to their operation. An Air Force Institute of Technology thesis (13) is the basis of the work measurement system which is in effect today in R&D Contracting (25). A second reason is because the directorate is process-oriented. The management in R&D

Contracting is concerned with the process of awarding contracts. Thousands of different programs go through the same procedures in this directorate, and an improvement in the process may have a lasting effect on the contracting cycle. In most of ASD, the contracting groups are project-oriented. Contracting procedures are tailored for each project. An improvement in contracting procedures in a Systems Program Office (SPO) may not have as big of an effect as a change in procedures in R&D Contracting.

R&D Contracting has been in the forefront of applying computerization to the management process (25). Modeling is another step in using computers to improve the organization. Computer simulation may be unknown in R&D Contracting, but using the computers as an aid to management is very common.

Another reason for selecting R&D Contracting is the researcher's familiarity with it (six years of experience), its sponsorship of his schooling, and his personal interest in improving the contracting process there. As will be shown later, a detailed knowledge of the practical side of the contracting process was essential in the development of of the computer model.

R&D Organization

The R&D Contracting Directorate writes contracts for concept exploration, exploratory development, advance deve-

lopment, and manufacturing technology. The size of the contracts range from less than $10,000 to over $80 million. The directorate supports five main laboratories and several small ones (16).

The four buying divisions of the directorate each support a major laboratory. Each division has two or three branches, that support a specific laboratory or portion of a laboratory (see Figure 1). The directorate also has its own pricing division, contract review committee, small business office, and management operations division. A total of 162 personnel are authorized, including 24 military (4:135).

The function of the directorate is to solicit, negotiate, award, and administer development contracts. The individual buyer has more control over his contracts than the typical buyer in a SPO; the R&D buyer writes the solicitation, usually performs the pricing, negotiates the contract, writes the contract, and administers it until final delivery. The predominent contract type is Cost-Plus-Fixed-Fee (CPFF), although Cost Reimbursement, Cost-Sharing, Time-and-Materials, Fixed Price Level-of-Effort, and Firm Fixed Price contracts are common. Each buyer is expected to be able to select and write any type of contract at any dollar level. Extensive training and high quality personnel are required (12).

Assumptions and Limitations of the Research

1. The model only applies to R&D Contracting. The procedures in other buying organizations may be different. A model of another organization could be made following the same methods used in this study.

2. Procedures change, so the model will become increasingly inaccurate in time, unless the model is updated.

3. The model does not forecast the quality of contractual actions. The model could be used to predict the reduction in the contracting cycle which would occur if certain administrative reviews were eliminated, but the model will not predict the reduction in quality. A manager would be required to forecast the change in quality and determine whether the reduction in the contracting cycle outweighed the reduction in quality.

4. The model is imprecise (29:13). Any model incorporates only some of the many variables which impact the output (in this case, the output is contracting cycle time). Some of the variables which were not incorporated in the model are:

(a) Trainees were not included. The buyers, clerks, and the PCO in the model are all journeymen. With additional research into how trainees differ from journeymen in their time to perform the contractual actions, the model could incorporate trainees, too.

(b) Contract types (fixed price, time-and-materials, etc.) are not differentiated in the model. The contracting cycle might be longer or shorter with different contract types.

(c) Buying personnel may work faster when work is heavy, or when work must be completed by a specific date. The model does not incorporate this feature.

Definitions of Key Terms

Network map: R&D Contracting's management information system (DATA-CEN) recognizes thirty-four different contract types, such as F1 - fundings or C2 - Competitive Contract $ 10,000 to $ 100,000. The model includes twenty-eight of the thirty-four contract types, called networks. A network is a list of tasks which must be performed in chronological order to process a Purchase Request (PR) into a contractual action (contract award or contract modification). Each network includes the service time for each task. The network map is the listing of the networks in the Fortran subroutine of the model. Every PR in the model will follow a path through the network map to be processed into a contractual action.

Service Time: The time associated with the work that a server performs on a PR, the activity duration, is the service time. Service time does not include waiting time (the

time that a PR waits to be served) (22:19).

Contracting Cycle: The length of time which a PR is in the contracting process, from the receipt of the PR in R&D Contracting to the mailing of the contractual document is the contracting cycle. The contracting cycle is measured in hours in the model.

Queue: The queue is the line in which a PR waits until a server (buyer,clerk, or PCO) can begin working on the PR. If there are many PR's waiting for service, then the queue is long. The waiting time is called 'queuing time'.

Purchase Request (PR): A purchase request is a manually prepared form (AFLC/AFSC Form 36) to request central procurement action on requirements for material and services (28:562). The PR authorizes the contracting organization to begin the contracting process.

Buyer: The buyer protects the Government's interests in all contracting matters. The principle duties are: solicitation, pricing, source selection, contract writing, contract documentation, and contract administration. The buyer must adhere to all acquisition regulations, policies and procedures. The buyer is not permitted to sign a contract as an agent for the Government, unless he is also a contracting officer. The branch chief is the direct supervisor of both the buyer and the contracting officer. The journeyman buyer is grade GS-12. Trainee buyers start at

grade GS-5. The buyer's official title is Contract Specialist (2).

Clerk: The clerk assists the PCO and the buyer in soliciting, awarding, and administering contracts. The clerk must be a qualified typist. Major duties include drafting and typing of solicitation and contract documents, and formating documents and correspondence going to higher echelons. The official title of the clerk is Procurement Clerk (Typing). The journeyman level is grade GS-5. Trainee clerks start at grade GS-3 (3).

Procuring Contracting Officer (PCO): The PCO provides direction, guidance, and on-the-job training for the buyers. The PCO has review and approval responsibilities over work generated by the buyers. The PCO is the official contracting agent of the Government. In R&D Contracting most PCO's also act as buyers, but in the model these two roles are separated. When the PCO in the model acts as a buyer, he is Buyer-D. The official title of the PCO in R&D Contracting is Contract Negotiator. The grades for PCO's are GS-12 and GS-13.(1).

Summary

This study was designed to develop a model of the contracting cycle in R&D Contracting. An accurate model would provide management with a tool to predict the effect

of change on the contracting cycle. Chapter II is a review of related research and theory on the management tools which are used to project or measure change in the Department of Defense (DoD) contracting organizations. A discussion of modeling and its uses as a management tool, and a review of the methods for collecting data for the model are also included. Chapter III incorporates a description of the contracting cycle in R&D Contracting and its imitation in the model. The experimental design is presented. Chapter IV reviews the results of the experimentation with the model and offers an interpretation of the results. Chapter V summarizes the study and discusses findings, draws conclusions, and recommends topics for future research.

CHAPTER II

BACKGROUND

This chapter explores three issues: (1) how managers measure the effect of change in Government contracting organizations, (2) what modeling is, and its benefits, and (3) how data should be collected for the model.

Measuring Change in Government Contracting

In order to make effective decisions, managers need accurate and timely information on their organizations (6:659). A management information system and data base are essential to measurement systems (19:330). A management information system is any system designed to collect, organize, process, and analyze data to provide the manager with information to make decisions (6:659). Work measurement is a key requirement; without it, a manager cannot know how efficient or effective the organization is. Department of Defense (DoD) contracting managers have measured effectiveness and efficiency in three ways: (1) time standards, (2) indices, and (3) trend data (8:9).

Time Standards

Time standards, or productivity standards, are preestablished time intervals in which a specific task should be accomplished (8:12). A clearly related concept from

industry is the work standard. A work standard is defined as the time required by a qualified worker performing at a normal rate of speed, and experiencing normal fatique and delays, to produce one unit of output (11:7). Standards can be used for projecting the delivery date for the customer. They can also be used as a benchmark to judge a worker's efficiency. The manager uses standards for forecasting and planning, and to compare one organization with another (9:7).

Work measurement systems based on Frederick Taylor's scientific management techniques were used by the Army's Rock Island Arsenal and by the Navy's shipyards in Boston and Mare Island in the early 1900's (35:19). The use of standards in DoD contracting dates back to 1965 with the advent of the Defense Integrated Management Engineering System (8:13).

Hanscom Air Force Base has used procurement standards extensively. Separate standards were developed for each grade level of contracting personnel; higher paid personnel were expected to perform more work. Each employee's performance rating was largely based on a combination of the number of documents processed and the dollar value of the documents processed (8:20).

The Air Force Logistics Command at Warner-Robins Air Logistics Center developed the E-841 system of performance

standards with three goals: (1) to forecast personnel requirements based on workload fluctuations, and policy or procedural changes, (2) to provide a data base for evaluation of buying personnel, and (3) to provide a simple management tool (8:20).

Each contractual action was broken down into two components, variable and constant. The constant component consists of tasks which are always required for a specific type of contractual action. The variable component is composed of up to 53 different tasks which may be required on a specific contractual action. The applicable standards for the additional tasks are added to the constant component standard and a composite standard is developed for each contractual action (8:21). In implementing this system, some organizations require the buyers to log all their activities as they perform them in order to produce an accurate composite standard for each action.

Standards have proven very useful in high volume, repetitive activities. Labor performance standards have been used within DoD in manpower determinations, workloading and scheduling, cost estimating, budgeting, and in evaluating labor performance. Productivity improvements as high as thirty percent have been recorded in DoD (21:37).

Indices

The second measurement tool is the index. Indices

measure the change which has occurred to a specified variable over time (17:586). Indices are commonly used to compare the efficiency of an organization, or the efficiency of individuals in the organization. Indices must be compared over time to determine the effect of change. Managers try to find cause-and-effect relationships in indices. The major use of indices in DoD contracting are for pricing efficiency, labor efficiency, and performance efficiency (8:32).

Pricing efficiency is used to determine the effectiveness of the contract negotiator. Two pricing efficiency formulas are:

(1) $\frac{\text{Offeror's Proposed Cost - Negotiatied Price}}{\text{Offeror's Proposed Cost - Air Force Objective}}$ = Pricing Efficiency

(2) $\frac{\text{Historical Unit Cost}}{\text{Negotiated Unit Cost}}$ = Pricing Efficiency

A second use for indices in DoD contracting is for determining labor efficiency. Organizations with labor standards can compare actual hours to standard hours earned to determine labor efficiency. In evaluating the productivity of the organization, the total time spent on training, staff meetings, and leave is compared to the labor hours spent on the primary mission (8:35). These two formulas are:

(1) $\frac{\text{Actual Hours Expended}}{\text{Standard Hours Earned}}$ = Labor Efficiency

(2) $\frac{\text{Indirect Hours}}{\text{Direct Hours}}$ = Labor Efficiency

The third common use for indices in DoD contracting is for measuring performance efficiency. Outputs of the organization are compared to inputs. Typical performance efficiency indices are cost-per-contracting action, and cost-per-contracting-dollar. The cost-per-contracting-action is appropriate to organizations with a stable workload. The cost-per-contracting-dollar is more appropriate to organizations with flexible workloads or a wide range of complexity in contractual actions (8:37).

Productivity Trends

The last major measurement technique used in DoD contracting is productivity trends. Productivity trends compare the present with the past to predict the future. It is a time series that describes the long-term movement of productivity. For example, if productivity has an upward trend, then productivity is increasing, but not necessarily in each time period. Trends dampen the effect of seasonality and cycles (17:597). DoD Instruction 5010.34 states that productivity trend data is important in budgeting, manpower planning, and operational management (10:3 of Encl.3).

Trends give the contracting manager an historical perspective on the efficiency of the organization.

Background Factors

When using standards, indices, and trends, DoD contracting managers must consider the following factors (34:18):

1. the education and skill of the labor force,
2. the level of technology available, including automation,
3. the extent of capital investment by the organization,
4. the resourcefulness and enterprise of the managers and workers,
5. the perceptions of the workforce,
6. the tenure of key personnel, and
7. environmental factors (social, psychological, and cultural influences on the organization).

If any of these factors change significantly, the output of the organization could change.

Workload must be analyzed to determine its effect on output. A change in workload can hide the effects of a change to the organization. The number of overaged contracts and contracting actions is a good indication of workload (8:61).

The experience level of personnel sometimes changes. Automation often changes the ratio of professionals to non-professionals in the organization. An increasing ratio of military-to-civilian personnel may indicate a reduction in experienced personnel (8:62). An uneven workload may distort the output in the organization. A manager must consider all these factors when evaluating the effect of change in the organization.

Decision-making in R&D Contracting

R&D Contracting has been using scientific management to improve productivity for a long time. This organization had a work measurement system as early as 1960. This system was automated in the late 1960's, and extensively improved since then (13:25).

The management information system, DATA-CEN, provides managers and buyers with many reports without requiring extensive data input. Some of the major reports are:

1. a weekly performance report generated at the directorate, division, branch, and buyer levels. This report contains a listing of:

    a. purchase requests accepted by month,

    b. contract awards by month,

    c. standard versus actual output by month,

d. current work by contract type,

e. current workload,

f. forecasted workload by month,

2. a monthly report of delinquent contracts, and

3. a report on the status of each active PR, whenever the status of the PR is affected (25).

DATA-CEN keeps a running total of measurement points accumulated by each buyer and PCO, so individual productivity can be assessed. A forecast for the completion of the current work by buyer is reported each week. The DATA-CEN system is a time standard system. Today, there are standards for thirty-four types of contractual actions. These standards were developed in a 1974 Air Force Institute of Technology thesis (13). The researcher of the thesis surveyed most of the buyers in R&D Contracting. Each buyer surveyed was asked to provide average time estimates for each of 370 different activities which make-up the buyer's job. From these estimates, time standards were developed for each of the contract networks. These standards were later added to the management information system, so that the amount of work completed could be measured.

Shortcomings of Work Measurement Systems

Work measurement is an attempt to summarize and quantify work. It is necessarily a simplification of reality, so

inaccuracies are bound to occur. In addition to this basic problem with all work measurement systems, there are major problems with all the work measurement systems surveyed.

Time standards work better in high volume organizations than in organizations with one-of-a-kind actions (21:37). Time standards would be more appropriate to base contracting than to R&D Contracting, but time standards would be more appropriate to R&D Contracting than to contracting in a SPO.

The cost of administering a time standard system may outweigh the benefit of such a system. One implementation of time standards required 4800 engineered standards. Such a system requires extensive computer services and maintenance service (to run the system and update the standards), and places a heavy clerical workload on the workers whose work is measured (35:40).

Problems with indices and trend analysis stem from changes in the baselines and the definitions of inputs and outputs. For indices and trend analysis to function properly, changes to the system must be kept to a minimum. Since most contracting organizations operate in a dynamic environment, the managers who use these techniques may be ignoring this basic requirement (35:19)

In R&D Contracting, the DATA-CEN system lacks complexity factors; all actions of a network are projected to take the same standard amount of time. Standards cannot be custo-

mized for each PR. The system partially compensates for this by the proliferation of network types (thirty-four), and by permitting delay factors to be added to the standard time when appropriate (25).

Another feature that DATA-CEN lacks, is the ability to adjust the standard and forecasted completion dates for workload (25). The system forecasts that a PR will spend the standard amount of time to process through the contracting cycle whether the organization has no work-in-process, or is three months behind schedule. If the personnel in the contracting organization have no other work, then a PR will never have to wait in anyone's in-basket; the PR will receive service immediately. The PR should be processed in less than the standard time. Conversely, if the organization is overworked, the PR will encounter situations where it is waiting days for a server to finish other work before the PR can be processed.

The cost of work-in-process has been overlooked by the work measurement tools. William Sandman, consultant on productivity, states that no one has been considering the cost of work-in-process. He calculates that most work sits in queues for eighty percent of its time in the shop (27:8). Excess work-in-process increases the completion time for most work. Sandman believes that there is an optimum quantity of work-in-process (27:9). Less than the optimum redu-

ces productivity through worker idleness. Too much work-in-process increases leadtimes and decreases productivity. In industry, excess work-in-process is excess inventory, so reducing work-in-process saves money. In R&D Contracting, reducing work-in-process would reduce queueing time which would reduce the contract cycle.

By disregarding the effect of workload on the contracting cycle, a manager could easily misinterpret the effect of a change to the system. An improvement to the system could go unrecognized if workload increased. A new inefficiency could go unnoticed if workload decreased.

Simulation: A Potential Solution

Scientific management has been used in the manufacturing sector for years to increase productivity. The increases in the productivity of manufacturing and agriculture have outgained the increase in the productivity of the service industry. From 1950 to 1970, productivity growth in the service sector was 1% lower than the national average (13:1). Increasing productivity is easier in manufacturing than in the service sector. With physical, repetitive tasks, small reductions in the work process create big savings. These reductions are the result of work measurement methods; work is divided into small tasks which are analyzed and simplified. But work measurement methods have

been less successful with mental tasks, so service organizations (like the Government) have been less productive than manufacturing firms (11:330).

Recently, scientific management has developed techniques to help managers improve their organizations. Organizational behaviorists have studied organizations in an attempt to improve communications and motivation. Computer science has automated many of the service activities. Operational researchers have applied queueing theory to determine the optimum number of tellers in banks and cashiers in stores. Service organizations have learned to enlist their customers to increase productivity. Salad bars in restaurants, direct-dial long distance telephone calls, and electronic bank tellers are all examples of this (15:81).

The science of systems analysis was developed to help managers study and understand the ramifications of changes to their organizations (29:1). The systems analysis technique which is particularly useful in comparing alternatives is simulation. Simulation is the process of designing and conducting experiments with a model of the real system (29:2). The purpose of the model is to draw conclusions about real situations by analyzing the model (6:7).

With the advent of the digital computer and high level simulation languages, it is possible for a manager to use a computer simulation to determine the likely effect of change

on his organization. The manager can test many alternatives on a model and chose the one with the best outcome. Another benefit of this tool is that a model will provide the manager with the ability to test previously 'unthinkable' changes. A manager could determine the effect on output from forming a word-processing pool, without risking the animosity of the secretaries. One could determine the effect of reduced inspection on output without shipping any untested items.

Modeling may provide the manager with a better picture of the results of a change than reality would. When the effect of change cannot be determined within a short period after the introduction of the change, other variables may obscure the results of the change. For example, the quality circle of R&D Contracting introduced a procedure to reduce the solicitation preparation time. The new procedure was tested for one year (FY83). Then the effect of the new procedure on the contracting cycle was assessed. Workload in FY83 increased significantly over the workload in FY82. Many workers in R&D Contracting retired, or left the organization during the year. Unlike a scientific experiment, the quality circle was unable to control all the variables, so drawing conclusions about the effect of the new solicitation procedure has proven to be difficult (34).

The new solicitation procedure could have been run on a model of the organization; all other variables could have

been controlled. If the model revealed that the new procedure had no effect on the contracting cycle, then the one year experiment could have been avoided. If the procedure made a significant reduction in the contracting cycle on the model, management might have instituted the new procedures and avoided the confusion that a one-year test entails. Success on the model might have lowered the resistance of the contracting personnel to the new procedure, which could improve the effect of the change. The model could be used today to predict the effect that the old procedure would have had on the contracting cycle in FY83 (the new procedure test period).

Background of Modeling

There are five major functions that modeling fulfils:

1. an aid to thought,
2. an aid to communication,
3. for training and instructing,
4. a prediction tool,
5. an aid to experimentation (29:5).

Modeling is used in business, economics, marketing, education, politics, social science, behavioral science, international relations, transportation, manpower, law enforcement, urban studies, global systems, and many other areas (29:3).

Modeling in physical science can be very precise; the models are often based on scientific fact and theoretical laws. In fact, mathematics is a subset of modeling. But modeling is more of an art than a science for the industrial engineers, managers, and operations researchers, who deal with procedural systems. Procedural systems have few fundamental laws and are difficult to describe and represent. Policy is hard to quantify. There are considerable random components, and human decision-making is basic to the system. Procedural systems can be improved through procedural changes or design changes regarding scheduling, sequencing, distribution, allocation, or layout (22:1).

A computer language was developed over a ten year period by Purdue professor A. B. Pritsker to model procedural systems. The name of the language is Q-GERT, which is an acronymn for Graphical Evaluation and Review Technique with Queuing. Q-GERT is based on Program Evaluation and Review Techniques (PERT), but augments PERT with queuing and decision-making (22:vii).

Q-GERT models have been developed for various applications:

1. claims processing in an insurance company,
2. production lines,
3. planning for contract negotiations,
4. research and development planning (22:5).

In the first application, the model was used to predict the processing time of various types of claims in a large office. The following procedural changes were investigated:

1. Changes in the volume of each type of work handled by the regional service office;
2. Changes in the composition and requirements of the work input;
3. Changes in priority rules for the processing of work in the same operating unit;
4. Changes in the pathways of the work flow system;
5. Reallocation of personnel among the different departments; and
6. Changes in total processing times of customer requests due to training programs in specific areas (22:7).

This application is very similar to the application in R&D Contracting, and confirms the appropriateness of the Q-GERT simulation language as the vehicle for a model of the contracting process.

Applicable Data Collection Methods

To construct a simulation model which accurately imitates the contracting cycle times in R&D Contracting, the tasks which are involved in transforming a PR into a contract award must be defined. After the tasks are defined, the service time for performing each task must be ascertained. The service times are of critical importance; if they are not accurate, the model will not imitate the system.

There are a number of methods to determine service

times. These methods are classed as work measurement techniques. Work measurement is a means of establishing an equitable relationship between the number of hours worked and the amount of work produced (11:7).

Historical Records

Historical records are the simplest type of work measurement. Output is correlated with labor hours. In procurement, contract line items awarded are frequently correlated with the number of employees in the organization. One year is compared to the last to determine productivity gains. For example, if 10,000 line items are awarded in 1980 with an organization of 100 people, and 10,800 line items are awarded in 1981 with an organization of 104 people, then these two years are compared as follows:

$$\text{Lines Awarded/Employees} = \frac{1980}{10000/100} = 100 \qquad \frac{1981}{10800/104} = 103.8$$

So productivity increased by 3.8%.

The advantages of the historical records technique are:

1. It is easy to install and maintain.
2. It is simple to understand.
3. It can be used and maintained at a minimum cost.
4. It can provide information relatively rapidly.
5. It can be used in a small office performing varied functions, or it can be used in a large office performing only a single function (10:66).

Unfortunately, this technique has disadvantages:

1. Standards set by this technique automatically include all the inefficiencies of the past.
2. Standards set this way lack an absolute measure of effectiveness; consequently, it is impossible to compare performance between work centers.
3. It is impossible to change the standards when changes in operating methods or procedures are made.
4. The standards are only approximations and cannot be used where precision is required - for example, in the case of incentive wages (10:66).

Batching

A second measurement technique is batching; a technique of assigning an amount of work which is pre-measured to each employee. The size of the batch is changed until the batch can be performed by most employees in one hour. This becomes the standard for the job.

The advantages are that an employee's performance can be measured against the standard at any time, and the standard can be used for production scheduling.

The disadvantages are that unless the premeasured work is very uniform, the standards will not be precise. This technique cannot be used when there are many difrerent jobs that each employee performs (10:67).

Self-Logging

A third measurement technique is self-logging or the diary method. Self-logging requires that the employee maintain a record of what jobs he has performed, how long each job took to complete, and how many items he produced in a specified period. This technique requires the employee to

keep records from one week to several months. The advantages are:

1. It is easy to install.
2. It is simple to understand.
3. It does not require elaborate training for usage.
4. It can be used to measure small work centers or isolated jobs that do not justify the use of more expensive or elaborate methods of measurement (10:68).

The disadvantages are that self-logging measures the actual time to perform a job, not the time that should be spent on the job. This technique depends on the cooperation of the people being measured. If they are careless or antithetical to the study, they can sabotage the results. Maintaining the log is fairly time-consuming; analyzing the logs takes longer. Precise standards cannot be set by this method (10:68).

Work Sampling

A fourth technique is work sampling. This technique requires that an observer record what workers are doing at random periods of time during the day. When a predetermined number of observations are completed, statistical methods are used to set-up time standards (11:335). For example, if 100 of the 500 observations found employees performing a certain task, the study would conclude that employees spend 20% of their time performing that task.

The advantages of work sampling are:

1. It is a relatively inexpensive technique to use.

2. It produces quick results in some situations.
3. It does not interfere with the normal routine of a work center.
4. It is less tedious, from the analyst's standpoint, than other techniques.
5. It can be used without technical training.
6. It produces results that are known to be reliable and accurate.
7. It can be used on small work centers that do not warrant the use of more elaborate techniques (10:70).

The disadvantages of work sampling are that it measures actual time, not the time the work should take. Employees do not understand or trust the technique. If procedures change, then the study must be repeated (10:70).

Stopwatch Method

The stopwatch technique of work measurement is the best known. An observer or camera watches the employee's every move. Each job is broken down into elements which are timed by the observer. The observer chooses a worker of average or better performance and notes the intensity of his effort. If the employee is working harder than normal, the employee's output will be discounted in setting the standard. If he is lackadaisical in his work, the standard will be set higher than his actual output.

The advantages of the stopwatch technique are:

1. It provides a highly accurate measurement of time.
2. It is a fast method for developing standards.
3. It provides a good record of methods, procedures, and working conditions.
4. It is easy to explain to employees.
5. It can be used in situations requiring a very precise standard - for example, in the case of incentive wages (10:71).

Stopwatch methods have been successfully used in factories, but less successfully in offices, because:

1. The stopwatch creates a morale problem, because employees do not like to be observed and timed.
2. The stopwatch connotes 'efficiency' and 'control' to the office worker; consequently, resentment may build up when the stopwatch is introduced in an office situation.
3. The stopwatch is unsatisfactory for measuring long cycle activities or work that is varied in nature.
4. The stopwatch is a costly way to measure low volume operations (10:71).

Synthetic Time System

A fifth work measurement technique is the predetermined time or synthetic time system. A job is broken down into specific bodily motions. The time for each motion is taken from a predetermined time table developed by a firm's own time study data or from industry standards. The times for each motion are added up and a precise time standard for each job is developed. The advantages are:

1. Standards developed through this approach are more precise and more objective than those developed through other techniques.
2. When methods change, the standards can easily be revised without restudying the entire job.
3. Standards can be established relatively rapidly.
4. The technique has a high degree of acceptance among employees and supervisors.
5. Standards can be maintained at low cost.
6. Predetermined times permit evaluation of proposed method changes prior to installation.
7. An organization's own personnel can be trained to use predetermined times effectively (10:73).

The disadvantages are that a highly skilled analyst is

required to segment a job into body motions. This type of work measurement only applies to repetitive, physical work.

Critical Evaluation of Work Measurement Methods

The historical method is a likely candidate to use in gathering data for a computer simulation model. This would certainly be the cheapest method of gathering data. The computerized management information system (MIS) in R&D Contracting would readily provide the number of contracting actions and the completion time for each award. The problem is that the present MIS system does not breakdown the awards into the approximately 60 steps required by the simulation model. So the needed data is not available from present records. Historical data will be used to validate the model. The simulation model will provide estimated completion times which will be compared to the completion times shown in the historical records. The actual inputs (new starts, contract modifications, etc.) of previous years will be input into the model to test whether the model will accurately replicate the output of the past.

Batching may be an effective measurement technique for measuring individual productivity and for scheduling production, but it will not provide the information needed for the model. A typical contract takes 150 days, and the contracts are not uniform (there is a range of complexity from

buy-to-buy), so batching appears to be infeasible.

Initially, self-logging appears be very feasible. The many different tasks require many observations. If fifty people would keep diaries for a few weeks, there would be thousands of observations. This method has several drawbacks. This technique requires the most cooperation of the employees being measured. There is a natural resistance to being measured by any technique. But a technique that demands your active cooperation may invite sabotage.

A second problem with self-logging is that the cooperation of management is essential. Management must be sold on the potential benefits of the computer simulation model, otherwise they would not approve the diary method of collecting data. To make the diary method acceptable, the data collection period must be relatively short (two-to-three weeks), and the forms must be simple to fill out. The question is whether enough data can be gathered in a short period to make this method statistically acceptable.

What is the probable sample size? Last year the R&D Contracting made the following awards:

CONTRACT TYPES	NUMBER OF AWARDS
Competitive New Starts	349
Sole Source New Starts	179
Contract Modifications	1672
Delivery Orders	315
Fundings	1238

(25:13)

The simulation model breaks these five categories into

twenty-eight (28) groups based on dollar amounts (less than $100,000, $100,000 to $250,000, etc.). Examining the worst case, Sole Source New Starts, the model breaks this group into eight categories. If the 179 Sole Source New Starts were divided evenly among the eight networks in the simulation model, then there would be 22 contracts in each group. Given the expected variance in the times to complete each activity (each contract type is composed of approximately 60 activities) it is unlikely that even twenty-two samples would be statistically significant. For example, if an activity takes an average of four hours to perform, and the variance is four hours, to achieve 90% confidence that the sample mean is within thirty (30) minutes of the population mean requires a sample of forty-three (43). Projected data collection period - 2 years.

Asking an employee to keep a diary for one or two years is likely to result in gross inaccuracies in the data because the employee's motivation to make accurate records will flag long before the end of the data collection period. The self-logging method appears to be infeasible in this instance.

Work sampling suffers from the same problems - insufficient sample size. A lone observer (this specific situation) is unlikely to be able to make more observations than fifty employees keeping diaries.

Using the work sampling technique in contracting presents several problems. The first problem is in limiting the number of work categories to a reasonable number. Work categories are the different tasks performed by contracting personnel. The process of contracting involves so many different work categories that an excessive period of time would be required to collect a statistically significant sample in each work category. To solve this problem, a few general categories could replace the many work categories. Unfortunately, a few general categories would not provide the task information required by the model. Even when work sampling has been performed using general activities, the observer has not been unobtrusive. Unlike many forms of physical work, an observer cannot readily decide what job an individual is performing. In the past, observers tried to solve this problem by attaching a list of job activities to each work station and asking the buyers to mark the correct activity at all times. Despite the fact that the contracting activities being measured were much simpler than the contracting activities in R&D contracting, the buyers were unable to fit many of their activities into the general headings. The observers were constantly being asked by individuals to help them classify the particular job that they were doing (25). Work sampling will not garner the required information.

A modified form of work sampling was considered, called the Adcock method of work measurement (26:32). It is a cross between self-logging and work sampling. The person being measured fills out a diary of what he is doing at the moment when a telephone pocket pager (beeper) goes off. The beeper goes off at random intervals, approximately twice an hour. The work measurer spends his time making different beepers beep at random intervals to collect random samples from many employees. The advantage of this method is that the employee defines what he is doing, rather than an observer possibly misinterpreting what the employee is doing, and the employee is not required to record everything he does (26:32). This method is recommended for measuring the work of managers, because managers do so many different things every hour. This method is less appropriate with buyers and clerks because they are likely to spend longer on each work activity. Filling out a diary twice-an-hour is likely to require more diary-writing than recording everything (self-logging), because many jobs take longer than thirty minutes. In short, work sampling is less preferable than self-logging, and infeasible in this instance.

The stopwatch technique does not appear to be a good technique for use in R&D Contracting. Many repetitions of the same activity by one worker is a rarity. It is also unsatisfactory because of the long cycle times, the variety of

contracting actions, and the uneconomical expense of measuring over one thousand activities.

A predetermined time system is not appropriate to non-physical work and there is no time study data or industry standards to construct synthetic times.

Since none of the work measurement techniques appear to be feasible in this case, a judgmental, or subjective technique must be used. A survey was used in 1974 to collect information needed by that study of R&D Contracting (13). The information gleaned from that survey is not sufficientlv detailed for use on this simulation model.

Delphi Procedure

The Delphi procedure is considered to be useful in acquiring accurate data from a group of experts (29:88). A panel of experts is chosen, but the experts are interviewed individually. Each expert provides an estimate of the time to complete an activity. After the first round of interviews, the estimates are averaged and a second round of interviews take place. When an expert's estimate is beyond a range of the average (such as one standard deviation), he is asked to justify or revise his estimate. If the expert believes his estimate is correct, his justification for his estimate is communicated to all the participants, to permit them to revise their estimates. Revised estimates are received from everyone. If the data collector believes that

further consensus is likely, additional rounds of interviews are conducted.

The advantage of the Delphi method is that group opinion is not formed by only a few vocal or important people on the panel. When justifications for outlying estimates are circulated, the opinion-maker is not identified.

There are problems with the Delphi technique. The bandwagon effect may cause consensus instead of reasoned argument. But experiments have shown that the Delphi technique is more efficient than face-to-face confrontation, and the estimates improve with the number of participants (29:90).

Objective work measurement techniques would be preferred if the number of samples which could be taken were statistically significant. But given the many different work activities and the low volume of work in R&D Contracting, subjective techniques must be used. The Delphi technique appears to be useful, practical, and preferable to other subjective techniques, so it was used to collect the data for the model.

The Delphi technique had to be modified in this study, because of time constraints. The number of estimates which each expert was asked to make was substantial (see appendices F, H, and J). Providing a justification for each estimate would have overburdened the experts. Only one round of questioning was conducted. The researcher planned on con-

ducting a second round on major elements of the modeled networks which significantly departed from historical data. Because of the breadth of the study, the researcher was unable to conduct any subsequent rounds.

Summary

This chapter presented a review of work measurement systems used by DoD contracting organizations. Each system has problems which cause inaccuracies in results. One of the major inadequacies of these work measurement systems is that the effect of workload on the contracting cycle is ignored.

Modeling can be a solution to this problem, but modeling a contracting organization requires a large amount of information on the procedures, functions, and service times of the organization. Methods of collecting the information required for the model were also reviewed.

Chapter III explores in detail the collection of data, the construction of the model, and the plan for answering the research questions.

CHAPTER III

METHODOLOGY

This chapter is composed of three topics. The first topic is the construction of the model, which includes a description of the data that was required to build the model, how that data was collected, an example of the modeling of a typical contractual action, and a detailed description of the model. The second topic is the experimentation plan. This includes the validation of the model, the limitations of the model, and the experimental design for answering the research questions. The third topic is a description of the computer programs developed, and the method of running the model at Wright-Patterson Air Force Base.

Constructing the Model

Constructing the model is the most time-consuming phase of the research. The researcher must learn how the system to be modeled functions by observing and participating in the system (29:46). After this research period, relevant data required to imitate the system must be ascertained. The three major sets of data which were required for this effort are: (1) the arrival times (schedule) of incoming work to the system, (2) a detailed step-by-step description

(network map) of the contracting process, and (3) the service times (working times) associated with each contract activity.

Collecting Arrival Times

The DATA-CEN system has a record of the arrival time of each PR received in the R&D Contracting directorate for the last three years (25). A list of these arrival times was provided by the Operations Management Division of R&D Contracting. Because the DATA-CEN system was revised at the beginning of FY82, the data before that period could not be used. FY82 was the only full fiscal year of data which followed the new system, so the arrival of PR's in the model imitates the PR arrival of that year.

Constructing Network Maps

The network maps were constructed next. Experienced buyers, clerks, and PCO's in R&D Contracting provided the chronological ordering of detailed tasks which compose the contracting process. Each network of the network map was based on the more-general networks defined in the DATA-CEN system (23). Twenty-eight networks were constructed:

NAME OF NETWORK	DESCRIPTION
C2	Competitive contract between $10,000 and $100,000
C3	Competitive contract between $100,000 and $250,000
C4	Competitive contract between $250,000 and $500,000
C5	Competitive contract between $500,000 and $750,000
C6	Competitive contract between $750,000 and $1,000,000
C7	Competitive contract between $1 and $3.5 Million

C8 Competitive contract between $3.5 and $10 Million
F2 Competitive Fast Track contract
C9 Dual award (contract)
S2 Sole source contract between $10,000 and $100,000
S3 Sole source contract between $100,000 and $250,000
S4 Sole source contract between $250,000 and $500,000
S5 Sole source contract between $500,000 and $750,000
S6 Sole source contract between $750,000 and $1,000,000
S7 Sole source contract between $1 and $3.5 Million
S8 Sole source contract between $3.5 and 10 Million
F3 Sole source Fast Track contract

F1 Funding (modification)

M2 Modification between $10,000 and $100,000
M3 Modification between $100,000 and $250,000
M4 Modification between $250,000 and $500,000
M5 Modification between $500,000 and $750,000
M6 Modification between $750,000 and $1,000,000
M7 Modification between $1 and 3.5 Million
M8 Modification between $3.5 and $10 Million
F4 Fast Track modification

A1 Administrative notice (unilateral)

M0 No cost modification (bilateral)

Collecting Service Times

Each of the twenty-eight networks was subdivided into three groups: (1) the work performed by the PCO, (2) the work performed by the clerk, and (3) the work performed by the buyer and others. Based on information provided by several experienced personnel in R&D Contracting, major activites of each element of each network were determined. A list of these activities was constructed for each group, for each network. Copies of these lists were distributed to five experienced buyers, five experienced clerks, and five experienced PCO's in R&D Contracting for additions, dele-

tions, or corrections (see Appendix L).

The lists were revised as a result of the comments received from the fifteen experienced personnel. The revised lists are in Appendices F, H, and J. These lists were used to collect the third major set of data required, the service times for each activity. Before the service times were collected, the number of different service times required by the model had to be reduced. If every activity was estimated, each estimator would develop over 1500 estimates. The number of work activities was reduced by eliminating duplicates. For example, in twenty of the twenty-eight networks, the buyer carries the contract file to an office in another building for their review of the contract. The estimate of the time to walk there and back was asked once and used in all twenty networks.

Certain major activities were always estimated in each network in which they occurred. The major activities were:

1. PCO review of the new PR.
2. buyer's solicitation preparation.
3. clerk's solicitation preparation.
4. buyer's review of typed solicitation.
5. PCO's review of solicitation.
6. buyer's pricing of offers.
7. buyer's negotiation with offerors.
8. buyer's write-up of the award.

9. clerk's contract preparation.

10. buyer's review of the typed award.

11. PCO's review of the award.

In addition to estimating jobs which they performed, the buyers were asked to estimate times for work which is performed by individuals and groups (such as the Judge Advocate General [JAG] or Committee), which are not fully modeled. These groups are not modeled with queues and servers. Their service times are a combination of queue and service times. The processing of a PR is usually delayed by these outside activities, so the buyer's estimates should be accurate.

Before starting the sampling process, the researcher should define the sources of the data in terms of universe and population from which the sample is to be drawn.

Universe

The universe of the sample is the 41,000 federal employees who compose the procurement occupations group (33:10-11).

Population

R&D Contracting is authorized over 100 procurement positions. The personnel range in grade level from the clerk trainee (GS-3) to the R&D Director (GS-15), the military rank spans from Airman to Lieutenant Colonel (4:1-4).

Sample

To select a sample to answer the questionnaire, a list of

all the personnel in the four buying divisions of R&D Contracting was obtained. The workforce was divided into four groups: (1) buyers, (2) clerks, (3) PCO's, and (4) others. New employees do not have the background of experience in R&D Contracting to make sound estimates, so clerks and PCO's with less than one year of experience in their jobs were eliminated from the sample. Because of the complexity of the job, buyers with less than two years of experience were eliminated from the sample. PCO's have several years of experience as buyers, so one year of PCO experience was acceptable.

The names of the buyers, clerks and PCO's who met the criteria were thrown in a hat and drawn at random without replacement until twelve PCO's, twenty-four buyers', and twelve clerks' names were chosen. Then extra names were drawn as substitutes.

Of the twelve PCO's, eleven agreed to complete the questionnaire. Several of the buyers and clerks were on leave, so the substitutes were used. All personnel in the sample were provided with instructions for completing the questionnaire. These guidelines are in Appendix E.

There were two different questionnaires for the buyers. The first surveyed the high-dollar networks (such as the C6, S7, or M8 network). The second surveyed the low-dollar networks. Each of the buyers selected was asked whether he/she

had experience with high-dollar contracts. If the buyer did not have high-dollar experience, they were given a low-dollar questionnaire. The low-dollar questionnaires were completely distributed by the time the sixteenth buyer was asked to participate. All buyers, both selected and not selected in the sample, were asked to complete the high-dollar questionnaire, if they had required experience. Many high-dollar questionnaires remained, so all the PCO's in R&D Contracting with the required experience, who were not already selected to answer the PCO questionnaires, were asked to answer the high-dollar buyer questionnaires. Altogether, ten high-dollar questionnaires were distributed.

The questionnaires for all three groups required six estimates for each activity (or task): (1) the normal or average time to complete the task, (2) the optimistic time or the time it would take to complete the task if there were few problems with the contracting action, (3) the pessimistic time or the time that it would take to complete a task if there were more problems than normal, (4) the percentage of the time that the normal situation occurs, (5) the percentage of the time that the optimistic situation occurs, and (6) the percentage of the time that the pessimistic situation occurs. The purpose of the last three estimates is to aid in determining the proper distribution type (normal, triangular, uniform, etc.).

All three groups were asked to estimate their nonworking time; the percentage of the day that they take breaks or socialize. They also provided estimates of the percentage of the day that is spent on non-DATA-CEN work; work that is not required in performing any of the twenty-eight networks.

The estimate questionnaire is very detailed, listing most of the activities that are usually performed. There is even a list of the non-DATA-CEN work. The concept of the detailed questionnaire is to ensure that the estimates were made on the same tasks. There are so many networks, that many elements of the job could be overlooked by the estimator. So the questionnaires both reminded the interviewees of most of the work involved in each task and focused their attention on making good estimates.

Modeling a Funding: An Example

To explain how the model imitates the contracting cycle in R&D Contracting, a funding modification will be traced through the contracting cycle. The funding network, F1, is the most popular contract type, accounting for twenty-five percent of the contracting actions in R&D Contracting (25). It is also one of the simplest networks with a short contracting cycle. First, the processing of a funding action will be examined, step-by-step, then the imitation by the model will be explained.

How Funding is Processed

The contracting cycle for awarding a funding is shown in Figure 2. The funding starts with Congress, but for our purposes the funding starts when a purchase request (PR) for the funded amount arrives in the R&D Directorate. The PR is entered into the computer system, mailed to the Division Chief, who passes it to the Branch Chief, who assigns it to the appropriate buyer.

The buyer reviews the PR to insure that it is correct and telephones the contractor asking him for a letter stating the amount of funds which are needed for the fiscal year. If there are any problems with the funding amount (with the contractor) or problems with the PR format, the buyer telephones the PR initiator (usually an engineer at a laboratory) to resolve the issue. If the problem is critical, the PR may be rejected and returned to the initiator (this rarely occurs). The buyer accepts the PR, fills out a computer input card, sends the original PR to accounting, attaches the PR to the applicable contract file, and gives the file to the procurement clerk (activity 1 on Figure 2). Fundings are so routine, that the buyer does not need to draft the funding modification for the clerk. The clerk drafts and types the funding document. The clerk also prepares the contract documentation, and returns the package to the buyer (activity 2).

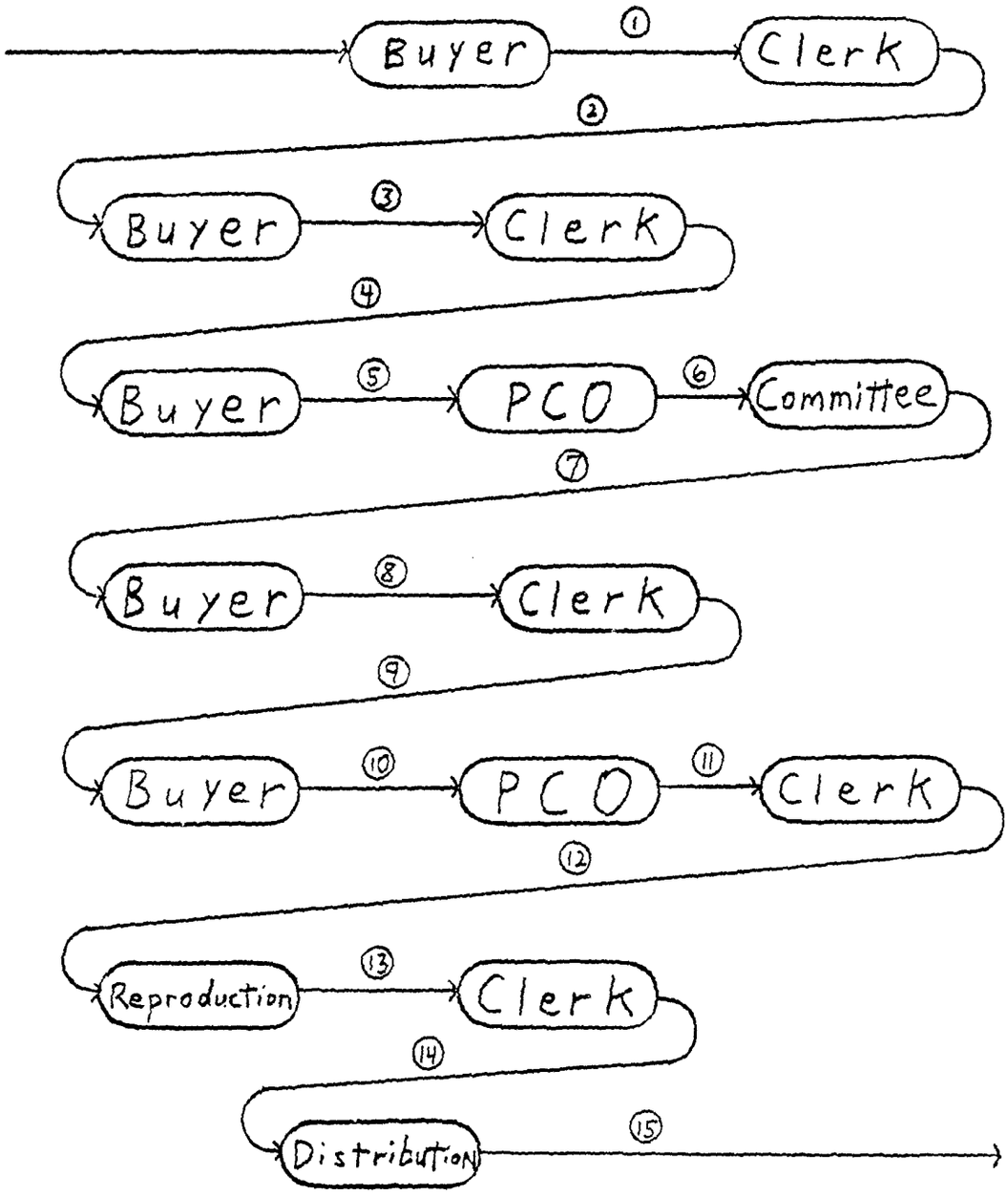


Figure 2

FUNDING PROCESS

The buyer reviews the file, usually makes a change, and returns it to the clerk (activity 3). The clerk types the change and gives it back to the buyer (activity 4). Accounting certifies the funds and returns the PR to the buyer. The contractor sends a letter agreeing to the funding. These are added to the contract file and given to the PCO for review (activity 5). The PCO reviews and sends the contract file to Committee (activity 6). They review the file and return it to the buyer directly, or indirectly through the Division Chief who may also perform a review (activity 7). The buyer answers Committee's comments and asks the clerk to type-up any changes (activity 8). The clerk types up the changes and returns the file to the buyer (activity 9). The buyer reviews (activity 10), and the PCO reviews and signs the funding modifications (activity 11). The clerk inputs the amendment into the computer and sends the amendment to reproduction (activity 12). Reproduction makes copies for all interested parties (activity 13). When the amendment returns, the clerk prepares copies of the supporting documentation and sends the package to distribution (activity 14). Distribution mails the funding modification to the contractor and distributes copies of the modification and supporting documentation to appropriate offices (activity 15), which ends the contracting cycle.

How Funding is Modeled

The model tries to imitate the contracting cycle, but the full model (Figure 3) does not resemble the contracting cycle of Figure 2. The oval shapes are nodes, and are numbered on the right inside corner. The funding cycle begins in Node 1 (it could also be started in Node 4, but this will be ignored for now, for simplicity). The lines which connect the nodes to each other are called branches. Branches represent service activities. The funding PR generated in Node 1 flows through the branch to Node 2, where it is assigned to a buyer. Assume that the PR is assigned to Buyer-A. The buyer's clerk is Clerk-A.

The PR flows to the traffic node (Node 3) where it is distributed to Buyer-A for service. Since nodes 1,2, and 3 are administrative nodes (nodes for the convenience of the model), no time has accumulated on the total contracting cycle time of the funding PR. As the PR goes from Node 5 to Node 11, the time for the buyer to perform his activity (accepting the PR, calling the contractor, preparing the file,etc.) is recorded as the total contracting cycle time for the PR. At Node 11, the PR is directed to Node 37, Clerk-A. The PR flows through nodes 38 and 39 in no time. As the PR flows from Node 39 to Node 40, the time that the clerk spends preparing the contract modification and file is added to the total contracting cycle time. The PR flows

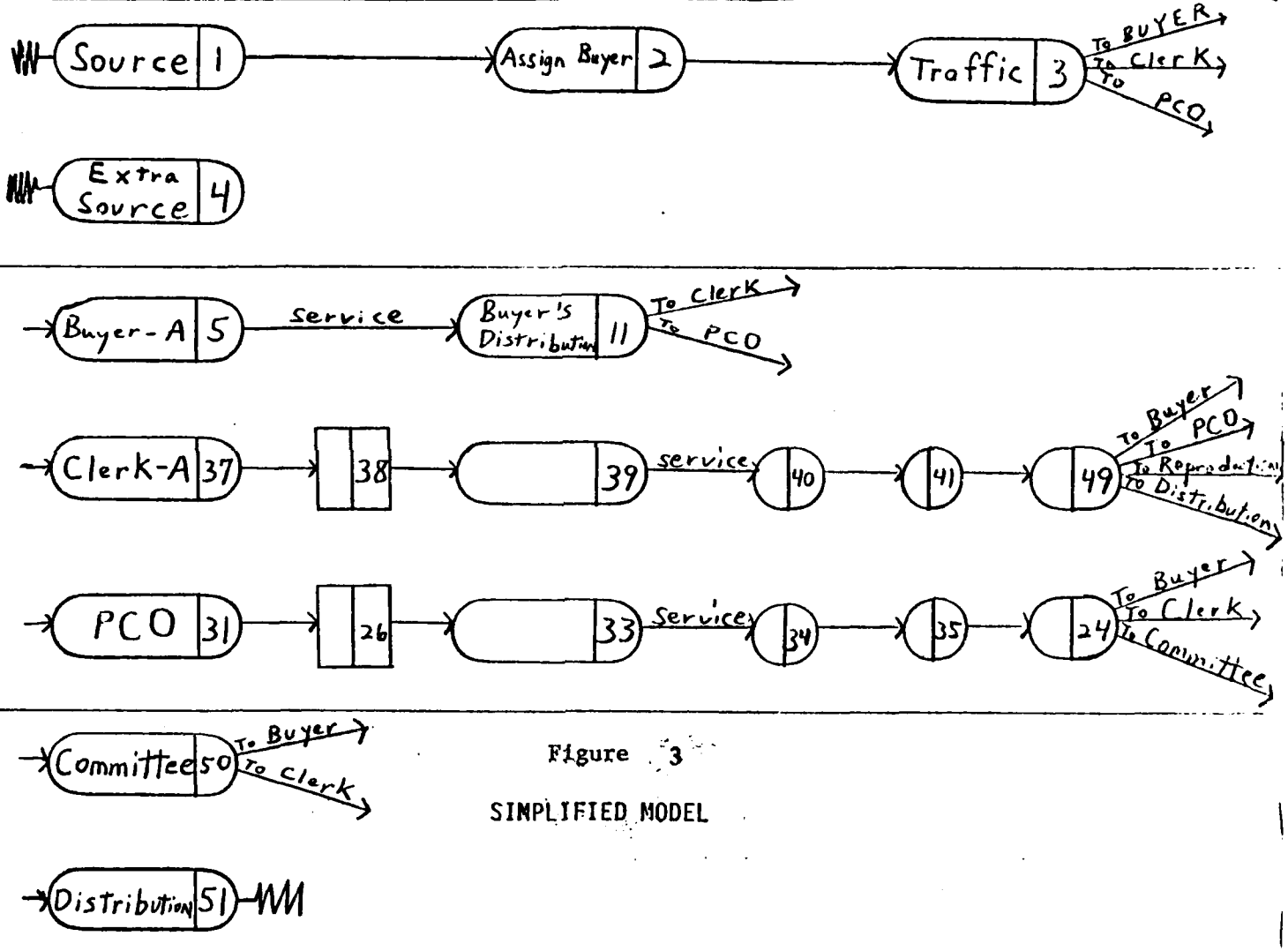


Figure 3

SIMPLIFIED MODEL

through nodes 40, 41, and 49, where it is distributed to Buyer-A. The time that Buyer-A spends reviewing the file is added to the total contracting time as the PR flows from Node 5 to Node 11. The PR is distributed at node 11 to Clerk-A. As the PR flows through the clerk's nodes again, the time that the clerk spends making the buyer-directed changes is added to the total contracting time of the PR. The PR is distributed back to the buyer, where the buyer's time in reviewing the changes is added to the total contracting cycle time. At Node 11, the PR is distributed to the PCO (Node 31). The PR flows through nodes 31, 26, 33, and 34. As the PR flows from Node 33 to Node 34, the time that the PCO spends reviewing the funding action is added to the total contracting cycle time. The PR flows through nodes 34, 35, and 24, where the PR is distributed to Committee (Node 50). As the PR flows from Node 24 to Node 50, the time that Committee spends reviewing the funding is added to the total contracting cycle time of the PR. From Node 50, the PR is returned to Node 5, Buyer-A. The time for the buyer to make Committee-directed changes is added to the running total of contracting cycle time as the PR flows from Node 5 to Node 11. From Node 11 the PR goes to Clerk-A who makes the Committee-directed corrections. The time for making corrections is added to the contracting cycle time. The PR flows back to Node 5, the buyer reviews

the corrections, the buyer's review time is recorded, and Node 11 distributes the PR to the PCO. The time that the PCO takes to review and sign the funding modification is recorded between Node 33 and Node 34. The PR is distributed from Node 24 to Node 37, Clerk-A. The clerk's time for preparing the file for reproduction is added to the contracting cycle time. At Node 49, the PR is distributed to Reproduction. On the way to Reproduction (Node 3 plays the part of reproduction), the amount of time that reproduction will take in performing the required work on this funding action will be added to the total contracting cycle time. The PR is distributed to Clerk-A, who prepares the document for distribution. Clerk-A's time is recorded. Node 49 distributes the PR to Node 51, Distribution. On the way, the time that Distribution spends performing their tasks for the PR are added to the total contracting cycle time of the PR. Node 51 is the last node for all PR's in the model. Node 51 records that total contracting cycle time for the PR and averages the cycle time with other funding PR's that have been processed through the model.

This example of how a PR flows through the model is a simplification of how the model functions. A more detailed description will be presented in the next section.

Q-GERT Model Description

The model was constructed to imitate the contracting cycle in the Flight Dynamics branch (PMRNA) of R&D Contracting. The model is composed of three buyers, two clerks, and a PCO, who also buys (the PCO's buying role is depicted as Buyer-D). The Flight Dynamics branch is composed of more buying personnel than are depicted in the model, but the model has the basic components of the branch, except for the branch chief. Conclusions that can be drawn from experimentation with the model should be directly applicable to the branch. With a little modification, the model could depict any buying branch in R&D Contracting.

The model is composed of the following components: (1) the arrival routine, (2) the traffic node and sink node, (3) the distribution nodes, and (4) the servers (buyers, clerks, and PCO). Each component will be discussed separately.

Arrival Routine

Figure 4 depicts the section of the model classed as the arrival routine. Nodes 1, 4, and 6 are all source nodes. Source nodes generate PR's. Node 1 generates PR's of all twenty-eight network types. When a PR leaves the right side of Node 1, it creates another PR which is depicted as the curved line which arcs back to the left side of Node 1. This curved line, like all solid lines outside of nodes, represents activities. The basic function of the model is

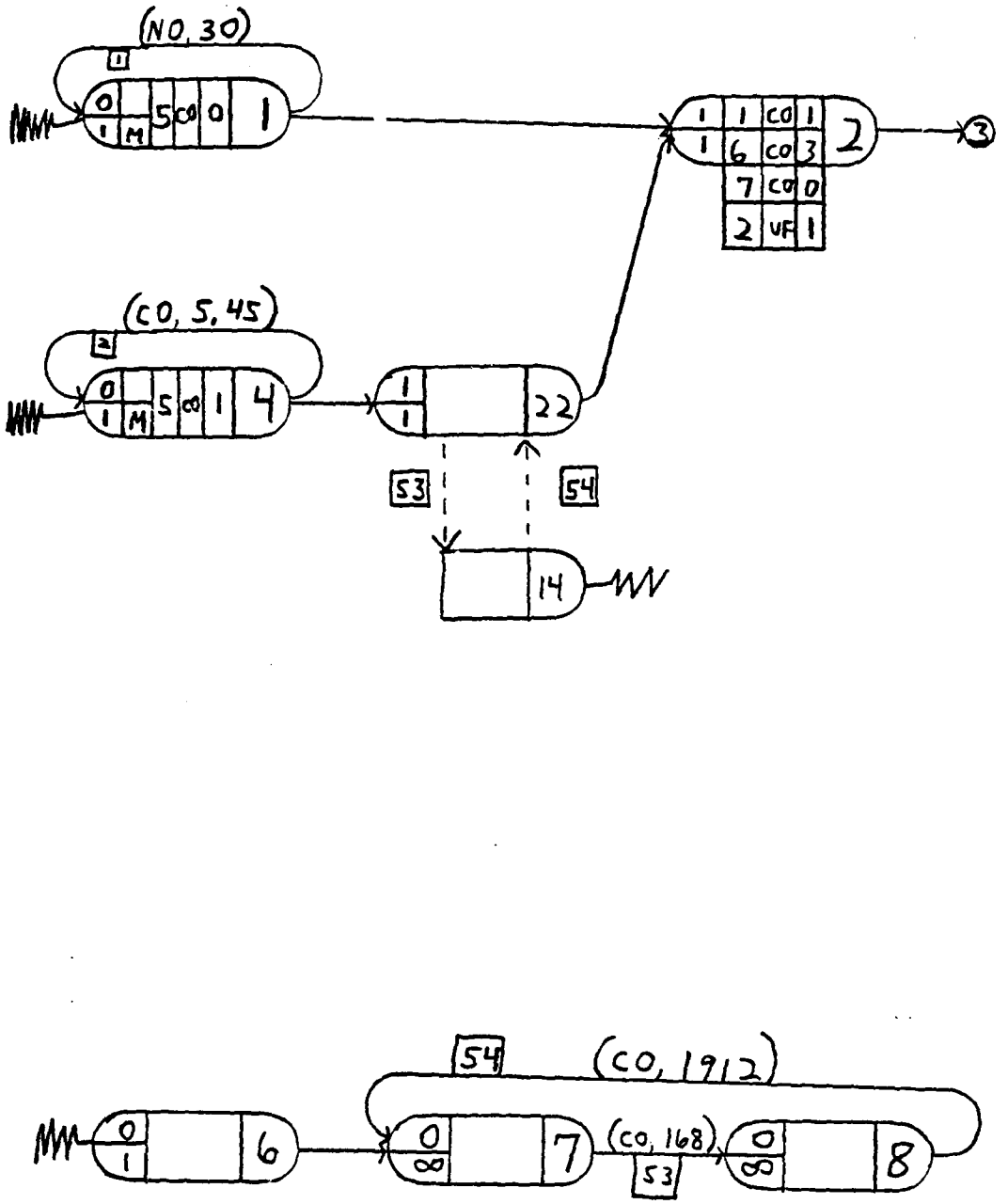


Figure 4

ARRIVAL ROUTINE

to measure time. The service time for the activity indicated by the number in the square box is '(NO,30)'. '(NO,30)' is a distribution of numbers with a mean of 18.7735, and a standard deviation of 3.3175 hours. The computer will supply the model with the exact number. This number will be different for each PR which flows through this path, because the computer uses its random number generator to pick this number. The distribution of arrival times was determined by analyzing the arrival times of PR's to PMRNA in FY82 (25). Since there is no activity time indicated between Node 1 and Node 2, a PR would flow through this branch without adding time to its total contracting cycle time.

Node 2 is a regular node which assigns a specific buyer and clerk to each PR, and determines the PR network type. Buyer-A, Buyer-B, and Buyer-C each have a thirty percent probability of being assigned any specific PR. Buyer-D, who is also the PCO, has a ten percent chance of being assigned a specific PR. The buyers are considered to be equally competent in their jobs. The branch chief of PMRNA stated that the PCO shoud have forty percent of the buying workload of a journeyman buyer (12). The probability of a specific PR being assigned to a specific network type was determined using the actual frequency of occurence of each network type in PMRNA in FY82 (25). After these assignments are made, the PR flows to Node 3, the traffic node.

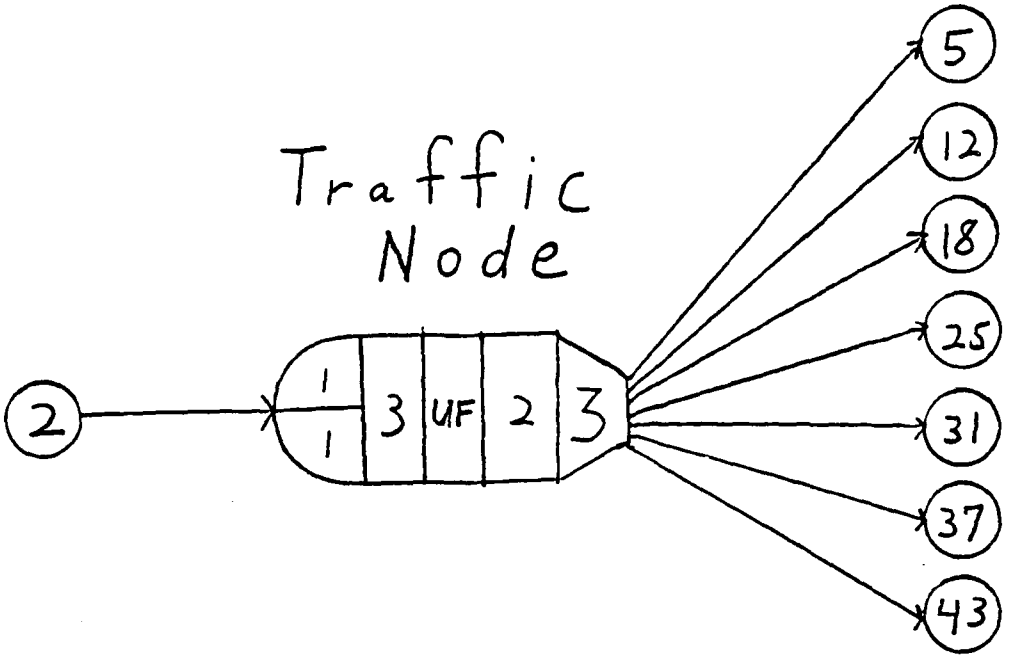
In October 1982, 83 funding PR's were received in PMRNA. The rest of the fiscal year, an average of six funding PR's were received per month (25). Node 4 is a special source node that imitates this flood on fundings for one month of every year. The PR's from Node 4 must travel through Node 22, before going on to Node 2. Node 22 and Node 14 act as a switch which either permits the fundings to flow to Node 2, or derails the PR's. Node 14 has no path to Node 2 or to anywhere else. PR's which flow to Node 14 disappear. On November 1 of each simulated year, Node 22 is replaced by Node 14. Node 4 continues to generate PR's, but they never enter the contracting cycle.

Nodes 6, 7, and 8 compose the clock which sets the time for Node 22 and Node 14. When a PR is generated by Node 6, it flows to Node 7. The PR travels for 168 work hours to reach Node 8. As soon as the PR reaches Node 8, Node 22 is replaced by Node 14. At Node 8, the PR travels for 1912 hours to reach Node 7. As soon as the PR reaches Node 7, Node 14 is replaced with Node 22, and the contracting system receives another flood of funding PR's.

When Node 4 funding PR's reach Node 2, Node 2 assigns the buyers by the same method as described earlier, but all the PR's are assigned to the funding network.

Traffic Node and Sink Node

Node 3 is the traffic node (see Figure 5). It is one of



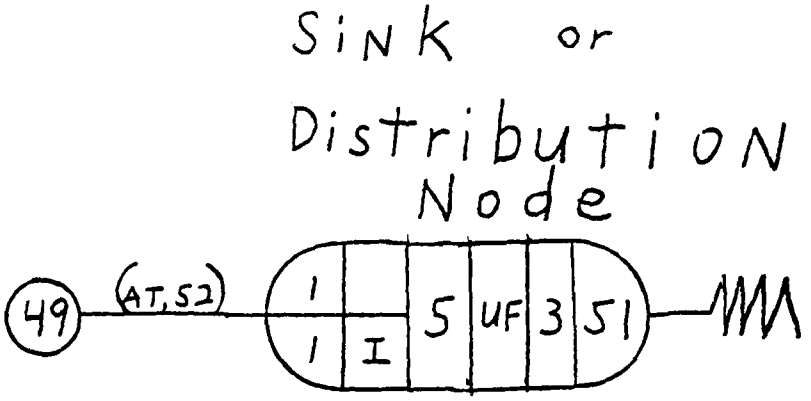


Figure 5

TRAFFIC AND SINK NODES

the only nodes which accesses the subroutine (3 UF 2). Whenever a PR flows through the traffic node, the map for the applicable network is consulted. Values are set in the attributes of each PR. In this model, each PR has 64 attributes. The attributes contain information which guide the PR through the correct nodes, when the PR has a choice of destinations. For example, if a PR is at node 5 (see Figure 7 on page 72), it has no choice of destinations; it must flow to Node 11. But if a PR is at Node 3, it has a choice of seven destinations. The subroutine will set the correct destination as "1" and the other six as "0", so the PR follows the proper course.

The subroutine sets the course of each contract in accordance with the map of the 28 types of contracts. But the subroutine is unable to set the path for a PR from the beginning to the end. The path must be set piece-meal, one step at a time. So each network is divided into many steps. At the beginning of every step, the PR flows through the traffic node for instructions. For example, the C2 network (a competitive purchase estimated to cost between $ 10,000 and $ 100,000) has seventeen (17) steps. The first step contains the following activities:

1. the PR flows from the traffic node (3) to the PCO (node 31),
2. the PCO's service time is computed for reviewing the new PR (attribute 43 = service time),
3. the PR flows from the PCO (node 24) to the

assigned buyer's in-basket (nodes 5, 12, 18, or 25),
4. the buyers's service time is computed for writing the RFP package (attribute 42 = service time),
5. the PR flows from the buyer to the clerk's in-basket (node 37 or 43),
6. the clerk's service time for typing the RFP and preparing the solicitation file is computed (attribute 44 = service time),
7. the PR flows to the traffic node(3) for the next step.

The reason that the clerk sends the PR to the traffic node is that the PR must return to the buyer. The buyer's service time (attribute 42) is already set as the RFP writing time. If the PR goes to the buyer twice in the same step, then the service time for doing two different activities would have to be the same. Since this rarely occurs, the PR must go through the traffic node so that the service time can be altered. Going through the traffic node has no effect on the simulated contracting cycle time.

The last step of each contractual action is where the contract award is sent to node 51, the distribution or sink node, where the time that each PR spent traversing through the contracting cycle is computed. Statistical information is gathered at this point, concerning the contracting cycle time of all PR's by network type. The mean of each network time is computed as well as the standard deviation, and a 90% confidence interval of the mean and a 90% confidence interval of the prediction of a sample. Q-GERT also tabulates the percentage of time that each buyer, clerk and PCO is

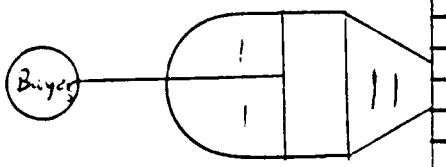
working. The average time that a PR sat in someone's in-basket is retained, as well as the maximum and minimum number of PR's that were in each person's in-basket at any one time. This information should be very helpful to a manager for spotting bottlenecks.

Distribution Nodes

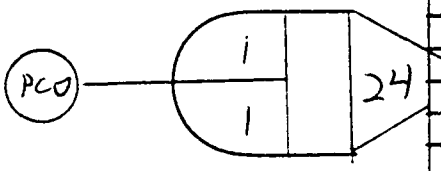
The distribution nodes are Node 11, Node 24, Node 49, and Node 50 (see Figure 6). Their function is to send the PR to the destination shown on the network map. The distribution node is shown as a combination of a conditional, take-first branching node and a table of the possible branching from the node. The distribution nodes are regular nodes in that no PR's wait for distribution. As soon as a PR arrives at a distribution node, the PR is distributed.

The tables of possible branching are not written in standard Q-GERT symbology. Because of the extensive branching, a non-standard format was required (see Figure 6). The first column (from the left) is the attribute numbers of the possible branching destinations. Attributes in Q-GERT are characteristics that are associated with a particular PR (22:29). In this model, each PR can carry up to 64 attributes at one time.

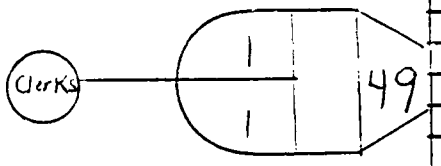
The next column in the table is the node number of the possible destinations. The third column is the name of the possible destinations. The fourth column is the service time



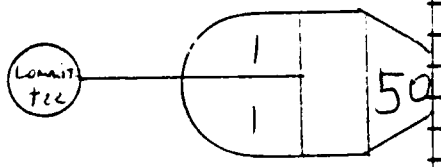
Attribute	Node	Destination	Service Time
12	37	Clerk-A	-----
13	43	Clerk-B	-----
14	31	PCO	-----
15	50	Committee	AT51
16	3	Traffic	----
17	3	Contractor	AT48
18	3	JAG	AT49
19	3	Tech.Eval.	AT50
20	3	Audit	AT55



29	5	Buyer-A	----
30	12	Buyer-B	----
31	18	Buyer-C	----
32	25	Buyer-D	----
33	37	Clerk-A	----
34	43	Clerk-B	----
35	3	Contractor	AT48
36	3	Traffic	----
37	3	Management	AT54
61	3	Committee	AT51



21	5	Buyer-A	----
22	12	Buyer-B	----
56	18	Buyer-C	----
57	25	Buyer-D	----
23	31	PCO	----
24	50	Committee	AT51
25	51	Distribution	AT52
26	3	Reproduction	AT53
27	3	Contractor	AT48
28	3	Traffic	----



38	3	Traffic	----
39	3	Management	AT54
40	37	Clerk-A	----
41	43	Clerk-B	----
45	5	Buyer-A	----
46	12	Buyer-B	----
47	18	Buyer-C	----
59	25	Buyer-D	----
60	31	PCO	----

Figure 6
Distribution Nodes

that will be added to the contracting cycle time if the PR choses the destination node in the same row. If there is no service time shown, then a PR routed to the destination in this row flows there without adding to the PR's contracting cycle time.

When a PR arrives at a distribution node, only one of the attributes listed in column 1 will be set to '1', all other attributes will be set to '0'. The setting of the attributes is performed when the PR flows through the traffic node (Node 3). So when a PR reaches a distribution node, its destination is predetermined. If the predetermined destination has a service time (column 4), then the service time was also set in the traffic node. For example, when a PR reaches Node 11, the PR goes to one of the destinations identified in column 2 of the table, depending on which attribute between 12 and 20, inclusive, is set to '1', If attribute 15 is set to '1', then the PR flows to Node 50 (Committee). The service time shown in attribute 51 would be added to the total contracting cycle time of the PR.

All the destination nodes function in the same manner, but the attribute numbers are different. Every time a PR is routed to the traffic node (Node 3), all the attributes of the PR are reset in accordance with the network maps.

Servers

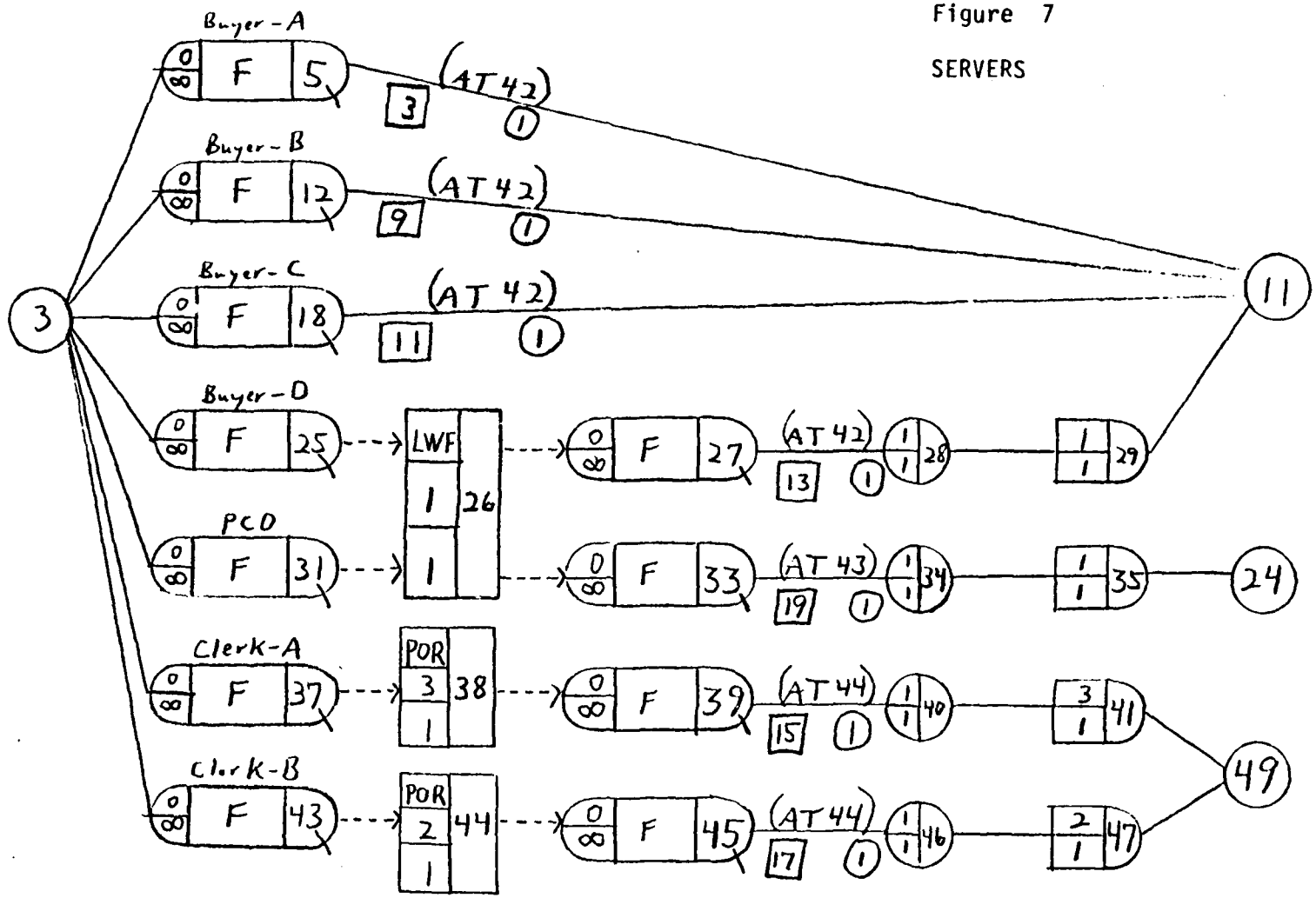
Three buyers, a buyer-PCO, and two clerks are modeled (see Figure 7). Nodes 5, 12, 18, 25, 31, 37, and 43 represent in-baskets for these workers. Each modeled person has one in-basket, except for the PCO, who has a separate in-basket (Node 25) for buying work, and another in-basket (Node 31) for PCO work. All the in-baskets have an unlimited capacity. The in-baskets are the queues which tend to build up if workload is heavy, and disappear if workload is light. Whenever a PR is forced to wait in a queue because the server (buyer, clerk, or PCO) is busy working on another PR, that waiting time is added to the total contracting cycle time for the PR.

The service time for each server is carried by each PR as attribute 42, 43, or 44. These attributes are set in the traffic node (node 3) in accordance with the service times collected from the experienced personnel in R&D Contracting who were sampled. Attributes 42, 43, and 44 are different for each PR and are changed by the traffic node many times during the processing of the PR in accordance with the network maps.

All servers work on PR's one-at-a-time. They follow first-in, first-out (FIFO) procedures in selecting work from their in-baskets. The buyer-PCO has two in-baskets, so an allocation node (26) decides which PR the buyer/PCO will work

Figure 7

SERVERS



on. The work in the queues is ordered in the FIFO method. The allocation node determines which of the two baskets has the PR which has been in either queue the longest. If that PR is in the buyer's queue, then the PR is moved to Node 27 and the service activity commences. When the service time has elapsed, the PR flows through Node 28, Node 29, and Node 11 to its new destinaion. When the PR passes through Node 29, the allocation node (26) is directed to pick another PR from either in-basket, and the process continues.

Clerk-A and Clerk-B each have only one in-basket. Their allocation nodes serve a different purpose than the PCO's allocation node. The branch chief of PMRNA stated that the typical clerk in his branch performs clerical duties for two buyers and a buyer/PCO (12). This would result in one clerk in the model being underworked, if additional work were not added. Burden is added in the Q-GERT subroutine to ensure that both clerks have a full workload. When Clerk-B works for two buyers and the buyer-PCO, no burden is added. But a burden of 1.4 times Clerk-A's workload is added because Clerk-A only types for one buyer in the model. When Clerk-A is processing a PR, the PR flows from nodes 37 to 39 and the service times stored in attribute 44 and the burden is added to the total contract cycle time of the PR. The allocation node keeps Clerk-A working on the burden after completing the work time associated with attri-

bute 44. Clerk-A is not available to work on another PR until the combined service time has passed.

For a more detailed look at the model, the complete model and Fortran subroutine are listed in Appendix B and Appendix C.

Assumptions and Limitations of the Model

1. DATA-CEN recognizes thirty-four different contract networks. Six of the thirty-four contract types are not included in the model. Three of the six are sole source, competitive and contract modifications under $10,000. The procedures for these actions are very different from the other networks, because they follow the regulations governing purchase orders. Based on discussion with R&D personnel (12) these actions were considered to be relatively rare. Analysis of the data supported this assumption for two of the three; the small contract modification proved to be more popular. The other three non-modeled actions are : (1) The Basic Ordering Agreement (BOA), (2) Undefinitized/Unpriced Action/Letter Contract, and (3) the definitization of an undefinitized action. The BOA is only used in a few of the eleven buving branches in the Directorate. The other two actions are equally rare. These actions are so uncommon that it is unlikelv that the model could predict the occurrence of these events, and anv improvements suggested by the model for these actions would

not be worth the expense of including these networks in the model.

2. The model does not include exceptional contracting actions, such as any contract which takes a year-and-a-half to place on contract, or the buys which are cancelled before award.

3. The differences between fixed price contracts and Cost-Plus-Fixed-Fee Contracts (CPFF) are not recognized in the model. There may be some substantial differences in the contracting cycle among different contract types, but the experts who provided estimates did not mention this. If there are differences, the model was based on CPFF type contracts.

4. The model assumes that despite the unique nature of every contract, most contracts follow the same procedures (network map). The contracting procedures specified in the questionnaire were generally accepted by all the experts surveyed. There were minor differences. Some PCO's do not review PR's before their buyers review them. Some buyers perform their own filing.

5. There were some strong differences concerning the correct procedure for soliciting a small sole source buy. Many of the buyers assumed that a formal RFP would be required. The buyers' questionnaire was purposively vague on this point. But the clerk's questionnaire stated that a

letter RFP would be prepared. So the buyer's RFP preparation and review time is much longer than the clerical time. More research is required to clear up this issue.

6. Only the buyers, clerks, and PCO's are fully modeled. The other actors (Committee, JAG, contractors, etc.) lack queues (in-baskets). Instead, their service times include a standard or typical queuing time. So no conclusions can be drawn about the effect of workload, or any change in procedures, on these actors from the model.

7. The buyers, clerks, and PCO modeled are experienced people. Each person is fully capable of performing his or her job. Overall, each buyer (or clerk) will receive the same amount of work as any other buyer (or clerk). This is both a limit and strength of the model. It is a limit because in real life each person has a different capability of performing work. The strength of this is that the actors in the model are composites of the experts who provided estimates. So the actors are more quick and efficient than half of the sample, and less slow and inefficient than the other half of the sample. These composite actors may be more representative of the directorate than any single living person.

8. The first-in, first-out (FIFO) method of selecting work from a queue is not followed by all buying personnel in R&D Contracting. Many of the people sampled stated that

they follow the FIFO method , but make exceptions for: (1) PR's which require only a small amount of work (service time), (2) Fast Track PR's are processed before any others, and (3) PR's which they judge to be of high priority. These exceptions were not modeled.

Verification

Verification is the process of determining whether the model is internally consistent - does the model perform as the modeler expects it to perform. A careful review of the simulation output can verify that many aspects of the model work correctly. Statistical nodes can be added to the model to measure the service or arrival times. The results of the statistical nodes can be compared with the theoretical distributions by the use of the Chi Square test. Statistical nodes can also measure whether the probability nodes are working properly. By requesting a trace, the output of the model will include a step-by-step movement of each transaction, so that proper working of the model can be verified.

Replacing all distributions with constants (the means) will generate a completion time which should be very close to a completion time which can be computed on paper using the PERT network procedure. If the model is not working properly, there should be a big disparity. Another verification technique which can be used, is to change a critical

distribution to ensure that the model is sensitive to important parameters.

One of the critical tests of the model is whether the attributes are assigned in accordance with the network map. When the model is running correctly, with no apparent problems, this information is not available to the researcher. But when the model fails to run correctly (which happens quite often during the construction phase of the program), Q-GERT will list each PR in the system, specify the value of each attribute, and its location (node) in the model when the model 'bombed'. Each of these will be checked to insure that they are correct.

Service Distribution Type

Picking the correct distribution type(s) is a problem for the modeler. Because of the method of collecting the service times (expert opinion instead of actual measuring), the correct distribution types cannot be determined statistically. Receiving the normal, optimistic, and pessimistic times for each service activity is compatible with four different types of distributions:

1. Triangular, where the optimistic and pessimistic distributions are the mimimum and the maximum values and the normal value is the mode. The likelihood of any service time increases linearily from 0 at the extreme values to the mode.

2. Beta-Pert is often used for service activity times in PERT networks, although the network can take many different shapes (22:205).

3. Discrete, in which the service times for each activity takes one of three values: the normal time, the optimistic time, or the pessimistic time. The likelihood of each of the three is based on the percentages that the experts estimated that each occurred.

The triangular distribution appears to be most appropriate, but if this distribution fails in validation, then the others will be tested.

Model-building and testing are not go/no-go situations. Once the model works, the work is not over. The model can always be improved. Because the model is a simplification of reality, the model will never be true in all situations. The modeler attempts to make the model behave correctly for the tests which he or she wants to run.

Validation

Validation is to compare the output from the model with the real thing. One technique is to ask experts to distinguish the model results from historical or theoretical results. This is the Turing test. If the experts can not decide which results are from the model, then the model is considered valid.

A better test is to compare model predictions with

historical results. If the model is valid, the model should be able to duplicate the actuals of a previous year given that year's input. This test will be made on the model.

Starting Conditions

A buying organization does not start each year from idle conditions. Some contracts are carried over from one fiscal year to the next. So using a model which starts from idle conditions, could bias the output.

The modeler can determine an average amount of work-in-process and start the model from this busy condition, or he can run the model for a long time to get the model up to equilibrium conditions (an average workload). This technique is similar to warming up an engine; the test does not begin until everything is warmed up. The warm-up technique will be used, unless the computer time wasted in the warm-up is considered to be excessive.

To determine when equilibrium conditions are reached, the warm-up period will be run for one-quarter year, one-half year, three-quarters of a year, one year, and two years of simulation time. The service times, the completion times, and a few key queue node waiting times will be compared. The comparison should reveal when the equilibrium conditions are reached. Once the time to reach equilibrium is determined, each run of the model will include the warm-up time before the test is started; statistics will not be

collected before the model has reached the equilibrium state.

Variance Reduction

Unless the full model proves unfeasible, variance reduction techniques will not be used to simplify the model. The model will be used for post-thesis work, so a full model is desirable. But variance reduction techniques can be used in controlling the pseudo-random numbers which are used to generate the arrival time of new work and the service times of work-in-process. By insuring that the same random number streams are used for the arrival and service activities in a comparison of two contracting processes, the random variance of the output can be reduced, resulting in better accuracy and a smaller sample size. This technique will be used in comparing the present contract procedures with modified contract procedures (fewer administrative reviews) to answer research question four.

Plan for Experimentation

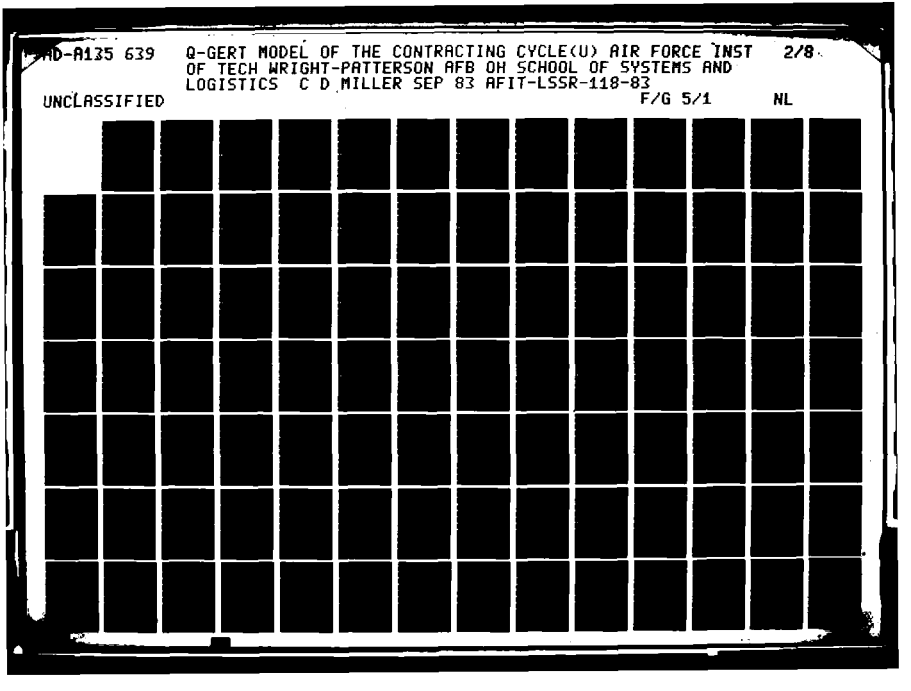
Research Question 1

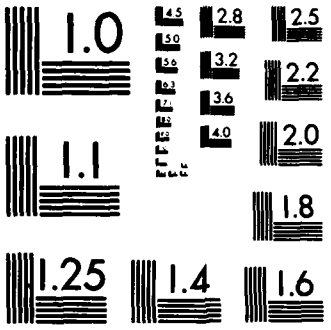
Research question 1 is to determine an optimum ratio of buyers-to-clerk for the Flight Dynamics Branch (PMRNA) of R&D Contracting. The model will imitate the actual PR's that were received in FY82 by this branch. The three buyers, two clerks, and buyer/PCO in the model will be expected to

handle a percentage (estimated by the branch chief of PMRNA) of this workload. Initially, the first clerk will handle the clerical duties for Buyer-A only. The second clerk will perform the clerical duties for Buyer-B, Buyer-C and the buyer/PCO. The model will simulate a year of contracting. The year will be replicated ten times to reduce year-to-year variation. The model will determine the service utilization percentages for the buyers, clerks, and PCO, which will show the percentage of time that each was working. If the buyers are busier than the clerks, then the clerks might be able to perform clerical duties for a larger number of buyers or buyer/PCO's. If the results of the model show that the clerks are busier, then there would be a case for reducing the buyer-to-clerk ratio. The contracting cycle times will be compared. The smaller the buyers-to-clerk ratio, the shorter the contracting cycle should be. The percentage change will be recorded, and may be more significant than the server utilization comparison. This will be discussed in the next chapter.

Research Question 2

Research question 2 is to determine an optimum level of work for a PCO with three buyers. A process similar to the process used in answering research question 1 will be followed. The server utilization times of the three buyers will be compared with the combined server utilization time


AD-A135 639
Q-GERT MODEL OF THE CONTRACTING CYCLE(U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND LOGISTICS C D MILLER SEP 83 AFIT-LSSR-118-83
2/8
UNCLASSIFIED
F/G 5/1
NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

of Buyer-D and the PCO (Buyer-D and the PCO are the same server). The workload will be increased and decreased for comparison purposes. The effect on the contracting cycle will be documented.

Research Question 3

Research question 3 is to plot the contracting cycle time against the percentage of the PMRNA workload that the servers in the model are processing. The branch chief of PMRNA believes that forty percent of the branch's workload is the amount which he would expect the workers imitated in the model to perform (12). This percentage will be varied from twenty percent to sixty percent, in five percent intervals. There is expected to be a point where a slight increase in workload will cause a significant increase in the contracting cycle time.

Research Question 4

Research question 4 is to reduce or eliminate an administrative review to determine its effect on the contracting cycle. Network F1, the funding network, will be remapped to eliminate the committee's review. This should demonstrate the effect that one change in one network has on the contracting cycles of all the networks.

Computer Programs

Four computer programs are listed in the appendix, as

Appendix A, Appendix B, Appendix C, and Appendix D. The first program, Net, is written in Fortran and was used to build the third program, the Fortran subroutine to the Q-GERT model. Net was used to build the twenty-eight network maps. Like all computer coding, any mistake (mental or clerical) can prevent a program from working properly. Finding a mistake in computer coding is often a time-consuming activity. This program, Net, prevents clerical mistakes and guides a person who is familiar with the contracting process to build a network without learning to program a computer. This program will be needed in the future to update the model if procedures change and for testing new procedures in contracting.

The second program is the model written in the Q-GERT simulation language. Changes in the number of runs, the time that the model should simulate (one year, two years, etc.), the start-up time, the workload, and the ratio of buyers-to-clerks can easily be adjusted in this program. To run the simulation requires this program, the subroutine (program three), and the Q-GERT procedures file (QGPROC).

The third program is the Fortran subroutine to the Q-GERT model which contains the network maps, assigns specific buyers and networks to each PR, and records the contracting cycle time for each PR by network.

The fourth program is the Q-GERT procedures file

(QGPROC), which runs the simulation on the ASD Computer Center's computer system at Wright-Patterson AFB. Batching this program to the ASD's Cyper computer will run the computer model. The model uses 300,000 units of core memory, so the program cannot be run interactively.

Summary

This chapter described the methods used to gather data for the construction of the model, and the plan for experimenting with the model after it was constructed. The next chapter will describe the results of the experimentation, and answer the research questions.

CHAPTER IV

DATA FINDINGS AND ANALYSIS

The purpose of this chapter is to report and analyze the results of the study. Interpretation of the results will permit the answering of the research questions. The objective of this study is to develop a computer model of R&D Contracting which can be used to predict the effect of changes in policies, procedures, and organizational structure on the contracting cycle. The first part of this chapter describes the interpretation of data collected from the sample of expert opinion in R&D Contracting, and the verification and validation of the model. The last part of the chapter describes and analyzes the research experimentation.

Interpretation of Data Collected

As described in Chapter III, data was needed on the service time for each activity in the contracting process. Data was collected by the subjective technique of asking experienced personnel to estimate the time required to perform each activity. The data was analyzed by determining the mean, the standard deviation, the median, and the number in the sample for each of the three estimates collected on each activity. An analysis of this data showed that the median was consistently smaller than the mean. By putting

the data in histograms, it was observed that the majority of the estimates were situated in the lowest quartile. To determine when to use the median instead of the mean as the point of central tendency, McClave and Benson (17:61) present a similar situation in which the Delphi technique was used to collect estimates from experts. Based on the information and example provided by McClave and Benson, and the similarity to this situation, the median was chosen as the most representative point of central tendency. The normal estimate, as well as the pessimistic estimate and the optimistic estimate, are the median values of the estimates collected.

Verification

Verification is the process of determining whether a model performs as the modeler expects it to perform. The first step in verifying the model was to replace the variable service time distributions with constants. Each service time in the C2 network was replaced with the median value of the normal estimate of that service time. The model was run with only one PR flowing through this C2 network. The contracting cycle time from the model matched the hand-calculated total of the means of the service times.

The second test was to run 100 PR's through a number of networks to ensure that the service distributions functioned

properly. The time between arrivals of the PR's was set at a large amount, so that there were few PR's in the contracting process at any one time. This reduced the queuing time to a minimum. The result of the test was that the average contracting cycle time was slightly above the total of the means of the service times (which was expected because of the small amount of queuing time), so the test was successful.

The third test was to examine whether the sixty-four attributes of each PR flowing through the model were being assigned correctly, a critical feature of the model. Every attribute of over 100 PR's of various networks and in various stages in the contracting process was examined. Every attribute was correct.

The fourth test was to trace a PR through the Q-GERT model. This trace provided an output which listed, in chronological order, every node that the PR flowed through. The PR flowed through each node in accordance with the network map. This test was successful.

The percentage of PR's of each network type generated by the model were compared with the actual percentage of PR's of each network type processed by the branch of R&D Contracting being modeled. The percentages were the same, proving that the pseudo-random generator in the Q-GERT model was working as expected.

The modeler concluded that the model was internally consistent; the model performed as it was expected to perform.

Validation

Verification is the process of proving that the model is internally consistent; validation is the process of showing that the model accurately simulates what its designed to imitate. This model was designed to simulate the contracting cycle time of the Flight Dynamics Branch (PMRNA) of R&D Contracting. The model attempts to simulate the arrival and subsequent contracting cycle times of PR's received by PMRNA in FY82. This is a crucial test of the model. A model is designed to be used to predict events which are in the future. For example, the model might be used to predict the effect of the hiring of an additional worker on the contracting cycle time. But the decision-maker must have faith in the model's ability to make accurate predictions. A test which can create faith in the decision-maker is to use the model to predict events which have already happened. The model is fed the inputs of the past to determine whether the model can accurately predict the events that have already occurred. This is a crucial test and a very demanding one. It is also a test that this model initially failed.

The actual numbers and average contracting cycle times of the PR's received in PMRNA in FY82 by network type are listed in Table I. There was a problem with some of the networks, because the DATA-CEN system was revised at the beginning of FY82, so there were some networks which were replaced by new networks. Network F1 includes PR's from obsolete network C4. Network M0 includes PR's from obsolete network C5. These obsolete networks, C4 and C5, have exact counterparts in the new networks, F1 and M0. The row of Others are PR's which were processed under networks which are no longer used by the DATA-CEN system. These obsolete networks were broader than the new networks, so the results of these networks cannot be accurately converted into the contracting cycle times for the new networks. The hours spent on the Other networks are not included in the total average contracting cycle time. Other also contains networks M1 and D1 because these networks were not modeled.

The number of PR's in each network is only 25% of the PR's actually processed through the model. The model processed PR's for ten years, instead of one year, to increase the accuracy of the sample. Since the model only processed 40% of the workload of PMRNA each year, to compare the model with actuals the total from the ten years of PR's must be reduced to 25% of its ten year value as follows:

1 Year of Actual PR's = 0.25 times 10 Years of Modeled PR's

(40% Workload)

TABLE 1

Actual Vs Modeled PRs and Cycle Times

Networks	FY82 PRs	Cycle Times	Model PRs	Cycle Times
C2	2	1089	2	1379
C3	6	935	5	1542
C4	5	1273	5	1539
C5	1	1371	1	1832
C6	2	1417	1	2044
C7	6	1641	4	1724
C8	2	1371	2	2258
F2	2	851	2	1377
S2	4	471	5	1093
S3	1	320	1	1276
S4	1	1103	1	1260
S5	-	--	-	--
S6	-	--	-	--
S7	1	663	1	1943
S8	-	--	-	--
C9	2	360	2	828
F1	147	136	142	236
M2	18	409	25	958
M3	5	489	5	1136
M4	4	691	4	1062
M5	3	411	2	1088
M6	1	1217	1	1781
M7	3	431	4	1598
M8	-	--	-	--
F4	7	256	8	957
A1	24	116	25	110
F3	24	468	25	997
M0	58	184	59	375
Others	20			
Total/ave	349	304	335	558
Index	100	100	96	184

The model imitated the number of PR's by network type accurately. The model and actual number of PR's in each network type were usually quite close. The contract cycle times were quite different. The contracting cycle times of the model were consistently higher than actual contracting cycle times. The average contracting cycle time of the PR's in the model was 84% higher than actuals (558 hours - modeled versus 304 hours - actuals).

The model overestimated the contracting cycle times of almost every network, so the modeler searched for a problem which affected all networks. The problem was found in the model's adjustment to labor hours to account for holidays, leave, and non-DATA-CEN activities. The model imitates the yearly operation in PMRNA. Personnel in PMRNA work forty-hour weeks; there is very little overtime (11). With fifty-two weeks in the year, there are 2080 hours available for work. Holidays, vacation, sick leave, administrative leave, training, and other miscellaneous activities reduce the number of hours which each emplovee is available for performing the modeled work. Because much of this non-modeled activity occurs at different times for different employees, the model makes each worker unavailable for modeled work for small periods throughout the year, instead of merely reducing the work year by the time spent on non-modeled activity.

When buying personnel are on-the-job, they do not spend all their time working on activities which are included in the model. Clerks spend time sorting the mail, and performing computer validations. Buyers spend time attending meetings with engineers and contractors which do not result in contractual actions. PCO's process many administrative documents which are required, but not included in the model. PCO's also train buyers and substitute for vacationing personnel.

A list of the non-modeled work activities was provided in the questionnaire. The experts estimated the time spent on the non-modeled work. These estimates were analyzed in the same manner as the estimates of the service activities. The results are listed in appendices F, H, and J.

During the interview, each expert was asked for an estimate of the amount of the work day that he (or she) spends socializing or taking breaks. This data was analyzed in the same manner as the estimates on the service activities. The results of this survey of the amount of time which is spent on non-DATA-CEN work is presented in Table 2.

Since the model accounts for 2080 hours in a year, the buyers, clerks, and the PCO in the model must be made unavailable to perform work for the calculated percentage of the year that each worker spends on non-modeled activity. This was done in the model by adding non-modeled time to

TABLE 2

Modeled Work Hours in Year

	PCO	BUYER	CLERK
Total Hours in Year	2080	2080	2080
Total Leave, Holiday	540	540	540
Hours at Work	1540	1540	1540
Time Spent on Non-Modeled Work	647	493	400
Time Spent Non-Productively	120	286	131
Time Available For Modeled Work	773	761	1009

each service time performed by the buyers, clerks, and the PCO. The non-modeled time is a percentage of the working time. The percentages used were:

PCO 169% of working time [(2080 hours/773 hours) - 1]

Buyer 173% of working time [(2080 hours/761 hours) - 1]

Clerks 106% of working time [(2080 hours/1009 hours) - 1]

The model adds vacation, non-DATA-CEN work time, and non-productive time to each service activity. Whenever one of the buyers, clerks, or the PCO works on a PR, time is added to the service time for these non-modeled activities.

The problem with using this method for accounting for non-modeled time is that working activities and non-working

activities have equal priority in the model. Each server works on non-modeled activities without considering whether the non-modeled activities are as important as the modeled activities. Experienced personnel in R&D Contracting (11,15) stated that much of the non-modeled work has a lower priority than the modeled work, so the buyers and PCO's would not perform some of the non-modeled work until they were idle. They estimated that at least 25% of the non-modeled time would be spent on this low priority work.

To more accurately simulate the contracting cycle time, the modeler deleted the accounting for the low-priority, non-modeled work in the model. This low-priority work makes up 17.5% of each of the buyer's and PCO's workload. So the model was modified to reduce the percentage of non-modeled activities which would be performed after each service activity. The non-modeled times which are added to the service times as a percentage of work time were changed to:

PCO 129%

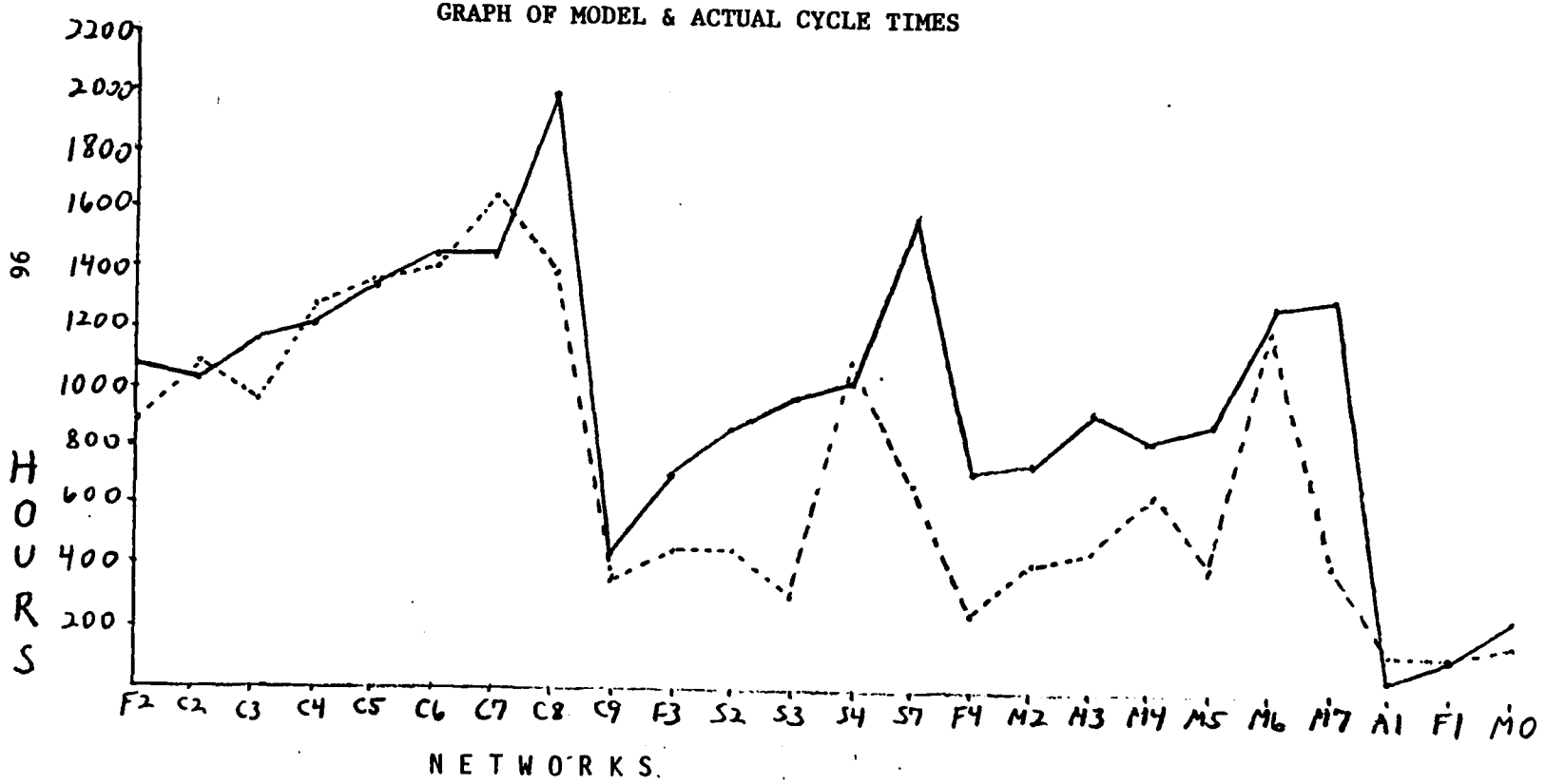
Buyer 132%

Clerk 106% (unchanged).

With this change, the contracting cycle times predicted by the model were much closer to the actual contracting cycle times (see figure 8).

Figure 8

GRAPH OF MODEL & ACTUAL CYCLE TIMES



Analysis of Figure 8

The twenty-four networks are listed on the X-axis (four of the modeled networks received no PRs, so they are not plotted). The contracting cycle times (in hours) are listed on the Y-axis. The dotted line connects the discrete points of the average actual time that each network was completed in PMRNA in FY82. The solid line connects the discrete average contracting times projected by the model for each network.

The projected contracting cycle times for the competitive contracts (F2 through C9) for the model compare favorably with the actual contracting cycle times. Network C8 is the only anomaly. Actuals for the C8 network (competitive contract between $3.5 million and $10 million) for both PMRNA and for the Directorate (not shown) are lower than the actuals for network C7 (competitive contract between $1 million and $3.5 million). Network C8 has all the procedures of network C7, and additional reviews, so it is logical to expect the C8 network to have a longer contracting cycle time than the C7 network. Since the C8 network has a shorter contracting cycle time, another factor must be influencing the results. The branch chief of PMRNA suggested two possible factors (11):

1. better buying personnel are assigned to the larger, more complicated contracts,

2. the high dollar PR's have a higher priority than other contracting actions, so queuing times for these actions are reduced.

Another factor which might explain the anomaly, is an inadequate sample. Only 10 C8 networks were processed in FY82. The model may be correct; the actuals may be unrepresentative of the population.

Networks F3 through S7 are the sole source contracts. The difference between the output of the model and the actual output is significant. The service times collected on the solicitation phase of these sole source PR's appear to be erroneous. The service times collected are very similar to the service times collected for the competitive PR's. The buyers apparently estimated the time for preparing a full solicitation package (including model contract) on the sole source PR's. The researcher expected the estimates to reflect the time required to prepare a letter solicitation. Instead, the estimates received reflect the time required to prepare a full solicitation package. The actual contracting cycle times are so short, that letter solicitations must have been used. So why did the sample of buyers make estimates on the full solicitation package? A former member of Committee (30) stated that letter solicitations are not authorized; the buyers are supposed to prepare full solicitation packages for all sole source solicitations. To

improve the model, a sample of the sole source contracts should be reviewed to determine whether letter solicitations are commonly used. If letter solicitations were used, new estimates on the service times for processing sole source PR's should be collected.

Networks F4 through M7 are the contract modifications. Although the actual contracting cycle times appear to be considerably smaller than the model's projections, the model's projections are probably more accurate. The experienced personnel in R&D Contracting who took part in the survey stated that the PR for any modification is not usually received at the beginning of the contracting cycle. The PR is usually received with the technical evaluation of the contractor's proposal. Sometimes the PR is not received until after the completion of negotiations. So the contracting cycle times shown as 'actuals' do not include the entire contracting cycle time.

The administration networks (A1, F1, and M0) are reasonably replicated by the model. The addition of a priority factor into the model could increase the accuracy of the model. Administrative notices (A1) usually have a low priority, so a longer contracting cycle would be expected. Fundings (F1) with a higher priority would have a shorter contracting cycle time.

In summary, the competitive networks (except network C8)

and the administrative networks are accurately modeled. The modification networks are probably accurate, but this cannot be proven. The sole source networks are inaccurate, but they contain the smallest number of PR's, so the effect on the total model is minimized.

Variance Reduction

Variance reduction was employed in the model by using the same seed for each experiment. This means that the model used the same random numbers in each experiment. Controlling the variance was also performed by running each experiment for a ten-year simulation period, which increased the sample to decrease the variation of the results.

Service Distribution Type

The triangular distribution was employed on all service times. Because the model appeared to perform properly with the triangular distribution, the alternative distributions (Beta-PERT or discrete) were not tested.

Starting Conditions

Starting the model from idle conditions would not be representative of the organization being modeled; some work is received one year and processed the next year. To determine the equilibrium state of the model (the point where a longer warm-up period has no effect on the workload in the

model) six different start-up periods were tested:

1. no starting conditions (0 hours),
2. three months (520 hours),
3. six months (1040 hours),
4. nine months (1560 hours),
5. one year (2080 hours),
6. two years (4160 hours).

The results are shown in Table 3.

TABLE 3

Starting Conditions

Starting Conditions	0	520	1040	1560	2080	4160
Average Contract Cycle Time (hours)	268.2	351.5	428.5	384.0	418.8	456.5
Server Utilization						
3 Buyers	59.5%	68.7%	73.3%	69.2%	71.0%	72.9%
PCO	55.6%	58.5%	65.4%	62.7%	65.5%	61.8%
Clerks	46.0%	53.1%	59.9%	56.2%	58.2%	59.0%
Queue						
3 Buyers	1.08	2.04	2.62	1.56	2.19	2.66
PCO	.99	1.49	2.55	1.95	3.00	1.84
Clerks	1.20	.97	1.07	1.00	1.18	1.11

The table indicates that with starting conditions of 1040 hours (six months of warm-up time) or more, the model reaches equilibrium conditions. A starting time of 2080 hours was used throughout the experimentation.

Results of Experimentation

In analyzing the results of the experimentation, the following statistical tests were performed to compare the means of the average contracting cycle times:

1. T-Test

Ho: $\mu_1 - \mu_2 = 0$

Ha: $\mu_1 - \mu_2 \neq 0$ (i.e., either $\mu_1 > \mu_2$ or $\mu_2 > \mu_1$).

Assumptions: (1) both populations are normally distributed, (2) both population variances are equal (this is confirmed in the second test).

T-critical (N = 10, α = .05) = 1.833

$$\text{T-calculated} = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{S_p^2\left(\frac{1}{N_1} + \frac{1}{N_2}\right)}} \quad \text{where } S_p^2 = \frac{(N_1-1)S_1^2 + (N_2-1)S_2^2}{N_1 + N_2 - 2}$$

Decision Rule: If T-calculated > T-critical then reject Ho.

2. F-Test

Ho: $\frac{\sigma_1^2}{\sigma_2^2} = 1$

Ha: $\frac{\sigma_1^2}{\sigma_2^2} \neq 1$

F-critical (N = 10, α = .05) = 3.18

$$\text{F-calculated} = \frac{S_1^2}{S_2^2}$$

Decision Rule: if F-calculated > F-critical then reject Ho.

These tests will be used to answer the research questions.

Research Question 1

Research question 1 was to determine an optimum ratio of buyers-to-clerk for the Flight Dynamics Branch (PMRNA) of R&D Contracting, assuming a workload similar to the actual workload of that branch in FY82. The three buyers, two clerks, and buyer/PCO were expected to perform 40% of the actual workload of the branch (11). The standard ratio of buyers-to-clerk is 2.4 to 1. One clerk is expected to perform clerical duties for two buyers and one buyer/PCO. The model assumed that the PCO only generates clerical work when performing as a buyer.

The buyer/PCO carries 40% of the buying workload of a journeyman buyer. This ratio was varied to 2 to 1 and 3.4 to 1. The workload for the buyers and buyer/PCO was constant throughout the tests (given the normal random variations). Table 4 contains the significant results of the experiment.

A reduction from the standard 2.4:1 ratio decreases the average contracting cycle time by 7.3 percent. This difference is statistically significant (see Table 5). Increasing the buyer-to-clerk ratio does not make a statistically significant difference to the average contracting cycle time. The clerks' server utilization time increases as the clerks' workload increases. The number of PR's sitting in the clerks' in-basket increases and the time that

TABLE 4

Buyer-to-Clerk Ratio

Ratio	2 : 1	2.4 : 1	3.4 : 1
Average Contracting Cycle Time (hours)	390.3	418.8	413.1
Server Utilization Clerks	46.8%	58.2%	81%
Average Number of PR's in Clerk's Queue	.68	1.18	4.53
Average Time of PR's in Clerk's Queue (hours)	3.03	6.00	9.77

the average PR sits in the in-basket increases from three hours to almost ten hours.

The T-calculated values are shown in the top half of Table 5. The values which are greater than the T-critical value of 1.833 are designated with an 'X'. This designation means that in comparing the means of the average contracting cycle times, the differences are statistically significant (i.e. the null hypothesis is rejected). When the T-calculated value fails to exceed the T-critical value, this condition is designated with an '0' in the bottom half of Table 5. The '0' designation means that in comparing the means of the average contracting cycle times, the difference

TABLE 5

Buyer-to-Clerk T - Statistics

	2 : 1	2.4 : 1	3.4 : 1
2 : 1	----	4.18133	3.22125
2.4 : 1		----	0.70004
3.4 : 1			----
2 : 1	----	X	X
2.4 : 1		----	0
3.4 : 1			----

T-calculated is shown in table.

T-critical = 1.833 n = 10. α = .05

X = Difference (row and column) is statistically significant.

0 = No statistical difference. Null hypothesis cannot be rejected.

results in insufficient evidence to reject the null hypothesis. There is no statistical difference between the means.

Clerical workload can be increased from its present level up to 40% without significantly effecting the average contracting cycle time. A reduction in clerical workload reduces the average contracting cycle, slightly.

Research Question 2

Research question 2 was to determine an optimum level of work for the PCO who reviews and signs for 3 journeyman buyers. The branch chief of PMRNA (12) stated that he would expect this PCO to carry 40% of a journeyman buyer's workload in addition to his PCO duties. The PCO's buying workload was changed to 20%, 30%, 50%, and 60% of a journeyman buyer's workload. No work was added or subtracted from the total workload that was in the branch. The PCO merely performed more or less of the buying workload. When the PCO carried a larger workload, each of the buyers had a smaller workload. The results of this experiment are shown in Table 6.

TABLE 6

PCO Workload

PCO Workload	20%	30%	40%	50%	60%
Average Contract Cycle Time (hours)	405.4	410.8	418.8	493.4	453.7
Buyers Utilization	74.8%	74.7%	71.0%	73.6%	73.0%
PCO Utilization	48.5%	59.4%	67.5%	79.7%	77.0%
Waiting Time in Queue					
Buyer's Queues	10.9	12.7	10.0	12.1	11.3
PCO's Queue	2.7	4.6	11.4	15.6	10.7

TABLE 7

PCO Workload T - Statistics

	20%	30%	40%	50%	60%
20%	--	.822707	1.77099	11.2084	5.85956
30%		--	1.14885	11.3586	5.57632
40%			--	9.11044	4.07487
50%				--	4.50248
60%					--

20%	--	0	0	X	X
30%		--	0	X	X
40%			--	X	X
50%				--	X
60%					--

T-calculated is shown in table

T-critical is 1.833. N = 10. α = .05

X = Difference (row to column) is statistically significant.

0 = Difference (row to column) is not statistically significant. Null hypothesis is not rejected.

The T-calculated values are shown in the top half of Table 7. The values which are greater than the T-critical value of 1.833 are designated with an 'X' in the lower half

of the table. The 'X' designates that the difference between the means of the average contract cycle time of the row and the column are statistically significant. For example, if the PCO's buying workload were increased from 30% of a buyer's workload to 40% of a buyer's workload, the increase in the average contract cycle time is not statistically significant. The T-calculated value of 1.14885 is less than the T-critical value of 1.833, so the T-test states that the means should be considered to be the same. This conclusion results in an '0' being placed in the lower portion of the table. When the difference between the means is significant, as in the difference between a workload of 40% and a workload of 50%, the T-calculated value of 9.11044 is greater than the T-critical value, so an 'X' is placed in the lower part of the table.

Increasing the PCO's workload from 20% has a negative effect on the average contracting cycle time. As the PCO increased his workload, the waiting time of contracting actions from the buyers increased from 2.7 hours to as high as 15.6 hours. The amount of work relief that the PCO could offer the buyers by the PCO shouldering more of the buyer's workload did not offset this loss of efficiency in the PCO reviewing cycle.

Research Question 3

Research question 3 was to plot the contracting cycle

time against the percentage of the PMRNA workload that the servers in the model are processing. Figure 9 is this plot.

If the servers in the model perform more than 35% of the branch's workload, the contracting cycle time increases rapidly with each increase in workload. At 55% and 60% of the branch's workload, the model failed to complete the simulation for ten years, because the amount of work-in-process became too great for the simulation language (Q-GERT can process up to 100 PR's simultaneously). The plot points for both workload 55% and 60% are averages for one year instead of ten years, so they are much less reliable as statistical averages.

Table 8 is a comparison of the average contract cycle times for the specified workloads. The T-calculated values are shown in the top half of the table. In the lower half of the table, the T-calculated value is interpreted. An 'X' means that the difference between the average contract cycle time of models specified in the row and column headers is statistically significant. An '0' designs that, statistically, the two averages are the same. If there were no statistical differences between any of the averages, then workload would have no effect on contracting cycle time.

A designation of 'F' in Table 8 means that the comparison of averages could not be performed by the T-test because the assumption of equal variances could not be sup-

Figure 9

GRAPH OF WORKLOAD

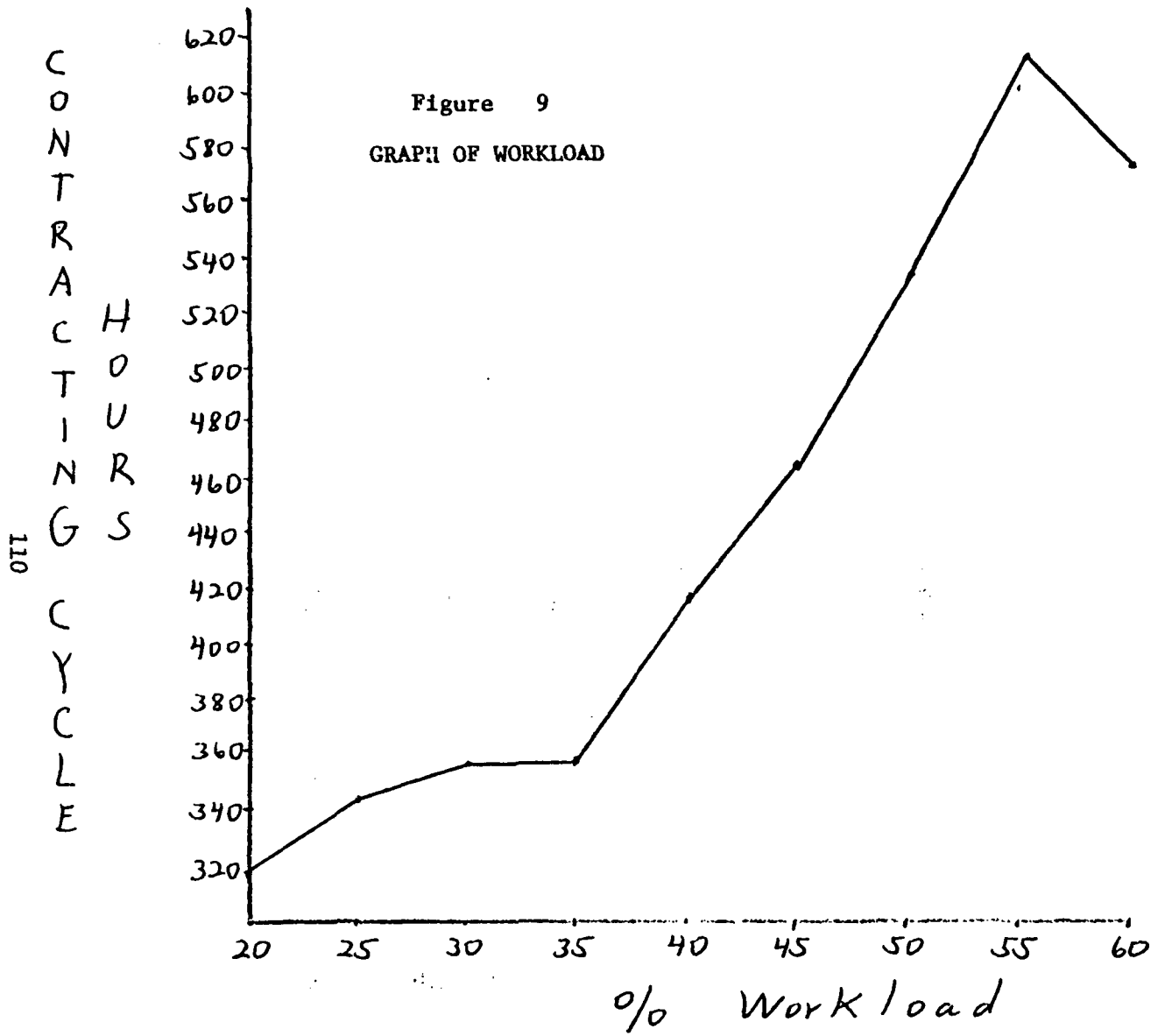


TABLE 8

Effect of Workload on Contracting Cycle

	20%	25%	30%	35%	40%	45%	50%	55%	60%
20%	--	4.2	5.3	5.6	14.2	16.3F	28.4	67.8	59.3
25%		--	1.6	2.2	10.8	13.7F	25.4	64.8	55.9
30%			--	0.5	8.2	11.7	21.8	47.9	41.1
35%				--	7.4	11.0	20.6	43.6	27.2
40%					--	5.1	13.9	34.6	28.0
45%						--	6.5	17.8	13.2
50%							--	12.2	13.2
55%								--	5.8
60%									--
20%	--	X	X	X	X	F	X	X	X
25%		--	O	X	X	F	X	X	X
30%			--	O	X	X	X	X	X
35%				--	X	X	X	X	X
40%					--	X	X	X	X
45%						--	X	X	X
50%							--	X	X
55%								--	X
60%									--

T-calculated is shown in table

T-critical = 1.833. N = 10. α = .05

X = Difference (row to column) is statistically significant.

0 = Difference (row to column) is not statistically significant. Null hypothesis cannot be rejected.

F = Failed F test, assumption of equal variances is not supported, so result of T test is suspect for individual comparison.

---

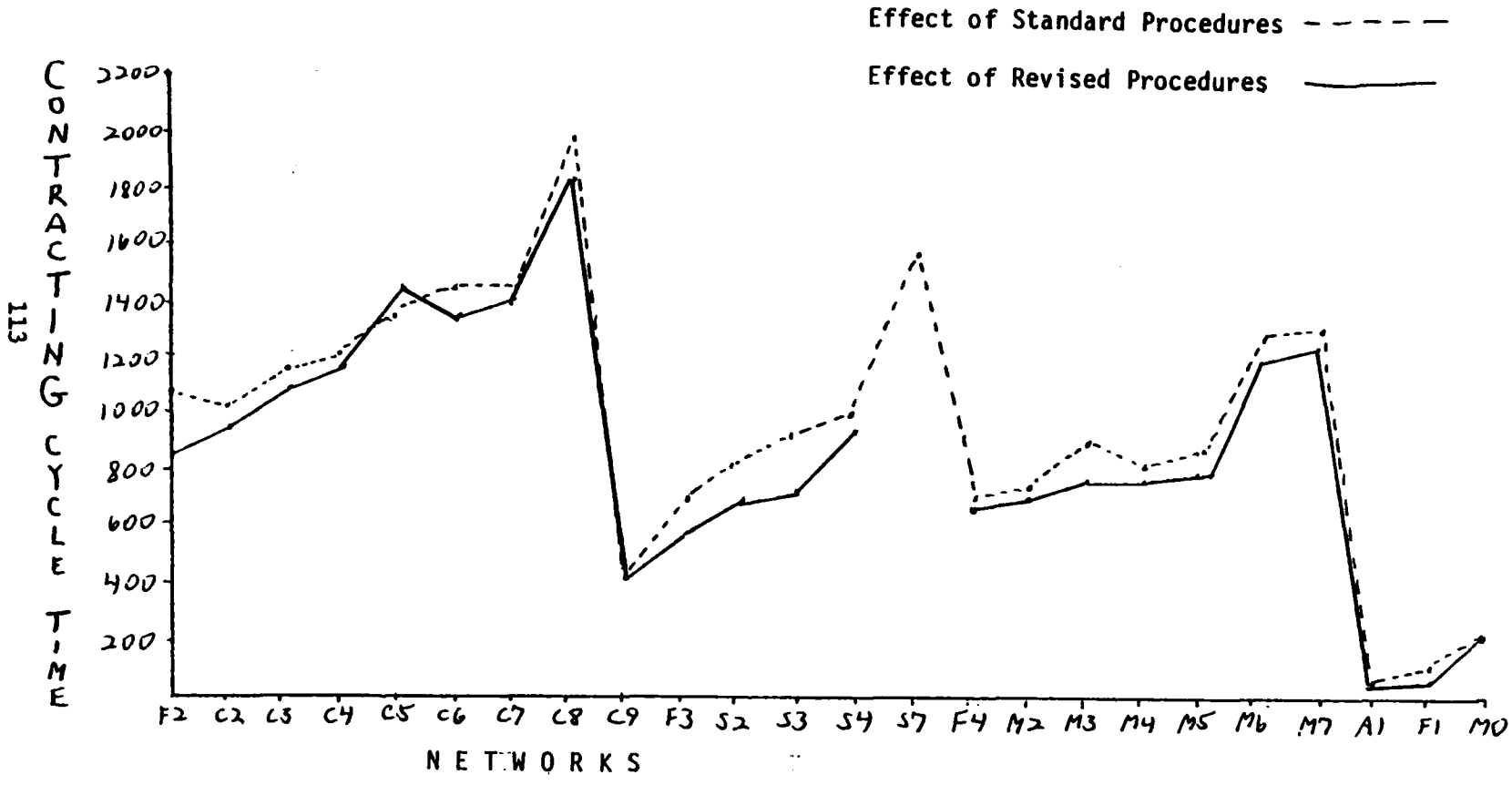
ported. Other statistical tests could be used to determine whether the difference between the averages are statistically significant, but additional tests are not necessary in this situation. Since there is a statistically significant difference between the 40% workload and the 35% workload, and there is a statistically significant difference between the 35% workload and the 25% workload, then there must be a statistically significant difference between 40% and 25% (the average contracting cycle time consistently increases from 20% to 40%). The failure of the F-test is considered to be a Type II error (17:285).

Research Question 4

Research question 4 was to determine the effect on the contracting cycle of eliminating the Committee review of funding actions (network F1) from the required procedures. The effect was very significant (see figure 10). The overall effect on the average contracting cycle time was to reduce

Figure 10

Graph of Contracting Cycle with New Procedures



the average from 418.8 hours to 338.5 hours, a 19% reduction. Making a change in the funding process should have a big effect on all the work-in-process, because fundings make-up over one-quarter of the PR's received in PMRNA. The time saved from eliminating the Committee review is not just the time that the PR spends in Committee. The time saved is the preparation of the Committee sheet, the PCO review, two buyer reviews, and one clerical correction service time. This time-savings can be used productively for processing all work-in-process. So the change in one network can influence the completion times of all the networks. Table 9 is the T-test which verifies that the difference is statistically significant.

TABLE 9

Change in Funding Procedures

	With Review	Without Review	Difference
Average Contract Cycle Time (hours)	418.8	338.5	
Standard Deviation of Means (10 runs)	17.7	12.5	
T-Test Results			
T-calculated			11.7188 (X)
T-critical			1.833
F-test			Passed

Conclusion: There is a statistically significant difference between these two means.

This experiment demonstrates the power of this management tool. Eliminating the Committee review of funding actions would obviously reduce the contracting cycle time for funding actions, but predicting the effect of this change on other actions is very difficult to forecast without a model.

Summary

This chapter reviewed and analyzed the results of the study. A review and analysis of the data collection, the verification and validation of the model, and a description and analysis of the research experimentation was presented. Chapter V summarizes the study, presents conclusions, and makes recommendations for future research.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of the study was to develop a model of the contracting cycle of a contracting organization. The model can be used to predict the effect of changes to the organization, procedures, and workload on the contracting cycle time. The Directorate of R&D Contracting, Aeronautical Systems Division, Air Force Systems Command, located at Wright-Patterson Air Force Base, Ohio was selected as the contracting organization to model. R&D Contracting was selected from the many contracting organizations at Wright-Patterson Air Force Base because they are process-oriented; thousands of purchase requests (PR) follow the same procedures. An improvement in the contracting process in R&D Contracting may have a permanent effect on the contracting cycle time.

To construct the model, data was collected on the contracting procedures used in R&D Contracting. Detailed procedures were ascertained on twenty-eight different contracting networks. These networks ranged from the unilateral administrative notice to the ten million dollar competitive procurement. Service times for performing the activities required by the contracting procedures were

collected from estimates provided by experienced personnel in R&D Contracting. Three estimates were provided by each expert on each activity. The first estimate was the normal or average time to perform the activity. The second estimate was the optimistic or shorter-than-average time that an activity would take to perform if there were less problems than usual. The last estimate of each activity was the pessimistic or longer-than-normal time that an activity would take to perform if there were many problems encountered. From these estimates a distribution, or range of times, was computed on each activity.

The model was constructed using the Q-GERT simulation language. Q-GERT is based on the PERT method of determining the time that a project will be completed. Q-GERT improves on PERT by using a distribution of service times instead of converting the estimated times into one service time. Q-GERT also incorporates queuing which permits a more realistic assessment of the completion times of work flowing through the system, because work can be stopped in queues, in-baskets, if a server in the system is busy performing other work. Q-GERT has been used to analyze systems similar to R&D Contracting.

Findings

After the model was constructed, it was tested for

accuracy. The PR's received by a branch of R&D Contracting in FY82 were replicated by the model to determine whether the output of the model would imitate the actual contracting cycle times. The management information system, DATA-CEN, of R&D Contracting provided a list of the PR's received in FY82, and the contracting cycle time of those PR's. The model successfully imitated the contracting cycle time of the competitive PR's and the administrative PR's. The model appeared to overestimate the contracting cycle times for the sole source PR's and for the contract modifications. The DATA-CEN system underestimates the contracting cycle times for contract modifications because most contract modification PR's are not received until the middle of the contracting cycle, so the modeled contracting cycle times for contract modifications may be accurate.

The modeled contracting cycle times for sole source PR's were definitely higher than actuals. Fortunately, this group has the smallest number of PR's, so the total effect on the model was minimized. The overestimation by the model is probably based on the difference between the method specified by the written procedures, and the method actually used in processing sole source PR's.

The model was used to perform four experiments to demonstrate the potential of the model as a management tool. Research question 1 was to determine the effect of varying

the buyer-to-clerk ratio on the contracting cycle time. Three tests were run using: (1) two buyers-per-clerk, (2) 2.4 buyers-per-clerk, and (3) 3.4 buyers-per-clerk. The results were that there was little change in the total contracting cycle time. Server utilization of the clerk increased from 47% to 81%. The model predicts that there would be little saving to the contracting cycle time if the workload for each clerk was reduced, and there would be no increase in the contracting cycle if the workload for each clerk were increased up to the tested maximum of three buyers and a PCO.

Research question 2 was to determine the optimum level of buying work for a PCO with three buyers to sign for. Five different worklevels were tested, 20%, 30%, 40%, 50%, and 60% of a journeyman buyer's workload. The result was that reducing the PCO's workload below the standard 40% did not change the average contracting cycle time significantly, but increasing the PCO's buying workload above the standard 40% caused a significant lengthening to the contracting cycle time. Since the PCO performs services on every PR, a PCO with a big backlog of work delays all the PR's. The PCO is a potential bottleneck in the contracting process, so the PCO's workload should be monitored by management.

Research question 3 was to determine the point where a small increase in workload would lead to a large increase in the average contracting cycle time. That point is when the

modeled group attempts to perform more than 35% of the branch's workload. If the workload for this group was reduced from the standard 40% to 35%, the savings in the average contracting cycle time would be 16%.

Research question 4 was to demonstrate a powerful use for the model of answering 'what if' questions on the contracting procedures. The 'what if' question demonstrated was - what if committee reviews were eliminated on fundings. The result of this change in the model was a reduction in the average contracting cycle time of 19%. Because there are so many fundings in PMRNA, this small change in procedures can lead to a big reduction in the average contracting cycle time for all networks.

Conclusions

Managers make many decisions which effect the contracting cycle time. Before making a decision, the manager should consider the cost or benefits which would accrue to the contracting cycle time. Predicting the effects of a decision is difficult because of the complexity of the contracting procedures. Measuring the effects of a change after the decision has been implemented is often difficult, if not impossible, because there is usually more than one change to the inputs, procedures, or resources in any time period; the workload changes, the experience level

of the buying personnel changes, and contracting procedures change frequently.

Modeling is a technique for predicting the effect of change. The model developed for this study attempted to incorporate many of the variables which compose the contracting process in R&D Contracting. The model is very detailed (see Appendix C). The verification, validation, and research experimentation of this study, demonstrate that the model can imitate the contracting process and have many valuable uses as a management tool.

In the past, managers have either had to ignore a decision's impact on the contracting cycle, or gauge a decision's impact on the contracting cycle on their experience. The prediction of the effect of a decision has been an art. The use of a model introduces science into this area of decision-making. A model cannot replace the manager in decison-making, but a model can provide the manager with valuable information upon which to make good decisions on issues which effect the contracting cycle time.

Recommendations for Future Research

This model can be improved with a relatively small amount of additional work. Modeling is an iterative process. A system is examined, data collected, a model constructed and tested. The test reveals areas where the

model can be improved. The second iteration is where the system is re-examined in order to solve the deficiencies in the model. More iterations may be required. The modeler must decide when the model is sufficiently perfected to suit his needs.

The needs of the contracting manager is for a management tool which can be used to predict the effect of changes to procedures, organizational stucture, and workload on the contracting cycle. The model can do that now. The issue is whether the model's predictions are sufficiently accurate, and whether management has sufficient faith in the model's ability to predict the effect of change. Additional research could improve the accuracy of the model's predictions, and provide another demonstration of the model's ability to accurately predict the future by using the model to predict the past of another branch of R&D Contracting.

Additional research should examine the discrepancy between the actual results and the modeled results of the sole source networks. The networks may need to be restructured to reflect the procedures actually used in R&D Contracting if these procedures differ from the formal written procedures. This restructuring may require a limited amount of data collection on service times.

Data should be collected on the point in the contracting cycle of the contract modification when the PR is received.

The model could be easily modified to collect statistics at that point to aid in the validation of the model.

The First-In, First-Out queuing system of the model should be examined to determine whether a more sophisticated system using a complicated priority system would more realistically simulate the contracting process. During data collection, many buyers, clerks, and PCO's stated that they select items from their in-basket in the following order: (1) items requiring a small amount of work, (2) high priority items, (3) Fast Track PR's, (4) any other pre-award work, (5) post-award administration. The model should be revalidated by modeling another branch of R&D Contracting. A successful validation of a second branch should bolster any decision-maker's faith in the accuracy and applicability of the model to his or her branch, division, or directorate.

The model is bumping against the limits of the Q-GERT language. The model failed to complete its simulation when workload exceeded 100 PR's in process. Another simulation language, such as SLAM, might be examined to determine whether another language might better accommodate this simulation.

Only twenty-eight of the thirty-four networks used in R&D Contracting were modeled. Future researchers should consider adding the other six networks to the model.

Network M1, contract modifications under $10,000, should definitely be added.

Data on the service times was collected by the subjective technique of asking experienced personnel to estimate the time that is required to perform each service activitv. Now that a base as been built, some key service times can be more accurately determined by using an objective work measurement technique, such as self-logging.

APPENDIX A

COMPUTER PROGRAM NET

```
      PROGRAM NET
      INTEGER SERVE(12),HERE,STEP,COUNT,CLERK(10),AFFIRM
      CHARACTER NETWK*2,NAMES(12)*12
      INTEGER NUMBER(5,12),SELECT,DEST,LINE,V,J,X,Y
      COMMON FACTOR,MEARAP
C
      DATA NAMES/'BUYER','CLERK','PCO','COMMITTEE','TRAFFIC',
     *'CONTRACTOR','JAG','TECH.EVAL','AUDIT','DISTRIBUTION',
     *'REPRODUCTION','MANAGEMENT'/
      DATA SERVE/42,44,43,51,0,48,49,50,55,52,53,54/
      DATA(NUMBER(1,J),J=1,12)/0,12,14,15,16,17,18,19,20,0,0,0/
      DATA(NUMBER(2,J),J=1,12)/21,0,23,24,26,27,0,0,0,25,26,0/
      DATA(NUMBER(3,J),J=1,12)/29,33,0,31,36,35,0,0,0,0,0,37/
      DATA(NUMBER(4,J),J=1,12)/45,40,60,0,38,0,0,0,0,0,0,39/
      DATA(NUMBER(5,J),J=1,12)/6,10,5P,0,0,0,0,0,0,0,0,0/
C
      STEP=1
      SELECT=5
      DEST=0
      COUNT=1
      PRINT*,'ENTER NAME OF NETWORK (2 CHARACTERS)'
      READ*,NETWK
      PRINT*,' '
      PRINT*,NETWK,' NETWORK'
      OPEN(10)
      WRITE(10,100) NETWK
  100 FORMAT('C',5X,'**** ',A2,1X,'NETWORK ****')
      PRINT*,'ENTER LINE NUMBER'
      READ*,LINE
      PRINT*,'LINE NUMBER = ',LINE
      WRITE(10,101) LINE,LINE+1,LINE+2,LINE+3,LINE+4,
     *LINE+5,LINE+6,LINE+7,LINE+8,LINE+9,LINE+10,
     *LINE+11,LINE+12
      WRITE(10,102) LINE+13,LINE+14,LINE+15,LINE+16,
     *LINE+17,LINE+18,LINE+19,LINE+20,LINE+21,
     *LINE+22,LINE+23,LINE+24
C     WRITE(10,102) LINE+25,LINE+26,LINE+27,LINE+28,LINE+29,
C     *LINE+30,LINE+31,LINE+32,LINE+33,LINE+34,
C     *LINE+35,LINE+36
      WRITE(10,103) LINE+25,LINE+26,LINE+27,LINE+28
  101 FORMAT(2X,I3,1X,'GOTO(',I3,',',I3,',',I3,',',
     *I3,',',I3,',',I3,',',I3,',',I3,',',I3,',',I3,',',I3,
     *',',I3,',',I3,',',')
  102 FORMAT(5X,',',I3,',',I3,',',I3,',',I3,',',I3,',',
```

```
     *I3,',',I3,',',I3,',',I3,',',I3,',',I3,',',I3,',',I3,
     *',',I3,',')
  103 FORMAT(5X,'*',I3,',',I3,',',I3,',',I3,',',I3,'),STEP')
C
      WRITE(10,104) NETWK,STEP
      PRINT 104,NETWK,STEP
  104 FORMAT('C',6X,' **** ',A2,' STEP ',I3,' ****')
C
   10 IF(SELECT.EQ.1)THEN
      X=2
      Y=6
      V=7
      W=9
      ENDIF
C
      IF(SELECT.EQ.2)THEN
      X=1
      Y=6
      V=10
      W=11
      ENDIF
C
      IF(SELECT.EQ.3)THEN
      X=1
      Y=6
      V=12
      W=12
      ENDIF
C
      IF(SELECT.EQ.4)THEN
      X=1
      Y=6
      V=12
      W=12
      ENDIF
      IF(SELECT.GT.4)THEN
      X=1
      Y=3
      V=3
      W=3
      ENDIF
C
      GOTO 25
      PRINT*,'  '
      PRINT*,'PICK  DESTINATIONS ( LABEL)'
      PRINT*,'  '
      DO 27 J=X,Y
      IF(J.EQ.SELECT)GOTO27
```

```
      PRINT*,J,' ',NAMES(J)
   27 CONTINUE
C
      DO 28 I=V,W
      PRINT*,I,' ',NAMES(I)
   28 CONTINUE
C
      PRINT*,'    '
   29 PRINT*,'ENTER DESTINATION'
      READ*,DEST
      IF(COUNT.GT.0)THEN
         DO 31 N=1,COUNT
      IF(DEST.EQ.ELEM(N))THEN
      PRINT*,'DESTINATIONS ALREADY USED.  GOTO TRAFFIC.'
      GOTO 10
      ENDIF
   31  CONTINUE
      ENDIF
      IF(SELECT.EQ.DEST)THEN
      PRINT*,'YOUR CARRIER FROM ',NAMES(SELECT),
     *' AND GOING TO ',NAMES(DEST),'.  TRY AGAIN.'
      GOTO 1
      ENDIF
      PRINT*,'FROM ',NAMES(SELECT),' TO ',NAMES(DEST)
      PRINT*,'                OK   YES(1)  NO(2)'
      READ*,AFFIRM
      IF(AFFIRM.EQ.2)GOTO 10
C
      WRITE(10,106) NAMES(SELECT),NAMES(DEST)
  106 FORMAT('C',7X,' **** FROM ',A12,' TO ',A12)
      IF(SELECT.GE.5)THEN
         WRITE(10,105) LINE+STEP,NUMBER(5,DEST)
  105 FORMAT(2X,I3,1X,'ATT(',I2,')=1')
      ELSE
      HERE=SELECT
      IF(HERE.GT.5)HERE=5
      WRITE(10,106) NUMBER(HERE,DEST)
  106 FORMAT(2X,'ATT(',I2,')=1')
      ENDIF
      IF(DEST.EQ.5)GOTO 135
      WRITE(10,107) NAMES(DEST)
      PRINT 107,NAMES(DEST)
  107 FORMAT('C',7X,'     ',A12,' SERVICE TIME     ')
C
   23 PRINT*,'COMPUTE?  YES(1)  NO(2)'
      READ*,AFFIRM
      IF(AFFIRM.EQ.2)THEN
      PRINT*,'ENTER FACTOR AND PARAMETER'
```

```
      READ*,FACTOR,NPARAM
      PRINT 109,SERVE(DEST),FACTOR,NPARAM
  109 FORMAT(6X,'ATT(',I2,')=',F6.2,'* TR(',I2,')')
      PRINT*,'       OK  -  YES(1) NO(2)'
      READ*,AFFIRM
      IF(AFFIRM.EQ.2)GOTO 23
      WRITE(10,109) SERVE(DEST),FACTOR, NPARAM
C
      ELSE
      CALL RATIC
      PRINT 109,SERVE(DEST),FACTOR, NPARAM
      WRITE(10,109) SERVE(DEST),FACTOR,NPARAM
      ENDIF
C
  133 IF(DEST.EQ.10)THEN
      WRITE(10,111)
      LAST=LINE+STEP+1
      DO 202 I=LINE+STEP+1,LINE+28
      WRITE(10,112) LAST
      LAST=LAST+1
  202 CONTINUE
  112 FORMAT(2X,I3,1X,'GOTO 9999')
      WRITE(10,113) NETWK
  113 FORMAT('C',7X,'END OF ',A2,' NETWORK')
      PRINT 113, NETWK
      PRINT*,'LAST LINE ALLOCATED = ',LINE+28
      PRINT*,'LAST LINE USED = ',LINE+STEP
      PRINT*,'DELETE LINES ',LINE+STEP+1,' TO ',LINE+28,'
     +FROM GOTO STATEMENT AT START OF NETWORK'
      PRINT*,' '
      PRINT*,'DO YOU WANT PAR LIST WRITTEN TO TAPE10?'
      PRINT*,'YES(1)   NO(2)'
      READ*,AFFIRM
      IF(AFFIRM.EQ.1) THEN
      PRINT*,'ANSWER YES TO NEXT QUESTION TO RECEIVE PAR'
      CALL RATIC
      PRINT*,'PAR TABLE WRITTEN TO TAPE10'
      ENDIF
      STOP
      ELSE
      SELECT=DEST
      DEST=0
      COUNT=COUNT+1
      IF(SELECT.GT.4)THEN
      PRINT*,'  '
      PRINT*,'  '
      PRINT*,'END OF STEP ',STEP
      STEP=STEP+1
```

```
      WRITE(10,111)
      WRITE(10,113)
      PRINT 104,NETWK,STEP
      WRITE(10,104) NETWK,STEP
      WRITE(10,113)
  113 FORMAT('C')
  111 FORMAT(6X,'GOTO 9999')
      COUNT=0
      ENDIF
C
      IF(COUNT.GT.0)THEN
      ELEM(COUNT)=SELECT
      PRINT*,'                    HISTORY'
      DO 115 I=1,COUNT
      PRINT*,'                    TO    ',NAMES(ELEM(I))
  115 CONTINUE
      PRINT*,'  '
      ENDIF
      ENDIF
C
      GOTO 10
      END
      SUBROUTINE RATIO
      REAL B(3),A(11),C(10),APPLE(10),CARROT(9)
      INTEGER AFFIRM
      COMMON FACTOR,NPARAM
C
      DATA A/1.,.9,.8,.7,.6,.5,.4,.3,.2,.1, 0/
      DATA C/1.,1.1,1.2,1.4,1.6,2.,2.5,3.,4.,1000.0/
C
  100 PRINT*,'ENTER NORMAL, OPTIMISTIC, PESSIMISTIC '
      READ*,B(1),B(2),B(3)
      PRINT*,'    ',B(1),'    ',B(2),'    ',B(3)
      IF(B(1).EQ.99)GOTO 1400
      IF(B(1).LT.B(2).OR.B(1).GT.B(3))THEN
      PRINT*,'  '
      PRINT*,'OUT OF ORDER.  REINPUT.'
      PRINT*,'  '
      GOTO 100
      ENDIF
C
      PRINT*,'  '
      PRINT*,'       OK  -  YES(1)  NO(2)'
      PRINT*,'  '
      READ*,AFFIRM
      IF(AFFIRM.EQ.2)GOTO 100
C
      FACTOR=B(1)
```

```
C
      B(2)=B(2)/FACTOR
      B(3)=B(3)/FACTOR
C
      KOUNT=0
      I=1
 1220 IF(B(2).LE.A(I).AND.B(2).GT.A(I+1))GOTO 1230
      I=I+1
      KOUNT=KOUNT+1
      GOTO 1220
C
 1230 J=1
 1240 IF(B(3).GE.C(J).AND.B(3).LT.C(J+1))GOTO 1300
      J=J+1
      GOTO 1240
C
 1300 NPARAM=(10*KOUNT)+J
      RETURN
C
 1400 DO 3000 J=1,10
      APPLE(J) = (A(J)+A(J+1))/2
 3000 CONTINUE
C
      DO 3010 I=1,9
      CARROT(I)=(C(I)+C(I+1))/2
      IF(I.EQ.9)CARROT(I)=(C(I)+2*C(I))/2
 3010 CONTINUE
C
      DO 3030 K=0,9,1
      DO 3040 L=1,9,1
C     WRITE(10,201) K*10+L,APPLE(K+1),CARROT(L)
      WRITE(10,*)'PAR,',K*10+L,',1,',APPLE(K+1),',',CARROT(L),',,'
  201 FORMAT('PAR,',I2,',1,',F6.2,',',F6.2,',,')
 3040 CONTINUE
 3030 CONTINUE
      RETURN
      END
```

APPENDIX B

Q-GERT MODEL OF R&D CONTRACTING

```
GEN,MILLER,STAGE,E,24,1983,0,1,9999,4160,10,,2080,63*
SEE,10,48131768981101*
SOU,1,0,1*
VAS,1,5,CO,0*
REG,2,1,1*
REG,3,1,1,F*
SOU,4,0,1*
VAS,4,5,CO,1*
REG,22,1,1*
SOU,6*
REG,14*
QUE,5/BUYER-A*
QUE,7*
QUE,8*
QUE,12/BUYER-B*
QUE,18/BUYER-C*
QUE,25/BUYER-D,0,(10)26*
RES,1/BUYER-D,1,26*
ALL,26,LWF,1,,25/27,31/33*
QUE,27*
REG,28,1,1,A*
FRE,29,,1,1,26*
REG,11,1,1,F*
*
QUE,37/CLERK-A,(10)38*
QUE,39*
QUE,40*
FRE,41,D,3,1,38*
RES,3/CLERK-A,1,38*
ALL,38,,3,,37/39*
ACT,39,40,AT,44,15/CLERK-A*
ACT,40,41,AT,63,16/CL-A-BRD*
ACT,41,49*
QUE,43/CLERK-B,(10)44*
QUE,45*
REG,49,1,1,F*
ALL,44,,2,,43/45*
RES,2/CLERKB,1,44*
FRE,47,D,2,1,44*
QUE,46*
ACT,45,46,AT,44,17/CL-B*
ACT,45,47,AT,62,18/CL-BRD*
ACT,47,49*
*
QUE,31/PCC,(10)26*
```

```
QUE,33*
REG,34,1,1,A*
FRE,35,,1,1,26*
REG,24,1,1,F*
*
REG,50,1,1,F*
SIN,51/DISTRIB,1,1,D,I*
*  ATTRIBUTE 6 ASSIGNS BUYER-CLERK RATIO:
*       6,CO,3 = 2 BUYERS + 1 PCO PER CLERK
*       6,CO,2 = 2 BUYERS PER CLERK
*       6,CO,4 = CLERK B HAS 3 BUYERS + PCO
*   7,CO,2080 = START-UP TIME OF 2080 HOURS
VAS,2,1,CO,1,6,CO,3,7,CO,2080.,2,UF,1*
VAS,3,3,UF,2*
VAS,51,5,UF,3*
PAR,10,,0.,1.*
PAR,20,,1.,4.40*
*  TO CHANGE WORKLOAD AMOUNT CHANGE PAR,30 CARD AS FOLLOWS:
* PAR,30,37.5451,.01,,6.63261     20%
* PAR,30,30.0361,.01,,5.30609     25%
* PAR,30,25.0301,.01,,4.42174     30%
* PAR,30,21.4544,.01,,3.79006     35%
* PAR,30,18.7726,.01,,3.3163      40%
* PAR,30,16.6867,.01,,2.94783     45%
* PAR,30,15.0181,.01,,2.65304     50%
* PAR,30,13.6528,.01,,2.41186     55%
* PAR,30,12.515,.01,,2.21087      60%
PAR,30,18.7735,.01,,3.3175*
MOD,53,22,14*
MOD,54,14,22*
ACT,1,1,NO,30,1/NEW-PO*
ACT,1,2*
ACT,2,3*
*
ACT,3,5,(8)2,A6.EQ.1*
ACT,3,12,(8)3,A7.EQ.1*
ACT,3,18,(8)4,A8.EQ.1*
ACT,3,25,(8)5,A9.EQ.1*
ACT,3,37,(8)6,A10.EQ.1*
ACT,3,43,(8)7,A11.EQ.1*
ACT,3,31,(8)8,A5.EQ.1*
*
* TO CHANGE WORKLOAD CHANGE ACT,4,4 AS FOLLOWS:
* 20% ACT,4,4,CO,10.9091,2/OCTFUN*
* 25% ACT,4,4,CO,8.72727,2/OCTFUN*
* 30% ACT,4,4,CO,7.27273,2/OCTFUN*
* 35% ACT,4,4,CO,6.23377,2/OCTFUN*
* 40% ACT,4,4,CO,5.45455,2/OCTFUN*
```

```
* 45% ACT,4,4,CO,4.84848,2/OCTFUN*
* 50% ACT,4,4,CO,4.36364,2/OCTFUN*
* 55% ACT,4,4,CO,3.96694,2/OCTFUN*
* 60% ACT,4,4,CO,3.63636,2/OCTFUN*
ACT,4,4,CO,5.45455,2/CCTFUN*
ACT,4,22*
ACT,22,2*
ACT,6,7*
ACT,7,8,CO,168,53/OCT*
ACT,8,7,CO,1912,54/NOVSEP*
*
ACT,5,11,AT,42,3/BUY-A*
*
ACT,12,11,AT,42,9/BUY-B*
*
ACT,18,11,AT,42,11/BUY-C*
*
ACT,27,28,AT,42,13/BUY-D*
ACT,28,29*
ACT,28,11*
*
ACT,11,37,(8)1,A12.EQ.1*
ACT,11,43,(8)2,A13.EQ.1*
ACT,11,31,(8)3,A14.EQ.1*
ACT,11,50,AT,51,20/CMMTTEE,,4,A15.EQ.1*
ACT,11,3,(8)5,A16.EQ.1*
ACT,11,3,AT,48,5/CNTRCTR,,6,A17.EQ.1*
ACT,11,3,AT,49,6/JAG,,7,A18.EQ.1*
ACT,11,3,AT,50,7/TECH-E,,8,A19.EQ.1*
ACT,11,3,AT,55,8/AUDIT,,9,A20.EQ.1*
*
*
*
ACT,49,5,(8)1,A21.EQ.1*
ACT,49,12,(8)2,A22.EQ.1*
ACT,49,18,(8)3,A56.EQ.1*
ACT,49,25,(8)4,A57.EQ.1*
ACT,49,31,(8)5,A23.EQ.1*
ACT,49,50,AT,51,20/CMMTTEE,,6,A24.EQ.1*
ACT,49,51,AT,52,21/DIST,,7,A25.EQ.1*
ACT,49,3,AT,53,22/REPRO,,8,A26.EQ.1*
ACT,49,3,AT,49,5/CNTRCTR,,9,A27.EQ.1*
ACT,49,3,(8)10,A28.EQ.1*
*
ACT,33,34,AT,43,19/PCO*
ACT,34,35*
ACT,34,24*
*
```

```
ACT,24,5,(8)1,A29.EQ.1*
ACT,24,12,(8)2,A30.EQ.1*
ACT,24,18,(8)3,A31.EQ.1*
ACT,24,25,(8)4,A32.EQ.1*
ACT,24,37,(8)5,A33.EQ.1*
ACT,24,43,(8)6,A34.EQ.1*
ACT,24,3,AT,48,5/CNTRCTR,,7,A35.EQ.1*
ACT,24,3,(8)8,A36.EQ.1*
ACT,24,3,AT,54,23/MGT,,9,A37.EQ.1*
ACT,24,50,AT,51,20/CMMTTEE,,10,A61.EQ.1*
*
ACT,50,3,(8)1,A38.EQ.1*
ACT,50,3,AT,54,23/MGT,,2,A39.EQ.1*
ACT,50,37,(8)3,A40.EQ.1*
ACT,50,43,(8)4,A41.EQ.1*
ACT,50,5,(8)5,A45.EQ.1*
ACT,50,12,(8)6,A46.EQ.1*
ACT,50,18,(8)7,A47.EQ.1*
ACT,50,25,(8)8,A59.EQ.1*
ACT,50,31,(8)9,A60.EQ.1*
PAR,1,1.,.95,1.05*
PAR,2,1.,.95,1.15*
PAR,3,1.,.95,1.3*
PAR,4,1.,.95,1.5*
PAR,5,1.,.95,1.8*
PAR,6,1.,.95,2.25*
PAR,7,1.,.95,2.75*
PAR,8,1.,.95,3.5*
PAR,9,1.,.95,6.*
PAR,11,1.,.85,1.05*
PAR,12,1.,.85,1.15*
PAR,13,1.,.85,1.3*
PAR,14,1.,.85,1.5*
PAR,15,1.,.85,1.8*
PAR,16,1.,.85,2.25*
PAR,17,1.,.85,2.75*
PAR,18,1.,.85,3.5*
PAR,19,1.,.85,6.*
PAR,21,1.,.75,1.05*
PAR,22,1.,.75,1.15*
PAR,23,1.,.75,1.3*
PAR,24,1.,.75,1.5*
PAR,25,1.,.75,1.8*
PAR,26,1.,.75,2.25*
PAR,27,1.,.75,2.75*
PAR,28,1.,.75,3.5*
PAR,29,1.,.75,6.*
PAR,31,1.,.65,1.25*
```

```
PAR,32,1.,,.65,1.15*
PAR,33,1.,,.65,1.3*
PAR,34,1.,,.65,1.5*
PAR,35,1.,,.65,1.8*
PAR,36,1.,,.65,2.25*
PAR,37,1.,,.65,2.75*
PAR,38,1.,,.65,3.5*
PAR,39,1.,,.65,6.*
PAR,41,1.,,.55,1.05*
PAR,42,1.,,.55,1.15*
PAR,43,1.,,.55,1.3*
PAR,44,1.,,.55,1.5*
PAR,45,1.,,.55,1.8*
PAR,46,1.,,.55,2.25*
PAR,47,1.,,.55,2.75*
PAR,48,1.,,.55,3.5*
PAR,49,1.,,.55,6.*
PAR,51,1.,,.45,1.05*
PAR,52,1.,,.45,1.15*
PAR,53,1.,,.45,1.3*
PAR,54,1.,,.45,1.5*
PAR,55,1.,,.45,1.8*
PAR,56,1.,,.45,2.25*
PAR,57,1.,,.45,2.75*
PAR,58,1.,,.45,3.5*
PAR,59,1.,,.45,6.*
PAR,61,1.,,.35,1.05*
PAR,62,1.,,.35,1.15*
PAR,63,1.,,.35,1.3*
PAR,64,1.,,.35,1.5*
PAR,65,1.,,.35,1.8*
PAR,66,1.,,.35,2.25*
PAR,67,1.,,.35,2.75*
PAR,68,1.,,.35,3.5*
PAR,69,1.,,.35,6.*
PAR,71,1.,,.25,1.05*
PAR,72,1.,,.25,1.15*
PAR,73,1.,,.25,1.3*
PAR,74,1.,,.25,1.5*
PAR,75,1.,,.25,1.8*
PAR,76,1.,,.25,2.25*
PAR,77,1.,,.25,2.75*
PAR,78,1.,,.25,3.5*
PAR,79,1.,,.25,6.*
PAR,81,1.,,.15,1.05*
PAR,82,1.,,.15,1.15*
PAR,83,1.,,.15,1.3*
```

```
PAR,84,1.,,.15,1.5*
PAR,85,1.,,.15,1.8*
PAR,86,1.,,.15,2.25*
PAR,87,1.,,.15,2.75*
PAR,88,1.,,.15,3.5*
PAR,89,1.,,.15,6.*
PAR,91,1.,,.05,1.05*
PAR,92,1.,,.05,1.15*
PAR,93,1.,,.05,1.3*
PAR,94,1.,,.05,1.5*
PAR,95,1.,,.05,1.8*
PAR,96,1.,,.05,2.25*
PAR,97,1.,,.05,2.75*
PAR,98,1.,,.05,3.5*
PAR,99,1.,,.05,6.*
FIN*
```

APPENDIX C

FORTRAN SUBROUTINE

```
C*******SUB********
      FUNCTION UF(IFN)
      REAL ATT(64), PNET(28), START, RATIO
      REAL BURDA, BURDB
      INTEGER STEP, PSTYPE, K, M, ASSIGN
C        TOTX() = COMPLETION TIME FOR CONTRACTS
C        ITTN() = NUMBER OF COMPLETIONS PER NETWORK
C        SUMSQ() = SUM SQUARE OF COMPLETION TIMES
C
C         CTOTX() = COMPLETIONS FOR ALL RUNS
C         NTOT() = NUMBER OF COMPLETIONS FOR ALL RUNS
C         CSSQ() = SUM SQUARE FOR ALL RUNS
C         CILP = CONFIDENCE INTERVAL - PREDICTION - LOWER
C         CIHP = CONFIDENCE INTERVAL - PREDICTION - UPPER
C         CILM = CONFIDENCE INTERVAL - MEAN - LOWER
C         CIHP = CONFIDENCE INTERVAL - MEAN - UPPER
      COMMON/GVAP/NDE,NFTBU(500),NREL(500),NRELP(500),NREL2(500),
     1NRUN,NRUNS,NTC(500),PARAM(100,4),TBEG,TNOW
      COMMON/CHRIS/TOTX(28),ITTN(28),SUMSQ(28),X,CTOTX(28),
     1NTOT(28),CSSQ(28)
      DATA PNET/.00722,.03249,.05415,.06137,.06859,.09025,.09747,
     *.10969,.12635,.12996,.14079,.14080,.14081,.14440,.14441,
     *.15523,.40794,.51625,.53430,.55235,.56318,.56679,.58123,
     *.58124,.60650,.89314,.97979,1.0/
      CALL GETAT(ATT)
C
      DO 1109 K=0,63,1
      ATT(K)=0.
 1109 CONTINUE
C
C  ########## FOR ASSIGNMENT OF BUYER AND PR TYPE (UF1), OR
C             FOR ASSIGNMENT OF ACTIVITIES (UF2), OR
C             FOR TABULATING NETWORK SINKS (UF3)
C
      GOTO(1000,2000,3000),IFN
C
C     $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
C
C          ASSIGNMENT OF BUYER AND PR TYPE (UF1)
C
C       ASSIGN BUYER
 1000 ASSIGN = INT(UN(20))
      DO 1015 M = 1,4
      IF (ASSIGN.EQ.M) ATT(4) = M
 1015 CONTINUE
C
C     ****** ASSIGNMENT OF BUYER-CLERK RATIO *****
      IF(INOW.EQ.0.0.AND.ATT(5).NE.1) THEN
```

```
          IF(ATT(6).EQ.3) THEN
             RATIO=2.
             BURDA=1.4
             BURDB=0.
          ENDIF
          IF(ATT(6).EQ.2) THEN
             RATIO=3.
             BURDA=0.
             BURDB=0.429
          ENDIF
          IF(ATT(6).EQ.4) THEN
             RATIO=0.
             BURDA=0.
             BURDB=0.
          ENDIF
C         **** ASSIGN STARTING CONDITIONS ****
             START=ATT(7)
          ENDIF
C         ******* ASSIGN PR TYPE (UF1) ******
          PR=UN(1)
          M=1
 1077     IF(PR.LE.PNET(M)) THEN
             UF=M
             GOTO 1079
          ENDIF
          M=M+1
          GOTO 1077
 1079     IF(ATT(5).EQ.1) UF=17
C
          CALL PUTATT(ATT)
          RETURN
C
C ##################################################
C
C         ******** ASSIGNMENT OF ACTIVITIES (UF2) ********
C
 2000     PRTYPE = NINT(ATT(2))
          STEP = NINT(ATT(1))
          ATT(6)=0.
          ATT(7)=0.
C
C         *** SEND TRANSACTION TO APPROPRIATE PR TYPE ***
C
          GOTO(1,42,83,124,165,206,247,289,330,371,412,453,494,535,
         *576,618,659,700,729,758,787,816,845,874,907,936,939,
         *968),PRTYPE
C
C         **** C2 NETWORK ****
```

```
    1 GOTO(  2,  3,  4,  5,  6,  7,  8,  9, 10, 11, 12, 13,
     * 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25,
     * 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37,
     * 38, 39, 40, 41),STEP
C       **** C2 STEP   1 ****
C         **** FROM TRAFFIC       TO PCO
    2 ATT(58)=1
C             PCO               SERVICE TIME
      ATT(43)=   .30* TR(35)
C         **** FROM PCO           TO BUYER
      ATT(29)=1
C             BUYER             SERVICE TIME
      ATT(42)= 10.00* TR(44)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=  6.00* TR(33)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C2 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
    3 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C2 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
    4 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR(49)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO               SERVICE TIME
      ATT(43)=  1.00* TR(56)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
```

```
C
C       **** C2 STEP   4 ****
C
C         **** FROM TRAFFIC       TO BUYER
    5 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C2 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
    6 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C         **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** C2 STEP   6 ****
C
C         **** FROM REPRODUCTION TO CLERK
    7 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(26)
C         **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(45)=176.00* TR(24)
      GOTO 9999
C
C       **** C2 STEP   7 ****
```

```
C
C          **** FROM CONTRACTOR    TO BUYER
    8 ATT( 6)=1
C             BUYER           SERVICE TIME
          ATT(42)=  3.00* TR(33)
C          **** FROM BUYER          TO TECH.EVAL
          ATT(19)=1
C             TECH.EVAL       SERVICE TIME
          ATT(50)=176.00* TR(43)
          GOTO 9999
C
C         **** C2 STEP   8 ****
C
C          **** FROM TECH.EVAL     TO BUYER
    9 ATT( 6)=1
C             BUYER           SERVICE TIME
          ATT(42)=  4.00* TR(54)
C          **** FROM BUYER          TO CLERK
          ATT(12)=1
C             CLERK           SERVICE TIME
          ATT(44)=   .50* TR(46)
C          **** FROM CLERK          TO TRAFFIC
          ATT(28)=1
          GOTO 9999
C
C         **** C2 STEP   9 ****
C
C          **** FROM TRAFFIC        TO BUYER
   10 ATT( 6)=1
C             BUYER           SERVICE TIME
          ATT(42)=  6.00* TR(36)
C          **** FROM BUYER          TO PCO
          ATT(14)=1
C             PCO             SERVICE TIME
          ATT(43)=   .80* TR(33)
C          **** FROM PCO            TO TRAFFIC
          ATT(36)=1
          GOTO 9999
C
C         **** C2 STEP  10 ****
C
C          **** FROM TRAFFIC        TO BUYER
   11 ATT( 6)=1
C             BUYER           SERVICE TIME
          ATT(42)=  3.00* TR(33)
C          **** FROM BUYER          TO CLERK
          ATT(12)=1
C             CLERK           SERVICE TIME
```

```
      ATT(44)=   .80* TR(35)
C        **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR    SERVICE TIME
      ATT(48)= 80.00* TR(24)
      GOTO 9999
C
C       **** C2 STEP  11 ****
C
C        **** FROM CONTRACTOR    TO BUYER
   12 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)= 10.00* TR(25)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  5.00* TR(45)
C        **** FROM CLERK          TO TRAFFIC
      ATT(29)=1
      GOTO 9999
C
C       **** C2 STEP  12 ****
C
C        **** FROM TRAFFIC        TO BUYER
   13 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(58)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(48)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C2 STEP  13 ****
C
C        **** FROM TRAFFIC        TO BUYER
   14 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO PCC
      ATT(14)=1
C           PCC            SERVICE TIME
      ATT(43)=  1.50* TR(33)
C        **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
```

```
C
C       **** C2 STEP  14 ****
C
C         **** FROM TRAFFIC       TO BUYER
   15 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(46)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C2 STEP  15 ****
C
C         **** FROM TRAFFIC       TO BUYER
   16 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(56)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(67)
C         **** FROM PCO           TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(53)
C         **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** C2 STEP  16 ****
C
C         **** FROM CONTRACTOR    TO BUYER
   17 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(31)
C         **** FROM PCO           TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
```

```
      ATT(44)=   .30* TR( 1)
C        **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** C2 STEP  17 ****
C
C        **** FROM REPRODUCTION TO CLERK
   18 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C        **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C           DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
   19 GOTO 9999
   20 GOTO 9999
   21 GOTO 9999
   22 GOTO 9999
   23 GOTO 9999
   24 GOTO 9999
   25 GOTO 9999
   26 GOTO 9999
   27 GOTO 9999
   28 GOTO 9999
   29 GOTO 9999
   30 GOTO 9999
   31 GOTO 9999
   32 GOTO 9999
   33 GOTO 9999
   34 GOTO 9999
   35 GOTO 9999
   36 GOTO 9999
   37 GOTO 9999
   38 GOTO 9999
   39 GOTO 9999
   40 GOTO 9999
   41 GOTO 9999
C       END OF C2 NETWORK
C       **** C3 NETWORK ****
   42 GOTO( 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54,
     * 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66,
     * 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78,
     * 79, 80, 81, 82),STEP
C       **** C3 STEP   1 ****
```

```
C         **** FROM TRAFFIC      TO PCO
   43 ATT(58)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C         **** FROM PCO            TO BUYER
      ATT(29)=1
C            BUYER          SERVICE TIME
      ATT(42)= 10.00* TR(44)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  6.00* TR(34)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C3 STEP   2 ****
C
C         **** FROM TRAFFIC        TO BUYER
   44 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C3 STEP   3 ****
C
C         **** FROM TRAFFIC        TO BUYER
   45 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(48)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=  1.00* TR(56)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C3 STEP   4 ****
C
C         **** FROM TRAFFIC        TO BUYER
   46 ATT( 6)=1
```

```
C              BUYER            SERVICE TIME
      ATT(42)=  1.00* TP(34)
C          **** FROM BUYER            TO CLERK
      ATT(12)=1
C              CLERK            SERVICE TIME
      ATT(44)=  1.00* TP(32)
C          **** FROM CLERK            TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C3 STEP   5 ****
C
C          **** FROM TRAFFIC          TO BUYER
   47 ATT( 6)=1
C              BUYER            SERVICE TIME
      ATT(42)=   .50* TP(46)
C          **** FROM BUYER            TO PCC
      ATT(14)=1
C              PCC              SERVICE TIME
      ATT(43)=   .30* TP( 6)
C          **** FROM PCC              TO CLERK
      ATT(33)=1
C              CLERK            SERVICE TIME
      ATT(44)=   .30* TP( 1)
C          **** FROM CLERK            TO REPRODUCTION
      ATT(29)=1
C              REPRODUCTION     SERVICE TIME
      ATT(53)= 10.00* TP(54)
      GOTO 9999
C
C        **** C3 STEP   6 ****
C
C          **** FROM REPRODUCTION TO CLERK
   48 ATT(10)=1
C              CLERK            SERVICE TIME
      ATT(44)=  1.00* TP(29)
C          **** FROM CLERK            TO CONTRACTOR
      ATT(27)=1
C              CONTRACTOR       SERVICE TIME
      ATT(41)=17.00* TP(24)
      GOTO 9999
C
C        **** C3 STEP   7 ****
C
C          **** FROM CONTRACTOR       TO BUYER
   49 ATT( 6)=1
C              BUYER            SERVICE TIME
      ATT(42)=  3.00* TP(33)
```

```
C          **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C               TECH.EVAL      SERVICE TIME
      ATT(50)=175.00* TR(43)
      GOTO 9999
C
C        **** C3 STEP   8 ****
C
C          **** FROM TECH.EVAL      TO BUYER
   50 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(54)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C3 STEP   9 ****
C
C          **** FROM TRAFFIC        TO BUYER
   51 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(56)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C               PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C3 STEP  10 ****
C
C          **** FROM TRAFFIC        TO BUYER
   52 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(53)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK          SERVICE TIME
      ATT(44)=   .50* TR(35)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C               CONTRACTOR     SERVICE TIME
      ATT(48)= 1.00* TR(24)
```

```
      GOTO 9999
C
C       **** C3 STEP  11 ****
C
C         **** FROM CONTRACTOR    TO BUYER
   53 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  6.00* TF(24)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  6.00* TF(34)
C         **** FROM CLERK         TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** C3 STEP  12 ****
C
C         **** FROM TRAFFIC       TO BUYER
   54 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TF(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  1.00* TF(44)
C         **** FROM CLERK         TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** C3 STEP  13 ****
C
C         **** FROM TRAFFIC       TO BUYER
   55 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TF(54)
C         **** FROM BUYER         TO PC
      ATT(14)=1
C             PC              SERVICE TIME
      ATT(43)=  1.00* TF(34)
C         **** FROM PC            TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** C3 STEP  14 ****
C
C         **** FROM TRAFFIC       TO BUYER
   56 ATT( 6)=1
```

```
C          BUYER          SERVICE TIME
      ATT(42)=  1.00* TP(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C          CLERK          SERVICE TIME
      ATT(44)=  1.00* TP(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(29)=1
      GOTO 9999
C
C        **** C3 STEP  15 ****
C
C          **** FROM TRAFFIC        TO BUYER
   57 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=   .50* TP(56)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C          PCC            SERVICE TIME
      ATT(43)=   .30* TP(57)
C          **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C3 STEP  16 ****
C
C          **** FROM TRAFFIC        TO BUYER
   58 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=   .50* TP( 6)
C          **** FROM BUYER          TO JAG
      ATT(18)=1
C          JAG            SERVICE TIME
      ATT(49)= 24.00* TP(36)
      GOTO 9999
C
C        **** C3 STEP  17 ****
C
C          **** FROM JAG            TO BUYER
   59 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=   .50* TP( 6)
C          **** FROM BUYER          TO TRAFFIC
      ATT(15)=1
      GOTO 9999
C
C        **** C3 STEP  18 ****
C
```

```
C          **** FROM TRAFFIC        TO BUYER
   60 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=  1.00* TP(33)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK                 SERVICE TIME
      ATT(44)=   .50* TP(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(25)=1
      GOTO 9999
C
C        **** C3 STEP  19 ****
C
C          **** FROM TRAFFIC        TO BUYER
   61 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=   .20* TP(33)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO                   SERVICE TIME
      ATT(43)=   .30* TP(33)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK                 SERVICE TIME
      ATT(44)=  1.00* TP(33)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR            SERVICE TIME
      ATT(48)=  6.00* TP(34)
      GOTO 9999
C
C        **** C3 STEP  20 ****
C
C          **** FROM CONTRACTOR     TO BUYER
   62 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=  1.00* TP(34)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO                   SERVICE TIME
      ATT(43)=   .30* TP(31)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK                 SERVICE TIME
      ATT(44)=   .30* TP( 1)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
```

```
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** C3 STEP  21 ****
C
C          **** FROM REPRODUCTION TO CLERK
   63 ATT(1..)=1
C            CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C            DISTRIBUTION SERVICE TIME
      ATT(52)= 10.00* TR(35)
      GOTO 9999
   64 GOTO 9999
   65 GOTO 9999
   66 GOTO 9999
   67 GOTO 9999
   68 GOTO 9999
   69 GOTO 9999
   70 GOTO 9999
   71 GOTO 9999
   72 GOTO 9999
   73 GOTO 9999
   74 GOTO 9999
   75 GOTO 9999
   76 GOTO 9999
   77 GOTO 9999
   78 GOTO 9999
   79 GOTO 9999
   80 GOTO 9999
   81 GOTO 9999
   82 GOTO 9999
C        END OF C3 NETWORK
C        **** C4 NETWORK ****
   83 GOTO( 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95,
     * 96, 97, 98, 99,100,101,102,103,104,105,106,107,
     *108,109,110,111,112,113,114,115,116,117,118,119,
     *120,121,122,123),STEP
C          **** C4 STEP   1 ****
C            **** FROM TRAFFIC        TO PCS
   84 ATT(58)=1
C            PCS            SERVICE TIME
      ATT(43)=   .30* TR( 8)
C          **** FROM PCS              TO BUYER
      ATT(29)=1
C            BUYER          SERVICE TIME
```

```
      ATT(42)= 12.00* TR(33)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  6.00* TR(24)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C4 STEP   2 ****
C
C        **** FROM TRAFFIC        TO BUYER
   85 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(54)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C4 STEP   3 ****
C
C        **** FROM TRAFFIC        TO BUYER
   86 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(45)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(26)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C4 STEP   4 ****
C
C        **** FROM TRAFFIC        TO BUYER
   87 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C        **** FROM CLERK          TO TRAFFIC
```

```
      ATT(28)=1
      GOTO 9999
C
C       **** C4 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
   68 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C4 STEP   6 ****
C
C         **** FROM TRAFFIC       TO BUYER
   85 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO JAG
      ATT(15)=1
C            JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** C4 STEP   7 ****
C
C         **** FROM JAG           TO BUYER
   90 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C4 STEP   8 ****
C
C         **** FROM TRAFFIC       TO BUYER
   91 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(34)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
```

```
      ATT(44)=    .50* TR(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** C4 STEP   9 ****
C
C          **** FROM TRAFFIC        TO BUYER
   92 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=    .50* TR(46)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC                   SERVICE TIME
      ATT(43)=    .50* TR(45)
C          **** FROM PCC            TO CLERK
      ATT(33)=1
C             CLERK                 SERVICE TIME
      ATT(44)=    .30* TR( 1)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 10.00* TR(54)
      GOTO 9999
C
C       **** C4 STEP  10 ****
C
C          **** FROM REPRODUCTION TO CLERK
   93 ATT(10)=1
C             CLERK                 SERVICE TIME
      ATT(44)=  1.00* TR(26)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR    SERVICE TIME
      ATT(48)=175.00* TR(24)
      GOTO 9999
C
C       **** C4 STEP  11 ****
C
C          **** FROM CONTRACTOR     TO BUYER
   94 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=  3.00* TR(33)
C          **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL     SERVICE TIME
      ATT(50)=175.00* TR(43)
      GOTO 9999
```

```
C
C       **** C4 STEP  12 ****
C
C         **** FROM TECH.EVAL     TO BUYER
   95 ATT( 6)=1
C              BUYER              SERVICE TIME
      ATT(42)=  4.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK              SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C4 STEP  13 ****
C
C         **** FROM TRAFFIC       TO BUYER
   96 ATT( 6)=1
C              BUYER              SERVICE TIME
      ATT(42)= 10.00* TR(64)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO                SERVICE TIME
      ATT(43)=   .80* TR(35)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C4 STEP  14 ****
C
C         **** FROM TRAFFIC       TO BUYER
   97 ATT( 6)=1
C              BUYER              SERVICE TIME
      ATT(42)=  4.00* TR(53)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK              SERVICE TIME
      ATT(44)=   .50* TR(35)
C         **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C              CONTRACTOR         SERVICE TIME
      ATT(43)= 30.00* TR(24)
      GOTO 9999
C
C       **** C4 STEP  15 ****
C
C         **** FROM CONTRACTOR    TO BUYER
```

```
   98 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)= 10.00* TR(24)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  6.00* TR(25)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C4 STEP  16 ****
C
C          **** FROM TRAFFIC        TO BUYER
   99 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(24)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(40)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C4 STEP  17 ****
C
C          **** FROM TRAFFIC        TO BUYER
  100 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(24)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.40* TR(35)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C4 STEP  18 ****
C
C          **** FROM TRAFFIC        TO BUYER
  101 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(55)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
```

```
      ATT(44)=  1.00* TR(46)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C4 STEP  19 ****
C
C        **** FROM TRAFFIC        TO BUYER
  102 ATT( 6)=1
C            BUYER                SERVICE TIME
      ATT(42)=   .50* TR(56)
C        **** FROM BUYER          TO PCC
      ATT(14)=1
C            PCC                  SERVICE TIME
      ATT(43)=   .30* TR(67)
C        **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C4 STEP  20 ****
C
C        **** FROM TRAFFIC        TO BUYER
  103 ATT( 6)=1
C            BUYER                SERVICE TIME
      ATT(42)=   .50* TR( 6)
C        **** FROM BUYER          TO JAG
      ATT(18)=1
C            JAG                  SERVICE TIME
      ATT(45)= 24.00* TR(36)
      GOTO 9999
C
C       **** C4 STEP  21 ****
C
C        **** FROM JAG            TO BUYER
  104 ATT( 6)=1
C            BUYER                SERVICE TIME
      ATT(42)=   .50* TR( 6)
C        **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C4 STEP  22 ****
C
C        **** FROM TRAFFIC        TO BUYER
  105 ATT( 6)=1
C            BUYER                SERVICE TIME
      ATT(42)=  1.00* TR(59)
C        **** FROM BUYER          TO CLERK
```

```
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C4 STEP  23 ****
C
C        **** FROM TRAFFIC        TO BUYER
  106 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .30* TR(33)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(33)
C        **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(33)
C        **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(45)= 60.00* TR(34)
      GOTO 9999
C
C       **** C4 STEP  24 ****
C
C        **** FROM CONTRACTOR     TO BUYER
  107 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(34)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(31)
C        **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C        **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(34)
      GOTO 9999
C
C       **** C4 STEP  25 ****
```

```
C
C          **** FROM REPRODUCTION TO CLERK
  108 ATT(10)=1
C              CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C              DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  109 GOTO 9999
  110 GOTO 9999
  111 GOTO 9999
  112 GOTO 9999
  113 GOTO 9999
  114 GOTO 9999
  115 GOTO 9999
  116 GOTO 9999
  117 GOTO 9999
  118 GOTO 9999
  119 GOTO 9999
  120 GOTO 9999
  121 GOTO 9999
  122 GOTO 9999
  123 GOTO 9999
C         END OF C4 NETWORK
C        **** C5 NETWORK ****
  124 GOTO(125,126,127,128,129,130,131,132,133,134,135,136,
     *137,138,139,140,141,142,143,144,145,146,147,148,
     *149,150,151,152,153,154,155,156,157,158,159,160,
     *161,162,163,164),STEP
C          **** C5 STEP   1 ****
C          **** FROM TRAFFIC        TO PCO
  125 ATT(58)=1
C              PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO            TO BUYER
      ATT(29)=1
C              BUYER          SERVICE TIME
      ATT(42)= 16.00* TR(53)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C              CLERK          SERVICE TIME
      ATT(44)=  7.00* TR(13)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
```

```
C       **** C5 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
  126 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  2.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C5 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
  127 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR(48)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC               SERVICE TIME
      ATT(43)=  1.00* TR(27)
C         **** FROM PCC           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C5 STEP   4 ****
C
C         **** FROM TRAFFIC       TO BUYER
  128 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C5 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
  129 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR(46)
```

```
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCO              SERVICE TIME
      ATT(43)=   .30* TR( 6)
C          **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** CS STEP   6 ****
C
C          **** FROM TRAFFIC        TO BUYER
  130 ATT( 6)=1
C             BUYER            SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER          TO JAG
      ATT(16)=1
C             JAG              SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C        **** CS STEP   7 ****
C
C          **** FROM JAG            TO BUYER
  131 ATT( 6)=1
C             BUYER            SERVICE TIME
      ATT(42)=   .50* TR( 5)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** CS STEP   8 ****
C
C          **** FROM TRAFFIC        TO BUYER
  132 ATT( 6)=1
C             BUYER            SERVICE TIME
      ATT(42)=  1.00* TR(58)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK            SERVICE TIME
      ATT(44)=   .50* TR(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C        **** CS STEP   9 ****
C
C          **** FROM TRAFFIC        TO BUYER
  133 ATT( 6)=1
```

```
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR(46)
C           **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=    .50* TR(45)
C           **** FROM PCC            TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 14.00* TR(56)
C           **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C         **** CS STEP  10 ****
C
C           **** FROM TRAFFIC        TO BUYER
  134 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(65)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C           **** FROM CLERK          TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C         **** CS STEP  11 ****
C
C           **** FROM TRAFFIC        TO BUYER
  135 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C           **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=    .50* TR(48)
C           **** FROM PCC            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .30* TR( 1)
C           **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION, SERVICE TIME
      ATT(53)= 10.00* TR(14)
      GOTO 9999
C
```

```
C       **** C5 STEP  12 ****
C
C         **** FROM REPRODUCTION TO CLERK
  136 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TP(26)
C         **** FROM CLERK          TO BUYER
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TP(34)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C5 STEP  13 ****
C
C         **** FROM TRAFFIC        TO CLERK
  137 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TP(54)
C         **** FROM CLERK          TO BUYER
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .40* TP(54)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TP(35)
C         **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TP(34)
      GOTO 9999
C
C       **** C5 STEP  14 ****
C
C         **** FROM CONTRACTOR     TO BUYER
  138 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TP(33)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=176.00* TP(43)
      GOTO 9999
C
C       **** C5 STEP  15 ****
C
```

```
C          **** FROM TECH.EVAL     TO BUYER
  139 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  4.00* TF(54)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK           SERVICE TIME
      ATT(44)=   .50* TF(56)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C5 STEP  16 ****
C
C          **** FROM TRAFFIC       TO BUYER
  140 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  6.00* TF(57)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO             SERVICE TIME
      ATT(43)=  1.00* TF(26)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C5 STEP  17 ****
C
C          **** FROM TRAFFIC       TO BUYER
  141 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  3.00* TF(55)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK           SERVICE TIME
      ATT(44)=   .50* TF(35)
C          **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C              CONTRACTOR      SERVICE TIME
      ATT(48)= 90.00* TF(24)
      GOTO 9999
C
C        **** C5 STEP  18 ****
C
C          **** FROM CONTRACTOR    TO BUYER
  142 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)= 12.50* TF(33)
```

```
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  7.00* TR(14)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C5 STEP  19 ****
C
C          **** FROM TRAFFIC        TO BUYER
  143 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(36)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(40)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C5 STEP  20 ****
C
C          **** FROM TRAFFIC        TO BUYER
  144 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=  1.50* TR(36)
C          **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C5 STEP  21 ****
C
C          **** FROM TRAFFIC        TO BUYER
  145 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(44)
C          **** FROM CLERK          TO TRAFFIC
      ATT(29)=1
```

```
      GOTO 9999
C
C       **** C5 STEP  22 ****
C
C         **** FROM TRAFFIC       TO BUYER
  146 ATT( 5)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR(56)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC               SERVICE TIME
      ATT(43)=   .30* TR(67)
C         **** FROM PCC           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C5 STEP  23 ****
C
C         **** FROM TRAFFIC       TO BUYER
  147 ATT( 5)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR( 5)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG               SERVICE TIME
      ATT(43)= 24.00* TR(36)
      GOTO 9999
C
C       **** C5 STEP  24 ****
C
C         **** FROM JAG           TO BUYER
  148 ATT( 5)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C5 STEP  25 ****
C
C         **** FROM TRAFFIC       TO BUYER
  149 ATT( 5)=1
C             BUYER             SERVICE TIME
      ATT(42)=  1.00* TR(33)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=   .50* TR(46)
```

```
C         **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** CS STEP  26 ****
C
C         **** FROM TRAFFIC        TO BUYER
  150 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42 =    .30* TR(33)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .60* TR(33)
C         **** FROM PCO            TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(56)
C         **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** CS STEP  27 ****
C
C         **** FROM TRAFFIC        TO BUYER
  151 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(65)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(34)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** CS STEP  28 ****
C
C         **** FROM TRAFFIC        TO BUYER
  152 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(36)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C         **** FROM PCO            TO CLERK
      ATT(33)=1
```

```
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(53)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C        **** C5 STEP  29 ****
C
C          **** FROM CONTRACTOR    TO BUYER
  153 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(31)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** C5 STEP  30 ****
C
C          **** FROM REPRODUCTION TO CLERK
  154 ATT(10)=1
C            CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C            DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  155 GOTO 9999
  156 GOTO 9999
  157 GOTO 9999
  158 GOTO 9999
  159 GOTO 9999
  160 GOTO 9999
  161 GOTO 9999
  162 GOTO 9999
  163 GOTO 9999
```

```
  164 GOTO 9999
C       END OF C5 NETWORK
C      **** C6 NETWORK ****
  165 GOTO(166,167,168,169,170,171,172,173,174,175,176,177,
     *178,179,180,181,182,183,184,185,186,187,188,189,
     *190,191,192,193,194,195,196,197,198,199,200,201,
     *202,203,204,205),STEP
C        **** C6 STEP   1 ****
C          **** FROM TRAFFIC        TO PCC
  166 ATT(58)=1
C             PCC              SERVICE TIME
      ATT(43)=   .70* TR(24)
C          **** FROM PCC            TO BUYER
      ATT(29)=1
C             BUYER            SERVICE TIME
      ATT(42)= 14.50* TR(55)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK            SERVICE TIME
      ATT(44)=  6.00* TR(22)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C6 STEP   2 ****
C
C          **** FROM TRAFFIC        TO BUYER
  167 ATT( 5)=1
C             BUYER            SERVICE TIME
      ATT(42)=  1.50* TR(46)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK            SERVICE TIME
      ATT(44)=  1.00* TR(56)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C6 STEP   3 ****
C
C          **** FROM TRAFFIC        TO BUYER
  168 ATT( 5)=1
C             BUYER            SERVICE TIME
      ATT(42)=   .50* TR(48)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC              SERVICE TIME
      ATT(43)=  1.30* TR(35)
```

```
C         **** FROM PCC              TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C6 STEP   4 ****
C
C         **** FROM TRAFFIC          TO BUYER
  169 ATT( 6)=1
C             BUYER                SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER            TO CLERK
      ATT(12)=1
C             CLERK                SERVICE TIME
      ATT(44)=  1.00* TR(58)
C         **** FROM CLERK            TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C6 STEP   5 ****
C
C         **** FROM TRAFFIC          TO BUYER
  170 ATT( 6)=1
C             BUYER                SERVICE TIME
      ATT(42)=   .50* TR(45)
C         **** FROM BUYER            TO PCC
      ATT(14)=1
C             PCC                  SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCC              TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C6 STEP   6 ****
C
C         **** FROM TRAFFIC          TO BUYER
  171 ATT( 6)=1
C             BUYER                SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER            TO JAG
      ATT(18)=1
C             JAG                  SERVICE TIME
      ATT(45)= 24.00* TR(35)
      GOTO 9999
C
C       **** C6 STEP   7 ****
C
C         **** FROM JAG              TO BUYER
  172 ATT( 6)=1
```

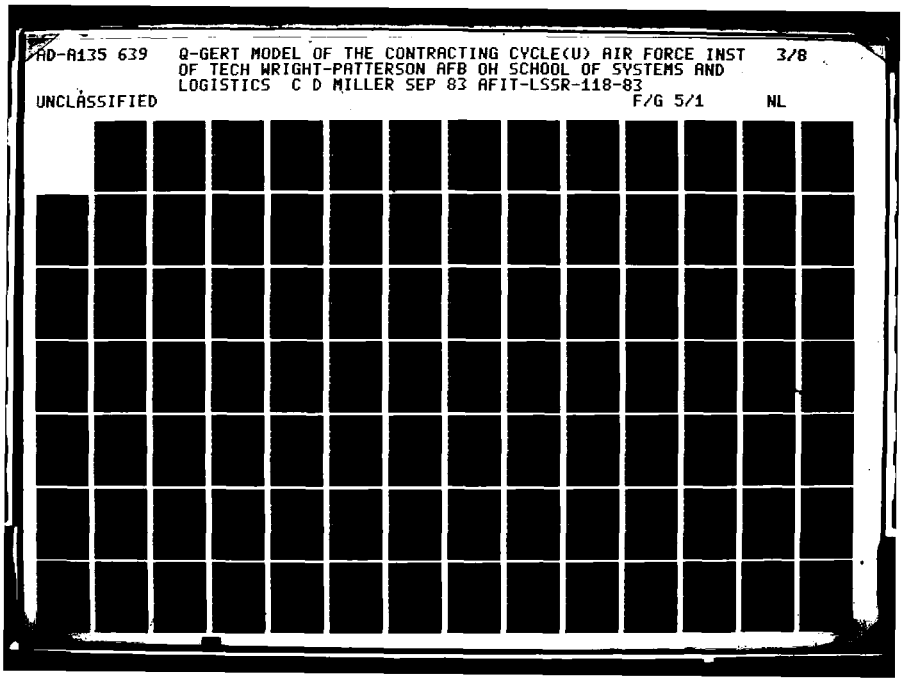
```
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TP( 5)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** C5 STEP   8 ****
C
C          **** FROM TRAFFIC        TO BUYER
  173 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TP(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=    .50* TP(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C6 STEP   9 ****
C
C          **** FROM TRAFFIC        TO BUYER
  174 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TP(48)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C            PCC            SERVICE TIME
      ATT(43)=    .30* TP(45)
C          **** FROM PCC            TO COMMITTEE
      ATT(61)=1
C            COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TP(55)
C          **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** C6 STEP  10 ****
C
C          **** FROM TRAFFIC        TO BUYER
  175 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  3.00* TP(65)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TP(56)
```

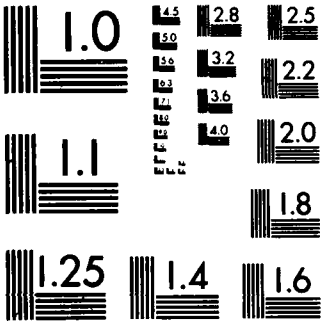
```
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C6 STEP  11 ****
C
C         **** FROM TRAFFIC        TO BUYER
  176 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(64)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(48)
C         **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C         **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 15.00* TR(64)
      GOTO 9999
C
C       **** C6 STEP  12 ****
C
C         **** FROM REPRODUCTION TO CLERK
  177 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(26)
C         **** FROM CLERK          TO BUYER
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(64)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C6 STEP  13 ****
C
C         **** FROM TRAFFIC        TO CLERK
  178 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(64)
C         **** FROM CLERK          TO BUYER
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .40* TR(64)
```

```
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C         **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C             CONTRACTOR     SERVICE TIME
      ATT(45)=176.00* TR(24)
      GOTO 9999
C
C       **** CS STEP  14 ****
C
C         **** FROM CONTRACTOR     TO BUYER
  179 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(33)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=176.00* TR(43)
      GOTO 9999
C
C       **** CS STEP  15 ****
C
C         **** FROM TECH.EVAL      TO BUYER
  180 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(54)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** CS STEP  16 ****
C
C         **** FROM TRAFFIC        TO BUYER
  181 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)= 10.00* TR(45)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.50* TR(43)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
```

```
      GOTO 9999
C
C       **** C6 STEP  17 ****
C
C          **** FROM TRAFFIC       TO BUYER
  182 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .20* TR(35)
C          **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 30.00* TR(24)
      GOTO 9999
C
C       **** C6 STEP  18 ****
C
C          **** FROM CONTRACTOR    TO BUYER
  183 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)= 11.00* TR(45)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT( 4)=  7.00* TR(32)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C6 STEP  19 ****
C
C          **** FROM TRAFFIC       TO BUYER
  184 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.40* TR(54)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(49)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C6 STEP  20 ****
C
```

```
C          **** FROM TRAFFIC       TO BUYER
  185 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO                 SERVICE TIME
      ATT(43)=  1.50* TR(33)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** CS STEP  21 ****
C
C          **** FROM TRAFFIC       TO BUYER
  186 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK               SERVICE TIME
      ATT(44)=  1.00* TR(46)
C          **** FROM CLERK         TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C        **** CS STEP  22 ****
C
C          **** FROM TRAFFIC       TO BUYER
  187 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=   .50* TR(56)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO                 SERVICE TIME
      ATT(43)=   .30* TR(67)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** CS STEP  23 ****
C
C          **** FROM TRAFFIC       TO BUYER
  188 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=   .50* TR(  )
C          **** FROM BUYER
      ATT(16)=1
```


AD-A135 639
Q-GERT MODEL OF THE CONTRACTING CYCLE(U) AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND LOGISTICS C D MILLER SEP 83 AFIT-LSSR-118-83
3/8
UNCLASSIFIED
F/G 5/1
NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
C            JAG              SERVICE TIME
      ATT(42)= 24.00* TR(36)
      GOTO 9999
C
C       **** CS STEP  24 ****
C
C          **** FROM JAG              TO BUYER
  189 ATT( 6)=1
C              BUYER            SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER            TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** CS STEP  25 ****
C
C          **** FROM TRAFFIC          TO BUYER
  190 ATT( 6)=1
C              BUYER            SERVICE TIME
      ATT(42)=  1.00* TR(58)
C          **** FROM BUYER            TO CLERK
      ATT(12)=1
C              CLERK            SERVICE TIME
      ATT(44)=   .50* TR(46)
C          **** FROM CLERK            TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** CS STEP  26 ****
C
C          **** FROM TRAFFIC          TO BUYER
  191 ATT( 6)=1
C              BUYER            SERVICE TIME
      ATT(42)=   .30* TR(33)
C          **** FROM BUYER            TO PCC
      ATT(14)=1
C              PCC              SERVICE TIME
      ATT(43)=   .50* TR(33)
C          **** FROM PCC              TO COMMITTEE
      ATT(61)=1
C              COMMITTEE        SERVICE TIME
      ATT(61)= 24.00* TR(56)
C          **** FROM COMMITTEE        TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** CS STEP  27 ****
C
```

```
C        **** FROM TRAFFIC       TO BUYER
  192 ATT( 6)=1
C             BUYER              SERVICE TIME
      ATT(42)=  3.00* TR(65)
C        **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK              SERVICE TIME
      ATT(44)=  2.00* TR(34)
C        **** FROM CLERK         TO TRAFFIC
      ATT(25)=1
      GOTO 9999
C
C       **** C6 STEP  28 ****
C
C        **** FROM TRAFFIC       TO BUYER
  193 ATT( 6)=1
C             BUYER              SERVICE TIME
      ATT(42)=  1.00* TR(36)
C        **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC                SERVICE TIME
      ATT(43)=   .50* TR(45)
C        **** FROM PCC           TO CLERK
      ATT(33)=1
C             CLERK              SERVICE TIME
      ATT(44)=  1.00* TR(53)
C        **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR         SERVICE TIME
      ATT(46)= 60.00* TR(54)
      GOTO 9999
C
C       **** C6 STEP  29 ****
C
C        **** FROM CONTRACTOR    TO BUYER
  194 ATT( 6)=1
C             BUYER              SERVICE TIME
      ATT(42)=   .50* TR(49)
C        **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC                SERVICE TIME
      ATT(43)=   .30* TR(31)
C        **** FROM PCC           TO CLERK
      ATT(33)=1
C             CLERK              SERVICE TIME
      ATT(44)=   .30* TR( 1)
C        **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
```

```
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** C6 STEP  30 ****
C
C         **** FROM REPRODUCTION TO CLERK
  195 ATT(10)=1
C            CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C            DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  196 GOTO 9999
  197 GOTO 9999
  198 GOTO 9999
  199 GOTO 9999
  200 GOTO 9999
  201 GOTO 9999
  202 GOTO 9999
  203 GOTO 9999
  204 GOTO 9999
  205 GOTO 9999
C        END OF C6 NETWORK
C       **** C7 NETWORK ****
  206 GOTO(207,208,209,210,211,212,213,214,215,216,217,218,
     *219,220,221,222,223,224,225,226,227,228,229,230,
     *231,232,233,234,235,236,237,238,239,240,241,242,
     *243,244,245,246),STEP
C         **** C7 STEP   1 ****
C           **** FROM TRAFFIC        TO PCC
  207 ATT(58)=1
C            PCC            SERVICE TIME
      ATT(43)=  1.00* TR(24)
C           **** FROM PCC            TO BUYER
      ATT(29)=1
C            BUYER          SERVICE TIME
      ATT(42)= 17.00* TR(54)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  8.50* TR(13)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
```

```
C       **** C7 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
  208 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  3.00* TR(55)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C7 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
  209 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR(48)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=  2.00* TR(26)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C7 STEP   4 ****
C
C         **** FROM TRAFFIC       TO BUYER
  210 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(29)=1
      GOTO 9999
C
C       **** C7 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
  211 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR(46)
```

```
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C              PCO          SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C7 STEP   6 ****
C
C         **** FROM TRAFFIC        TO BUYER
  212 ATT( 6)=1
C              BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER          TO JAG
      ATT(15)=1
C              JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** C7 STEP   7 ****
C
C         **** FROM JAG            TO BUYER
  213 ATT( 6)=1
C              BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C7 STEP   8 ****
C
C         **** FROM TRAFFIC        TO BUYER
  214 ATT( 6)=1
C              BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C              CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C7 STEP   9 ****
C
C         **** FROM TRAFFIC        TO BUYER
  215 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(45)
C            **** FROM BUYER          TO PCC
      ATT(14)=1
C            PCC            SERVICE TIME
      ATT(43)=   .50* TR(45)
C            **** FROM PCC            TO COMMITTEE
      ATT(61)=1
C            COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(56)
C            **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** C7 STEP  10 ****
C
C            **** FROM TRAFFIC        TO BUYER
  216 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(56)
C            **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C            **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C        **** C7 STEP  11 ****
C
C            **** FROM TRAFFIC        TO BUYER
  217 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C            **** FROM BUYER          TO PCC
      ATT(14)=1
C            PCC            SERVICE TIME
      ATT(43)=   .50* TR(48)
C            **** FROM PCC            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C            **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
```

```
C       **** C7 STEP  12 ****
C
C         **** FROM REPRODUCTION TO CLERK
  218 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(26)
C         **** FROM CLERK          TO BUYER
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(64)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C7 STEP  13 ****
C
C         **** FROM TRAFFIC        TO CLERK
  219 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(54)
C         **** FROM CLERK          TO BUYER
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .40* TR(54)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C         **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C             CONTRACTOR     SERVICE TIME
      ATT(46)=176.00* TR(24)
      GOTO 9999
C
C       **** C7 STEP  14 ****
C
C         **** FROM CONTRACTOR     TO BUYER
  220 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(35)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=176.00* TR(43)
      GOTO 9999
C
C       **** C7 STEP  15 ****
C
```

```
C          **** FROM TECH.EVAL     TO BUYER
  221 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  4.00* TR(54)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK           SERVICE TIME
      ATT(44)=   .50* TR(46)
C          **** FROM CLERK         TO TRAFFIC
      ATT(22)=1
      GOTO 9999
C
C        **** C7 STEP  16 ****
C
C          **** FROM TRAFFIC       TO BUYER
  222 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  7.00* TR(35)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO             SERVICE TIME
      ATT(43)=  1.50* TR(33)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C7 STEP  17 ****
C
C          **** FROM TRAFFIC       TO BUYER
  223 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** C7 STEP  18 ****
C
C          **** FROM TRAFFIC       TO BUYER
  224 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  2.00* TR(55)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK           SERVICE TIME
      ATT(44)=   .50* TR(35)
C          **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
```

```
C            CONTRACTOR    SERVICE TIME
      ATT(46)= 64.00* TR(35)
      GOTO 9999
C
C       **** C7 STEP  19 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  225 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(16)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  8.50* TR(13)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C7 STEP  20 ****
C
C         **** FROM TRAFFIC       TO BUYER
  226 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(49)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C7 STEP  21 ****
C
C         **** FROM TRAFFIC       TO BUYER
  227 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=  2.00* TR(26)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C7 STEP  22 ****
C
```

```
C          **** FROM TRAFFIC       TO BUYER
  228 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK               SERVICE TIME
      ATT(44)=  1.00* TR(46)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C7 STEP  23 ****
C
C          **** FROM TRAFFIC       TO BUYER
  229 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=   .50* TR(56)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO                 SERVICE TIME
      ATT(43)=   .30* TR(67)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C7 STEP  24 ****
C
C          **** FROM TRAFFIC       TO BUYER
  230 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER         TO JAG
      ATT(18)=1
C              JAG                 SERVICE TIME
      ATT(49)= 24.00* TR(36)
      GOTO 9999
C
C        **** C7 STEP  25 ****
C
C          **** FROM JAG           TO BUYER
  231 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
```

```
C       **** C7 STEP  26 ****
C
C         **** FROM TRAFFIC       TO BUYER
  232 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(58)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C7 STEP  27 ****
C
C         **** FROM TRAFFIC       TO BUYER
  233 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .30* TR(33)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .80* TR(33)
C         **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(56)
C         **** FROM COMMITTEE     TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C7 STEP  28 ****
C
C         **** FROM TRAFFIC       TO BUYER
  234 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(65)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(34)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C7 STEP  29 ****
C
```

```
C          **** FROM TRAFFIC       TO BUYER
  235 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(36)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(53)
C          **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 20.00* TR(54)
      GOTO 9999
C
C        **** C7 STEP  30 ****
C
C          **** FROM CONTRACTOR    TO BUYER
  236 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(29)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .80* TR(36)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C7 STEP  31 ****
C
C          **** FROM TRAFFIC       TO BUYER
  237 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(76)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C          **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 15.00* TR(84)
      GOTO 9999
C
```

```
C       **** C7 STEP  32 ****
C
C         **** FROM REPRODUCTION TO CLERK
  238 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  239 GOTO 9999
  240 GOTO 9999
  241 GOTO 9999
  242 GOTO 9999
  243 GOTO 9999
  244 GOTO 9999
  245 GOTO 9999
  246 GOTO 9999
C       END OF C7 NETWORK
C      **** C8 NETWORK ****
  247 GOTO(248,249,250,251,252,253,254,255,256,257,258,259,
     *260,261,262,263,264,265,266,267,268,269,270,271,
     *272,273,274,275,276,277,278,279,280,281,282,283,
     *284,285,286,287,288),STEP
C       **** C8 STEP   1 ****
C         **** FROM TRAFFIC        TO PCO
  248 ATT(58)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.50* TR(33)
C         **** FROM PCO            TO BUYER
      ATT(29)=1
C             BUYER          SERVICE TIME
      ATT(42)= 24.00* TR(63)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(54)
C         **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** C8 STEP   2 ****
C
C         **** FROM TRAFFIC        TO BUYER
  249 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
```

```
C         **** FROM BUYER          O TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C8 STEP   3 ****
C
C         **** FROM TRAFFIC        TO BUYER
  250 ATT( 6)=1
C             BUYER              SERVICE TIME
      ATT(42)= 12.00* TR(35)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK              SERVICE TIME
      ATT(44)= 10.00* TR(22)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP   4 ****
C
C         **** FROM TRAFFIC        TO BUYER
  251 ATT( 6)=1
C             BUYER              SERVICE TIME
      ATT(42)=  3.00* TR(35)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK              SERVICE TIME
      ATT(44)=  1.00* TR(36)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP   5 ****
C
C         **** FROM TRAFFIC        TO BUYER
  252 ATT( 6)=1
C             BUYER              SERVICE TIME
      ATT(42)=   .50* TR(48)
C         **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC                SERVICE TIME
      ATT(43)=  3.00* TR(36)
C         **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C8 STEP   6 ****
C
```

```
C         **** FROM TRAFFIC       TO BUYER
  253 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(59)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C9 STEP   7 ****
C
C         **** FROM TRAFFIC       TO BUYER
  254 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C8 STEP   8 ****
C
C         **** FROM TRAFFIC       TO BUYER
  255 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG             SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** C8 STEP   9 ****
C
C         **** FROM JAG           TO BUYER
  256 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR( 5)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
```

```
C       **** C8 STEP  10 ****
C
C         **** FROM TRAFFIC       TO BUYER
  257 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP  11 ****
C
C         **** FROM TRAFFIC       TO BUYER
  258 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(45)
C         **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(56)
C         **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** C8 STEP  12 ****
C
C         **** FROM TRAFFIC       TO BUYER
  259 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(55)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP  13 ****
C
```

```
C         **** FROM TRAFFIC       TO BUYER
  260 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C         **** FROM PCO           TO MANAGEMENT
      ATT(37)=1
C             MANAGEMENT     SERVICE TIME
      ATT(54)= 32.00* TR(55)
      GOTO 9999
C
C       **** C8 STEP  14 ****
C
C         **** FROM MANAGEMENT    TO BUYER
  261 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C8 STEP  15 ****
C
C         **** FROM TRAFFIC       TO BUYER
  262 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(26)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(54)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP  16 ****
C
C         **** FROM TRAFFIC       TO BUYER
  263 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .80* TR(55)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(26)
```

```
C         **** FROM PCO              TO CLERK
      ATT(33)=1
C               CLERK          SERVICE TIME
      ATT(44)=    .30* TR( 1)
C         **** FROM CLERK            TO REPRODUCTION
      ATT(26)=1
C               REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** C8 STEP  17 ****
C
C         **** FROM REPRODUCTION TO CLERK
  264 ATT(10)=1
C               CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(26)
C         **** FROM CLERK            TO BUYER
      ATT(21)=1
C               BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(54)
C         **** FROM BUYER            TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C8 STEP  18 ****
C
C         **** FROM TRAFFIC          TO CLERK
  265 ATT(10)=1
C               CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(54)
C         **** FROM CLERK            TO BUYER
      ATT(21)=1
C               BUYER          SERVICE TIME
      ATT(42)=    .40* TR(54)
C         **** FROM BUYER            TO PCO
      ATT(14)=1
C               PCO            SERVICE TIME
      ATT(43)=    .30* TR(35)
C         **** FROM PCO              TO CONTRACTOR
      ATT(35)=1
C               CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(24)
      GOTO 9999
C
C       **** C8 STEP  19 ****
C
C         **** FROM CONTRACTOR       TO BUYER
  266 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=  3.00* TP(33)
C            **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C            TECH.EVAL      SERVICE TIME
      ATT(53)=176.00* TP(43)
      GOTO 9999
C
C       **** C8 STEP  20 ****
C
C            **** FROM TECH.EVAL      TO BUYER
  267 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  4.00* TP(54)
C            **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .50* TP(46)
C            **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP  21 ****
C
C            **** FROM TRAFFIC        TO BUYER
  268 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)= 15.00* TP(53)
C            **** FROM BUYER          TO AUDIT
      ATT(22)=1
C            AUDIT          SERVICE TIME
      ATT(55)=352.00* TP(54)
      GOTO 9999
C
C       **** C8 STEP  22 ****
C
C            **** FROM AUDIT          TO BUYER
  269 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  2.00* TP(54)
C            **** FROM BUYER          TO PCC
      ATT(14)=1
C            PCC            SERVICE TIME
      ATT(43)=  2.00* TP(53)
C            **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
```

```
C       **** C8 STEP  23 ****
C
C         **** FROM TRAFFIC       TO BUYER
  270 ATT( 6)=1
C             BUYER          SERVICE TIME   ,
      ATT(42)=  3.00* TF(33)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(35)
C         **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 64.00* TR(35)
      GOTO 9999
C
C       **** C8 STEP  24 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  271 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)= 10.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)= 15.00* TR(21)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP  25 ****
C
C         **** FROM TRAFFIC       TO BUYER
  272 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(45)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP  26 ****
C
C         **** FROM TRAFFIC       TO BUYER
  273 ATT( 6)=1
```

```
C          BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C          PCO            SERVICE TIME
      ATT(43)=  3.00* TR(35)
C          **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C8 STEP  27 ****
C
C          **** FROM TRAFFIC        TO BUYER
  274 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C          CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C8 STEP  28 ****
C
C          **** FROM TRAFFIC        TO BUYER
  275 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=   .50* TR(56)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C          PCO            SERVICE TIME
      ATT(43)=   .30* TR(67)
C          **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** C8 STEP  29 ****
C
C          **** FROM TRAFFIC        TO BUYER
  276 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER          TO JAG
      ATT(16)=1
C          JAG            SERVICE TIME
      ATT(49)= 24.00* TR(36)
```

```
      GOTO 9999
C
C       **** C8 STEP  30 ****
C
C          **** FROM JAG          TO BUYER
  277 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER        TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C         **** C8 STEP  31 ****
C
C          **** FROM TRAFFIC      TO BUYER
  278 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(58)
C          **** FROM BUYER        TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C          **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** C8 STEP  32 ****
C
C          **** FROM TRAFFIC      TO BUYER
  279 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .30* TR(33)
C          **** FROM BUYER        TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .80* TR(33)
C          **** FROM PCO          TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(56)
C          **** FROM COMMITTEE    TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C         **** C8 STEP  33 ****
C
C          **** FROM TRAFFIC      TO BUYER
  280 ATT( 6)=1
```

```
C          BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(65)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C          CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(34)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** CB STEP  34 ****
C
C          **** FROM TRAFFIC        TO BUYER
  281 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(36)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C          PCO            SERVICE TIME
      ATT(43)=   .50* TR(45)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** CB STEP  35 ****
C
C          **** FROM TRAFFIC        TO BUYER
  282 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER          TO COMMITTEE
      ATT(15)=1
C          COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(35)
C          **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** CB STEP  36 ****
C
C          **** FROM TRAFFIC        TO BUYER
  283 ATT( 6)=1
C          BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
```

```
C       **** C8 STEP  37 ****
C
C         **** FROM TRAFFIC       TO BUYER
  284 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C8 STEP  38 ****
C
C         **** FROM TRAFFIC       TO BUYER
  285 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .90* TR(46)
C         **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(53)
C         **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** C8 STEP  39 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  286 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  2.00* TR(54)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
```

```
C       **** C8 STEP  40 ****
C
C         **** FROM TRAFFIC       TO BUYER
  287 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(59)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C         **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** C8 STEP  41 ****
C
C         **** FROM REPRODUCTION TO CLERK
  288 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C         **** FROM CLERK         TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
C       END OF C8 NETWORK
C       **** F2 NETWORK ****
  289 GOTO(290,291,292,293,294,295,296,297,298,299,300,301,
     *302,303,304,305,306,307,308,309,310,311,312,313,
     *314,315,316,317,318,319,320,321,322,323,324,325,
     *326,327,328,329),STEP
C         **** F2 STEP   1 ****
C         **** FROM TRAFFIC       TO PCO
  290 ATT(58)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(48)
C         **** FROM PCO           TO BUYER
      ATT(29)=1
C             BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(23)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  4.00* TR(23)
C         **** FROM CLERK         TO TRAFFIC
      ATT(29)=1
```

```
      GOTO 9999
C
C       **** F2 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
  291 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(56)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F2 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
  292 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR(48)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=  1.00* TR(26)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** F2 STEP   4 ****
C
C         **** FROM TRAFFIC       TO BUYER
  293 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(58)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F2 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
  294 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .50* TR(44)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 1)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** F2 STEP   6 ****
C
C          **** FROM REPRODUCTION TO CLERK
  295 ATT(10)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(26)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(14)
      GOTO 9999
C
C        **** F2 STEP   7 ****
C
C          **** FROM CONTRACTOR     TO BUYER
  296 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO TECH.EVAL
      ATT(13)=1
C            TECH.EVAL      SERVICE TIME
      ATT(50)=100.00* TR(25)
      GOTO 9999
C
C        **** F2 STEP   8 ****
C
C          **** FROM TECH.EVAL      TO BUYER
  297 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(54)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
```

```
C             CLERK          SERVICE TIME
      ATT(44)=    .50* TP(46)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F2 STEP   9 ****
C
C           **** FROM TRAFFIC        TO BUYER
  298 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  6.00* TP(33)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TP(54)
C           **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** F2 STEP  10 ****
C
C           **** FROM TRAFFIC        TO BUYER
  299 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TP(54)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TP(35)
C           **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 62.00* TP(34)
      GOTO 9999
C
C       **** F2 STEP  11 ****
C
C           **** FROM CONTRACTOR     TO BUYER
  300 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  7.00* TP(12)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  3.00* TP(33)
C           **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
```

```
      GOTO 9999
C
C       **** F2 STEP  12 ****
C
C         **** FROM TRAFFIC       TO BUYER
  301 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(54)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(48)
C         **** FROM CLERK         TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** F2 STEP  13 ****
C
C         **** FROM TRAFFIC       TO BUYER
  302 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(24)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** F2 STEP  14 ****
C
C         **** FROM TRAFFIC       TO BUYER
  303 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(46)
C         **** FROM CLERK         TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** F2 STEP  15 ****
C
C         **** FROM TRAFFIC       TO BUYER
  304 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TR(56)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=    .50* TR(45)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** F2 STEP  16 ****
C
C          **** FROM TRAFFIC        TO BUYER
  305 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TR( 6)
C          **** FROM BUYER          TO JAG
      ATT(13)=1
C            JAG            SERVICE TIME
      ATT(49)= 16.00* TR(56)
      GOTO 9999
C
C        **** F2 STEP  17 ****
C
C          **** FROM JAG            TO BUYER
  306 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TR( 6)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** F2 STEP  18 ****
C
C          **** FROM TRAFFIC        TO BUYER
  307 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=    .50* TR(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** F2 STEP  19 ****
C
```

```
C          **** FROM TRAFFIC       TO BUYER
  308 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .30* TR(33)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .30* TR( 6)
C          **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   1.00* TR(53)
C          **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 54.00* TR(44)
      GOTO 9999
C
C        **** F2 STEP  20 ****
C
C          **** FROM CONTRACTOR    TO BUYER
  309 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .60* TR(33)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .30* TR(39)
C          **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .30* TR( 1)
C          **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** F2 STEP  21 ****
C
C          **** FROM REPRODUCTION TO CLERK
  310 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=   2.00* TR(24)
C          **** FROM CLERK         TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
```

```
      GOTO 9999
  311 GOTO 9999
  312 GOTO 9999
  313 GOTO 9999
  314 GOTO 9999
  315 GOTO 9999
  316 GOTO 9999
  317 GOTO 9999
  318 GOTO 9999
  319 GOTO 9999
  320 GOTO 9999
  321 GOTO 9999
  322 GOTO 9999
  323 GOTO 9999
  324 GOTO 9999
  325 GOTO 9999
  326 GOTO 9999
  327 GOTO 9999
  328 GOTO 9999
  329 GOTO 9999
C       END OF F2 NETWORK
C       **** S2 NETWORK ****
  330 GOTO(331,332,333,334,335,336,337,338,339,340,341,342,
     *343,344,345,346,347,348,349,350,351,352,353,354,
     *355,356,357,358,359,360,361,362,363,364,365,366,
     *367,368,369,370),STEP
C         **** S2 STEP   1 ****
C           **** FROM TRAFFIC       TO PCO
  331 ATT(58)=1
C             PCO             SERVICE TIME
      ATT(43)=   .50* TR(59)
C           **** FROM PCO           TO BUYER
      ATT(29)=1
C             BUYER           SERVICE TIME
      ATT(42)=  8.00* TR(24)
C           **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  3.00* TR(33)
C           **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** S2 STEP   2 ****
C
C           **** FROM TRAFFIC       TO BUYER
  332 ATT( 6)=1
C             BUYER           SERVICE TIME
```

```
      ATT(42)=   .80* TR(33)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR( 1)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S2 STEP   3 ****
C
C        **** FROM TRAFFIC        TO BUYER
  333 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=  1.00* TR(56)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S2 STEP   4 ****
C
C        **** FROM TRAFFIC        TO BUYER
  334 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(51)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S2 STEP   5 ****
C
C        **** FROM TRAFFIC        TO BUYER
  335 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C        **** FROM PCO            TO CLERK
```

```
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(44)
C        **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(44)
      GOTO 9999
C
C       **** S2 STEP   6 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  336 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C           TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** S2 STEP   7 ****
C
C         **** FROM TECH.EVAL     TO BUYER
  337 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S2 STEP   8 ****
C
C         **** FROM TRAFFIC       TO BUYER
  338 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(24)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .80* TR(55)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S2 STEP   9 ****
C
C         **** FROM TRAFFIC       TO BUYER
```

```
  339 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C           **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S2 STEP  10 ****
C
C           **** FROM TRAFFIC        TO BUYER
  340 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  8.00* TR(53)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  4.50* TR(33)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S2 STEP  11 ****
C
C           **** FROM TRAFFIC        TO BUYER
  341 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S2 STEP  12 ****
C
C           **** FROM TRAFFIC        TO BUYER
  342 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C           **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=  1.00* TR(56)
C           **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
```

```
C
C       **** S2 STEP  13 ****
C
C         **** FROM TRAFFIC       TO BUYER
  343 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(43)
C         **** FROM CLERK         TO TRAFFIC
      ATT(23)=1
      GOTO 9999
C
C       **** S2 STEP  14 ****
C
C         **** FROM TRAFFIC       TO BUYER
  344 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=   .30* TR( 7)
C         **** FROM PCC           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(13)
C         **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** S2 STEP  15 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  345 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=   .30* TR(31)
C         **** FROM PCC           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
```

```
      ATT(44)=    .30* TR( 5)
C          **** FROM CLERK.          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** S2 STEP  16 ****
C
C          **** FROM REPRODUCTION TO CLERK
  346 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR( 4)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  347 GOTO 9999
  348 GOTO 9999
  349 GOTO 9999
  350 GOTO 9999
  351 GOTO 9999
  352 GOTO 9999
  353 GOTO 9999
  354 GOTO 9999
  355 GOTO 9999
  356 GOTO 9999
  357 GOTO 9999
  358 GOTO 9999
  359 GOTO 9999
  360 GOTO 9999
  361 GOTO 9999
  362 GOTO 9999
  363 GOTO 9999
  364 GOTO 9999
  365 GOTO 9999
  366 GOTO 9999
  367 GOTO 9999
  368 GOTO 9999
  369 GOTO 9999
  370 GOTO 9999
C         END OF S2 NETWORK
C        **** S3 NETWORK ****
  371 GOTO(372,373,374,375,376,377,378,379,380,381,382,383,
     *384,385,386,387,388,389,390,391,392,393,394,395,
     *396,397,398,399,400,401,402,403,404,405,406,407,
     *408,409,410,411),STEP
```

```
C        **** S3 STEP   1 ****
C          **** FROM TRAFFIC       TO PCO
  372 ATT(58)=1
C              PCO                 SERVICE TIME
      ATT(43)=   .60* TR(33)
C          **** FROM PCO           TO BUYER
      ATT(29)=1
C              BUYER               SERVICE TIME
      ATT(42)=  8.50* TR(25)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK               SERVICE TIME
      ATT(44)=  5.00* TR(33)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** S3 STEP   2 ****
C
C          **** FROM TRAFFIC       TO BUYER
  373 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK               SERVICE TIME
      ATT(44)=   .50* TR( 1)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** S3 STEP   3 ****
C
C          **** FROM TRAFFIC       TO BUYER
  374 ATT( 6)=1
C              BUYER               SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO                 SERVICE TIME
      ATT(43)=  1.00* TR(56)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** S3 STEP   4 ****
C
C          **** FROM TRAFFIC       TO BUYER
```

```
  375 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(51)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S3 STEP   5 ****
C
C        **** FROM TRAFFIC        TO BUYER
  376 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C        **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C        **** FROM PCC            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(44)
C        **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(43)=176.00* TR(44)
      GOTO 9999
C
C       **** S3 STEP   6 ****
C
C        **** FROM CONTRACTOR     TO BUYER
  377 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** S3 STEP   7 ****
C
C        **** FROM TECH.EVAL      TO BUY
  378 ATT( 6)=1
C             BUYER          SERVICE TIME
```

```
      ATT(42)=  2.00* TR(55)
C        **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S3 STEP   8 ****
C
C        **** FROM TRAFFIC        TO BUYER
  379 ATT( 6)=1
C           BUYER            SERVICE TIME
      ATT(42)=  5.00* TR(24)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO              SERVICE TIME
      ATT(43)=   .50* TR(44)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S3 STEP   9 ****
C
C        **** FROM TRAFFIC        TO BUYER
  380 ATT( 6)=1
C           BUYER            SERVICE TIME
      ATT(42)=  2.00* TR(56)
C        **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S3 STEP  10 ****
C
C        **** FROM TRAFFIC        TO BUYER
  381 ATT( 6)=1
C           BUYER            SERVICE TIME
      ATT(42)=  6.00* TR(35)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK            SERVICE TIME
      ATT(44)=  5.00* TR(43)
C        **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** S3 STEP  11 ****
C
C        **** FROM TRAFFIC        TO BUYER
  382 ATT( 6)=1
C           BUYER            SERVICE TIME
```

```
      ATT(42)=  1.50* TR(33)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S3 STEP  12 ****
C
C        **** FROM TRAFFIC        TO BUYER
  383 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=  1.10* TR(25)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S3 STEP  13 ****
C
C        **** FROM TRAFFIC        TO BUYER
  324 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(43)
C        **** FROM CLERK          TO TRAFFIC
      ATT(23)=1
      GOTO 9999
C
C       **** S3 STEP  14 ****
C
C        **** FROM TRAFFIC        TO BUYER
  385 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(66)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR( 7)
C        **** FROM PCO            TO TRAFFIC
```

```
      ATT(36)=1
      GOTO 9999
C
C       **** S3 STEP  15 ****
C
C         **** FROM TRAFFIC       TO BUYER
  386 ATT( 6)=1
C             BUYER               SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG                 SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** S3 STEP  16 ****
C
C         **** FROM JAG           TO BUYER
  387 ATT( 6)=1
C             BUYER               SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S3 STEP  17 ****
C
C         **** FROM TRAFFIC       TO BUYER
  388 ATT( 6)=1
C             BUYER               SERVICE TIME
      ATT(42)=  1.50* TR(66)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK               SERVICE TIME
      ATT(44)=   .80* TR(33)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S3 STEP  18 ****
C
C         **** FROM TRAFFIC       TO BUYER
  389 ATT( 6)=1
C             BUYER               SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO                 SERVICE TIME
```

```
      ATT(43)=   .30* TR(37)
C        **** FROM PCO           TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(13)
C        **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR     SERVICE TIME
      ATT(43)= 80.00* TR(54)
      GOTO 9999
C
C       **** S3 STEP  19 ****
C
C        **** FROM CONTRACTOR    TO BUYER
  390 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER         TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C        **** FROM PCO           TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 5)
C        **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** S3 STEP  20 ****
C
C        **** FROM REPRODUCTION TO CLERK
  391 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR( 4)
C        **** FROM CLERK         TO DISTRIBUTION
      ATT(25)=1
C           DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  392 GOTO 9999
  393 GOTO 9999
  394 GOTO 9999
  395 GOTO 9999
  396 GOTO 9999
  397 GOTO 9999
```

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  398 GOTO 9999
  399 GOTO 9999
  400 GOTO 9999
  401 GOTO 9999
  402 GOTO 9999
  403 GOTO 9999
  404 GOTO 9999
  405 GOTO 9999
  406 GOTO 9999
  407 GOTO 9999
  408 GOTO 9999
  409 GOTO 9999
  410 GOTO 9999
  411 GOTO 9999
C       END OF S3 NETWORK
C      **** S4 NETWORK ****
  412 GOTO(413,414,415,416,417,418,419,420,421,422,423,424,
     *425,426,427,428,429,430,431,432,433,434,435,436,
     *437,438,439,440,441,442,443,444,445,446,447,448,
     *449,450,451,452),STEP
C       **** S4 STEP   1 ****
C        **** FROM TRAFFIC       TO PCC
  413 ATT(56)=1
C            PCC           SERVICE TIME
      ATT(43)=   .90* TR(35)
C        **** FROM PCC           TO BUYER
      ATT(29)=1
C            BUYER         SERVICE TIME
      ATT(42)=  9.50* TR(25)
C        **** FROM BUYER         TO CLERK
      ATT(12)=1
C            CLERK         SERVICE TIME
      ATT(44)=  5.00* TR(32)
C        **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S4 STEP   2 ****
C
C        **** FROM TRAFFIC       TO BUYER
  414 ATT( 6)=1
C            BUYER         SERVICE TIME
      ATT(42)=  1.00* TR(26)
C        **** FROM BUYER         TO CLERK
      ATT(12)=1
C            CLERK         SERVICE TIME
      ATT(44)=   .50* TR( 1)
C        **** FROM CLERK         TO TRAFFIC
```

```
      ATT(28)=1
      GOTO 9999
C
C       **** S4 STEP   3 ****
C
C          **** FROM TRAFFIC       TO BUYER
  415 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(46)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S4 STEP   4 ****
C
C          **** FROM TRAFFIC       TO BUYER
  416 ATT( 5)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(51)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S4 STEP   5 ****
C
C          **** FROM TRAFFIC       TO BUYER
  417 ATT( 5)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S4 STEP   6 ****
C
C          **** FROM TRAFFIC       TO BUYER
```

```
  418 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C           **** FROM BUYER          TO JAG
      ATT(13)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C         **** S4 STEP   7 ****
C
C           **** FROM JAG            TO BUYER
  419 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C           **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C         **** S4 STEP   8 ****
C
C           **** FROM TRAFFIC        TO BUYER
  420 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .20* TR(33)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** S4 STEP   9 ****
C
C           **** FROM TRAFFIC        TO BUYER
  421 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C           **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(44)
C           **** FROM CLERK          TO CONTRACTOR
```

```
      ATT(27)=1
C           CONTRACTOR . SERVICE TIME
      ATT(48)=176.00* TR(44)
      GOTO 9999
C
C       **** S4 STEP  10 ****
C
C         **** FROM CONTRACTOR   TO BUYER
  422 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C           TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TF(36)
      GOTO 9999
C
C       **** S4 STEP  11 ****
C
C         **** FROM TECH.EVAL     TO BUYER
  423 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S4 STEP  12 ****
C
C         **** FROM TRAFFIC       TO BUYER
  424 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(44)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .90* TR(35)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S4 STEP  13 ****
C
C         **** FROM TRAFFIC       TO BUYER
  425 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.50* TR(66)
C         **** FROM BUYER          TO TRAFFIC
```

```
      ATT(15)=1
      GOTO 9999
C
C       **** S4 STEP  14 ****
C
C          **** FROM TRAFFIC       TO BUYER
  426 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(36)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  5.00* TR(32)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S4 STEP  15 ****
C
C          **** FROM TRAFFIC       TO BUYER
  427 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(33)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S4 STEP  16 ****
C
C          **** FROM TRAFFIC       TO BUYER
  428 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C          **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=  1.30* TR(35)
C          **** FROM PCC           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S4 STEP  17 ****
C
C          **** FROM TRAFFIC       TO BUYER
```

```
  429 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(43)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S4 STEP  18 ****
C
C        **** FROM TRAFFIC        TO BUYER
  430 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(56)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR( 7)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S4 STEP  19 ****
C
C        **** FROM TRAFFIC        TO BUYER
  431 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C        **** FROM BUYER          TO JAG
      ATT(18)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** S4 STEP  20 ****
C
C        **** FROM JAG            TO BUYER
  432 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C        **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S4 STEP  21 ****
```

```
C
C       **** FROM TRAFFIC       TO BUYER
  433 ATT( 6)=1
C           BUYER           SERVICE TIME
      ATT(42)=  1.50* TR(66)
C       **** FROM BUYER         TO CLERK
      ATT(12)=1
C           CLERK           SERVICE TIME
      ATT(44)=   .60* TR(33)
C       **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S4 STEP  22 ****
C
C       **** FROM TRAFFIC       TO BUYER
  434 ATT( 6)=1
C           BUYER           SERVICE TIME
      ATT(42)= 1.00* TR(54)
C       **** FROM BUYER         TO PCO
      ATT(14)=1
C           PCO             SERVICE TIME
      ATT(43)=   .30* TR(37)
C       **** FROM PCO           TO CLERK
      ATT(33)=1
C           CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(13)
C       **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR      SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** S4 STEP  23 ****
C
C       **** FROM CONTRACTOR    TO BUYER
  435 ATT( 6)=1
C           BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C       **** FROM BUYER         TO PCO
      ATT(14)=1
C           PCO             SERVICE TIME
      ATT(43)=   .30* TR(33)
C       **** FROM PCO           TO CLERK
      ATT(33)=1
C           CLERK           SERVICE TIME
      ATT(44)=   .30* TR( 5)
C       **** FROM CLERK         TO REPRODUCTION
```

```
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** S4 STEP  24 ****
C
C         **** FROM REPRODUCTION TO CLERK
  436 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR( 4)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C           DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  437 GOTO 9999
  438 GOTO 9999
  439 GOTO 9999
  440 GOTO 9999
  441 GOTO 9999
  442 GOTO 9999
  443 GOTO 9999
  444 GOTO 9999
  445 GOTO 9999
  446 GOTO 9999
  447 GOTO 9999
  448 GOTO 9999
  449 GOTO 9999
  450 GOTO 9999
  451 GOTO 9999
  452 GOTO 9999
C       END OF S4 NETWORK
C       **** S5 NETWORK ****
  453 GOTO(454,455,456,457,458,459,460,461,462,463,464,465,
     *466,467,468,469,470,471,472,473,474,475,476,477,
     *478,479,480,481,482,483,484,485,486,487,488,489,
     *490,491,492,493),STEP
C         **** S5 STEP   1 ****
C           **** FROM TRAFFIC        TO PCO
  454 ATT(58)=1
C           PCO            SERVICE TIME
      ATT(43)=   .80* TR(33)
C         **** FROM PCO            TO BUYER
      ATT(29)=1
C           BUYER          SERVICE TIME
      ATT(42)= 10.00* TR(25)
C         **** FROM BUYER          TO CLERK
```

```
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  4.00* TR(23)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** SS STEP   2 ****
C
C         **** FROM TRAFFIC        TO BUYER
  455 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR( 1)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** SS STEP   3 ****
C
C         **** FROM TRAFFIC        TO BUYER
  456 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER          TO PCC
      ATT(14)=1
C           PCC            SERVICE TIME
      ATT(43)=  1.00* TR(27)
C         **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** SS STEP   4 ****
C
C         **** FROM TRAFFIC        TO BUYER
  457 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(61)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
```

```
C
C       **** S5 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
  458 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(45)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S5 STEP   6 ****
C
C         **** FROM TRAFFIC       TO BUYER
  459 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO JAG
      ATT(12)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** S5 STEP   7 ****
C
C         **** FROM JAG           TO BUYER
  460 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S5 STEP   8 ****
C
C         **** FROM TRAFFIC       TO BUYER
  461 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .60* TR(33)
C         **** FROM CLERK         TO TRAFFIC
```

```
      ATT(28)=1
      GOTO 9999
C
C       **** S5 STEP   9 ****
C
C         **** FROM TRAFFIC       TO BUYER
  462 ATT( 5)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C         **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(45)
C         **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** S5 STEP  10 ****
C
C         **** FROM TRAFFIC       TO BUYER
  463 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(54)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S5 STEP  11 ****
C
C         **** FROM TRAFFIC       TO BUYER
  464 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .80* TR(65)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .80* TR(65)
C         **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
```

```
      ATT(44)=   .50* TR(41)
C        **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** S5 STEP  12 ****
C
C          **** FROM REPRODUCTION TO CLERK
  465 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(44)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(44)
      GOTO 9999
C
C       **** S5 STEP  13 ****
C
C          **** FROM CONTRACTOR     TO BUYER
  466 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C           TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** S5 STEP  14 ****
C
C          **** FROM TECH.EVAL      TO BUYER
  467 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S5 STEP  15 ****
C
C          **** FROM TRAFFIC        TO BUYER
  468 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(24)
C          **** FROM BUYER          TO PCC
```

```
      ATT(14)=1
C           PCO          SERVICE TIME
      ATT(43)=   .80* TR(33)
C        **** FROM PCO          TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S3 STEP  16 ****
C
C        **** FROM TRAFFIC      TO BUYER
  469 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(65)
C        **** FROM BUYER        TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S5 STEP  17 ****
C
C        **** FROM TRAFFIC      TO BUYER
  470 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(54)
C        **** FROM BUYER        TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  4.00* TR(03)
C        **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S5 STEP  18 ****
C
C        **** FROM TRAFFIC      TO BUYER
  471 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(54)
C        **** FROM BUYER        TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C        **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S5 STEP  19 ****
C
C        **** FROM TRAFFIC      TO BUYER
```

```
  472 ATT(-6)=1
C           BUYER           SERVICE TIME
      ATT(42)=   .75* TR(33)
C         **** FROM BUYER           TO PCO
      ATT(14)=1
C           PCO             SERVICE TIME
      ATT(43)=  1.50* TR(33)
C         **** FROM PCO             TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S5 STEP  20 ****
C
C         **** FROM TRAFFIC         TO BUYER
  473 ATT( 6)=1
C           BUYER           SERVICE TIME
      ATT(42)=   .50* TR(49)
C         **** FROM BUYER           TO CLERK
      ATT(12)=1
C           CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(43)
C         **** FROM CLERK           TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S5 STEP  21 ****
C
C         **** FROM TRAFFIC         TO BUYER
  474 ATT( 6)=1
C           BUYER           SERVICE TIME
      ATT(42)=   .50* TR(66)
C         **** FROM BUYER           TO PCO
      ATT(14)=1
C           PCO             SERVICE TIME
      ATT(43)=   .30* TR( 7)
C         **** FROM PCO             TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S5 STEP  22 ****
C
C         **** FROM TRAFFIC         TO BUYER
  475 ATT( 6)=1
C           BUYER           SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER           TO JAG
      ATT(18)=1
C           JAG             SERVICE TIME
```

```
      ATT(43)= 24.00* TR(35)
      GOTO 9999
C
C       **** S5 STEP  23 ****
C
C         **** FROM JAG           TO BUYER
  476 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S5 STEP  24 ****
C
C         **** FROM TRAFFIC       TO BUYER
  477 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(66)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S5 STEP  25 ****
C
C         **** FROM TRAFFIC       TO BUYER
  478 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(37)
C         **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(35)
C         **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** S5 STEP  26 ****
C
C         **** FROM TRAFFIC       TO BUYER
```

```
  479 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(54)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S5 STEP  27 ****
C
C           **** FROM TRAFFIC        TO BUYER
  480 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C           **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(13)
C           **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** S5 STEP  28 ****
C
C           **** FROM CONTRACTOR     TO BUYER
  481 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(36)
C           **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 5)
C           **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
```

```
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** S5 STEP  29 ****
C
C         **** FROM REPRODUCTION TO CLERK
  482 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  3.00* TR( 4)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  483 GOTO 9999
  484 GOTO 9999
  485 GOTO 9999
  486 GOTO 9999
  487 GOTO 9999
  488 GOTO 9999
  489 GOTO 9999
  490 GOTO 9999
  491 GOTO 9999
  492 GOTO 9999
  493 GOTO 9999
C       END OF S5 NETWORK
C       **** S6 NETWORK ****
  494 GOTO(495,496,497,498,499,501,501,502,503,504,505,506,
     *507,508,509,510,511,512,513,514,515,516,517,518,
     *519,520,521,522,523,524,525,526,527,528,529,530,
     *531,532,533,534),STEP
C         **** S6 STEP   1 ****
C         **** FROM TRAFFIC        TO PCO
  495 ATT(58)=1
C             PCO            SERVICE TIME
      ATT(43)=   .80* TR(33)
C         **** FROM PCO            TO BUYER
      ATT(29)=1
C             BUYER          SERVICE TIME
      ATT(42)= 12.00* TR(55)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  4.50* TR(23)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
```

```
C       **** S6 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
  496 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(58)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR( 1)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S6 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
  497 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=  1.30* TR(35)
C         **** FROM PCC           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S6 STEP   4 ****
C
C         **** FROM TRAFFIC       TO BUYER
  496 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(51)
C         **** FROM CLERK         TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** S6 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
  499 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(45)
```

```
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S6 STEP   6 ****
C
C         **** FROM TRAFFIC        TO BUYER
  500 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER          TO JAG
      ATT(18)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** S6 STEP   7 ****
C
C         **** FROM JAG            TO BUYER
  501 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S6 STEP   8 ****
C
C         **** FROM TRAFFIC        TO BUYER
  502 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C         **** FROM CLERK          TO TRAFFIC
      ATT(23)=1
      GOTO 9999
C
C       **** S6 STEP   9 ****
C
C         **** FROM TRAFFIC        TO BUYER
  503 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C          **** FROM PCO            TO COMMITTEE
      ATT(61)=1
C            COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(43)
C          **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** S6 STEP  10 ****
C
C          **** FROM TRAFFIC        TO BUYER
  504 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   2.00* TR(57)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   2.00* TR(54)
C          **** FROM CLERK          TO TRAFFIC
      ATT(24)=1
      GOTO 9999
C
C        **** S6 STEP  11 ****
C
C          **** FROM TRAFFIC        TO BUYER
  505 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .60* TR(65)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=    .80* TR(65)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=    .50* TR(41)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
```

```
C       **** S6 STEP  12 ****
C
C         **** FROM REPRODUCTION TO CLERK
  506 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(44)
C         **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(34)
      GOTO 9999
C
C       **** S6 STEP  13 ****
C
C         **** FROM CONTRACTOR     TO BUYER
  507 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** S6 STEP  14 ****
C
C         **** FROM TECH.EVAL      TO BUYER
  508 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S6 STEP  15 ****
C
C         **** FROM TRAFFIC        TO BUYER
  509 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(36)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(54)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
```

```
C       **** S6 STEP  16 ****
C
C         **** FROM TRAFFIC       TO BUYER
  510 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  1.00* TR(58)
C         **** FROM BUYER         TO TRAFFIC
      ATT(15)=1
      GOTO 9999
C
C       **** S6 STEP  17 ****
C
C         **** FROM TRAFFIC       TO BUYER
  511 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  6.00* TR(34)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=  4.00* TR(23)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S6 STEP  18 ****
C
C         **** FROM TRAFFIC       TO BUYER
  512 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  2.00* TR(55)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=   .80* TR(33)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S6 STEP  19 ****
C
C         **** FROM TRAFFIC       TO BUYER
  513 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .75* TR(33)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC               SERVICE TIME
      ATT(43)=  1.50* TR(36)
```

```
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S6 STEP  20 ****
C
C         **** FROM TRAFFIC       TO BUYER
  514 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR(49)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=  1.00* TR(43)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S6 STEP  21 ****
C
C         **** FROM TRAFFIC       TO BUYER
  515 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR(66)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=   .30* TR( 7)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S6 STEP  22 ****
C
C         **** FROM TRAFFIC       TO BUYER
  516 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG             SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** S6 STEP  23 ****
C
C         **** FROM JAG           TO BUYER
  517 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** S6 STEP  24 ****
C
C          **** FROM TRAFFIC        TO BUYER
  518 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** S6 STEP  25 ****
C
C          **** FROM TRAFFIC        TO BUYER
  519 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C            PCC            SERVICE TIME
      ATT(43)=   .30* TR(37)
C          **** FROM PCC            TO COMMITTEE
      ATT(61)=1
C            COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(35)
C          **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** S6 STEP  26 ****
C
C          **** FROM TRAFFIC        TO BUYER
  520 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(54)
```

```
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** S6 STEP  27 ****
C
C          **** FROM TRAFFIC        TO BUYER
  521 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TP(54)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TP(46)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TP(13)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TP(56)
      GOTO 9999
C
C        **** S6 STEP  28 ****
C
C          **** FROM CONTRACTOR     TO BUYER
  522 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TP(55)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TP( 8)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TP( 5)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TP(54)
      GOTO 9999
C
C        **** S6 STEP  29 ****
C
C          **** FROM REPRODUCTION TO CLERK
  523 ATT(10)=1
```

```
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR( 4)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C            DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TP(35)
      GOTO 9999
  524 GOTO 9999
  525 GOTO 9999
  526 GOTO 9999
  527 GOTO 9999
  528 GOTO 9999
  529 GOTO 9999
  530 GOTO 9999
  531 GOTO 9999
  532 GOTO 9999
  533 GOTO 9999
  534 GOTO 9999
C        END OF S6 NETWORK
C       **** S7 NETWORK ****
  535 GOTO(536,537,538,539,540,541,542,543,544,545,546,547,
     *548,549,550,551,552,553,554,555,556,557,558,559,
     *560,561,562,563,564,565,566,567,568,569,570,571,
     *572,573,574,575),STEP
C          **** S7 STEP   1 ****
C          **** FROM TRAFFIC        TO PCC
  536 ATT(58)=1
C            PCC            SERVICE TIME
      ATT(43)=  1.50* TR(33)
C          **** FROM PCC            TO BUYER
      ATT(29)=1
C            BUYER          SERVICE TIME
      ATT(42)= 12.00* TR(35)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  5.00* TR(22)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** S7 STEP   2 ****
C
C          **** FROM TRAFFIC        TO BUYER
  537 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  3.00* TP(35)
C          **** FROM BUYER          TO CLERK
```

```
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR( 1)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S7 STEP   3 ****
C
C        **** FROM TRAFFIC        TO BUYER
  538 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C        **** FROM BUYER          TO PCC
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=  2.50* TR(44)
C        **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S7 STEP   4 ****
C
C        **** FROM TRAFFIC        TO BUYER
  539 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(51)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S7 STEP   5 ****
C
C        **** FROM TRAFFIC        TO BUYER
  540 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .30* TR(46)
C        **** FROM BUYER          TO PCC
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR( 6)
C        **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
```

```
C
C       **** S7 STEP   6 ****
C
C         **** FROM TRAFFIC       TO BUYER
  541 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** S7 STEP   7 ****
C
C         **** FROM JAG           TO BUYER
  542 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S7 STEP   8 ****
C
C         **** FROM TRAFFIC       TO BUYER
  543 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S7 STEP   9 ****
C
C         **** FROM TRAFFIC       TO BUYER
  544 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C         **** FROM PCO           TO COMMITTEE
```

```
      ATT(61)=1
C           COMMITTEE    SERVICE TIME
      ATT(51)= 24.00* TR(45)
C        **** FROM COMMITTEE    TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** S7 STEP  10 ****
C
C         **** FROM TRAFFIC      TO BUYER
  545 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(54)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S7 STEP  11 ****
C
C         **** FROM TRAFFIC      TO BUYER
  546 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .80* TR(65)
C         **** FROM BUYER          TO PCC
      ATT(14)=1
C           PCC            SERVICE TIME
      ATT(43)=   .80* TR(65)
C         **** FROM PCC            TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR(41)
C         **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** S7 STEP  12 ****
C
C         **** FROM REPRODUCTION TO CLERK
  547 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(44)
C         **** FROM CLERK          TO BUYER
```

```
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(64)
C        **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S7 STEP  13 ****
C
C        **** FROM TRAFFIC        TO CLERK
  548 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(23)
C        **** FROM CLERK          TO BUYER
      ATT(21)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(74)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C        **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C             CONTRACTOR     SERVICE TIME
      ATT(43)=176.00* TR(34)
      GOTO 9999
C
C       **** S7 STEP  14 ****
C
C        **** FROM CONTRACTOR     TO BUYER
  549 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** S7 STEP  15 ****
C
C        **** FROM TECH.EVAL      TO BUYER
  550 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C        **** FROM BUYER          TO AUDIT
      ATT(20)=1
C             AUDIT          SERVICE TIME
```

```
      ATT(55)=352.00* TR(54)
      GOTO 9999
C
C       **** S7 STEP  16 ****
C
C          **** FROM AUDIT          TO BUYER
  551 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  8.00* TR(54)
C          **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(26)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S7 STEP  17 ****
C
C          **** FROM TRAFFIC        TO BUYER
  552 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S7 STEP  18 ****
C
C          **** FROM TRAFFIC        TO BUYER
  553 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(59)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S7 STEP  19 ****
C
C          **** FROM TRAFFIC        TO BUYER
  554 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(24)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  5.50* TR(12)
C          **** FROM CLERK          TO TRAFFIC
```

```
      ATT(28)=1
      GOTO 9999
C
C       **** S7 STEP  20 ****
C
C          **** FROM TRAFFIC       TO BUYER
  555 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S7 STEP  21 ****
C
C          **** FROM TRAFFIC       TO BUYER
  556 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  2.00* TR(23)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S7 STEP  22 ****
C
C          **** FROM TRAFFIC       TO BUYER
  557 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(43)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S7 STEP  23 ****
C
C          **** FROM TRAFFIC       TO BUYER
```

```
  558 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR(66)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .30* TR( 7)
C           **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C         **** S7 STEP  24 ****
C
C           **** FROM TRAFFIC        TO BUYER
  559 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR( 6)
C           **** FROM BUYER          TO JAG
      ATT(18)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C         **** S7 STEP  25 ****
C
C           **** FROM JAG            TO BUYER
  560 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR( 6)
C           **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C         **** S7 STEP  26 ****
C
C           **** FROM TRAFFIC        TO BUYER
  561 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   1.50* TR(66)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .60* TR(33)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** S7 STEP  27 ****
```

```
C
C          **** FROM TRAFFIC       TO BUYER
  562 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(37)
C          **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(35)
C          **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** S7 STEP  28 ****
C
C          **** FROM TRAFFIC       TO BUYER
  563 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(54)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** S7 STEP  29 ****
C
C          **** FROM TRAFFIC       TO BUYER
  564 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(13)
C          **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR     SERVICE TIME
```

```
      ATT(48)= 80.00* TR(56)
      GOTO 9999
C
C       **** S7 STEP  30 ****
C
C         **** FROM CONTRACTOR   TO BUYER
  565 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1* TR(76)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.10* TR(23)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S7 STEP  31 ****
C
C         **** FROM TRAFFIC        TO BUYER
  566 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 5)
C         **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** S7 STEP  32 ****
C
C         **** FROM REPRODUCTION TO CLERK
  567 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR( 4)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  568 GOTO 9999
  569 GOTO 9999
  570 GOTO 9999
  571 GOTO 9999
```

```
  572 GOTO 9999
  573 GOTO 9999
  574 GOTO 9999
  575 GOTO 9999
C       END OF S7 NETWORK
C      **** S8 NETWORK ****
  576 GOTO(577,578,579,580,581,582,583,584,585,586,587,588,
     *589,590,591,592,593,594,595,596,597,598,599,600,
     *601,602,603,604,605,606,607,608,609,610,611,612,
     *613,614,615,616,617),STEP
C       **** S8 STEP   1 ****
C         **** FROM TRAFFIC      TO PCC
  577 ATT(58)=1
C             PCO              SERVICE TIME
      ATT(43)=  1.30* TR(33)
C         **** FROM PCC          TO BUYER
      ATT(29)=1
C             BUYER            SERVICE TIME
      ATT(42)= 15.00* TR(45)
C         **** FROM BUYER        TO CLERK
      ATT(12)=1
C             CLERK            SERVICE TIME
      ATT(44)=   .80* TR(35)
C         **** FROM CLERK        TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C       **** S8 STEP   2 ****
C
C         **** FROM TRAFFIC      TO BUYER
  578 ATT( 6)=1
C             BUYER            SERVICE TIME
      ATT(42)=  1.50* TR(33)
C         **** FROM BUYER        TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S8 STEP   3 ****
C
C         **** FROM TRAFFIC      TO BUYER
  579 ATT( 6)=1
C             BUYER            SERVICE TIME
      ATT(42)= 12.00* TR(36)
C         **** FROM BUYER        TO CLERK
      ATT(12)=1
C             CLERK            SERVICE TIME
      ATT(44)=  5.00* TR(22)
C         **** FROM CLERK        TO TRAFFIC
```

```
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP   4 ****
C
C         **** FROM TRAFFIC      TO BUYER
  580 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C         **** FROM BUYER        TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR( 1)
C         **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP   5 ****
C
C         **** FROM TRAFFIC      TO BUYER
  581 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER        TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  2.50* TR(23)
C         **** FROM PCO          TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S8 STEP   6 ****
C
C         **** FROM TRAFFIC      TO BUYER
  582 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER        TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(51)
C         **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP   7 ****
C
C         **** FROM TRAFFIC      TO BUYER
```

```
  583 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR(46)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .30* TR( 6)
C           **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C         **** S8 STEP   8 ****
C
C           **** FROM TRAFFIC        TO BUYER
  584 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR( 6)
C           **** FROM BUYER          TO JAG
      ATT(18)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C         **** S8 STEP   9 ****
C
C           **** FROM JAG            TO BUYER
  585 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR( 6)
C           **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C         **** S8 STEP  10 ****
C
C           **** FROM TRAFFIC        TO BUYER
  586 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   1.00* TR(56)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .80* TR(33)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** S8 STEP  11 ****
```

```
C
C          **** FROM TRAFFIC       TO BUYER
  587 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR(46)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C          **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(45)
C          **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** S8 STEP  12 ****
C
C          **** FROM TRAFFIC       TO BUYER
  588 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(54)
C          **** FROM CLERK         TO TRAFFIC
      ATT(23)=1
      GOTO 9999
C
C        **** S8 STEP  13 ****
C
C          **** FROM TRAFFIC       TO BUYER
  589 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .80* TR(65)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .80* TR(65)
C          **** FROM PCO           TO MANAGEMENT
      ATT(37)=1
C             MANAGEMENT     SERVICE TIME
      ATT(54)= 24.00* TR(36)
      GOTO 9999
C
C        **** S8 STEP  14 ****
```

```
C
C          **** FROM MANAGEMENT    TO BUYER
  590 ATT( 6)=1
C              BUYER          SERVICE TIME
      ATT(42)=    .50* TR( 6)
C          **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** S8 STEP  15 ****
C
C          **** FROM TRAFFIC       TO BUYER
  591 ATT( 6)=1
C              BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(66)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(45)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** S8 STEP  16 ****
C
C          **** FROM TRAFFIC       TO BUYER
  592 ATT( 6)=1
C              BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER         TO PCC
      ATT(14)=1
C              PCC            SERVICE TIME
      ATT(45)=    .90* TR(44)
C          **** FROM PCC           TO CLERK
      ATT(33)=1
C              CLERK          SERVICE TIME
      ATT(44)=    .50* TR(41)
C          **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C              REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** S8 STEP  17 ****
C
C          **** FROM REPRODUCTION TO CLERK
  593 ATT(10)=1
C              CLERK          SERVICE TIME
```

```
      ATT(44)=  1.50* TR(44)
C        **** FROM CLERK          TO BUYER
      ATT(21)=1
C           BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(56)
C        **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S8 STEP  18 ****
C
C        **** FROM TRAFFIC        TO CLERK
  594 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(23)
C        **** FROM CLERK          TO BUYER
      ATT(21)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO PCC
      ATT(14)=1
C           PCC            SERVICE TIME
      ATT(43)=   .50* TR(46)
C        **** FROM PCC            TO CONTRACTOR
      ATT(35)=1
C           CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(34)
      GOTO 9999
C
C       **** S8 STEP  19 ****
C
C        **** FROM CONTRACTOR     TO BUYER
  595 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C           TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** S6 STEP  20 ****
C
C        **** FROM TECH.EVAL      TO BUYER
  596 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C        **** FROM BUYER          TO AUDIT
```

```
      ATT(20)=1
C           AUDIT          SERVICE TIME
      ATT(55)=352.00* TR(54)
      GOTO 9999
C
C       **** S8 STEP  21 ****
C
C         **** FROM AUDIT          TO BUYER
  597 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  8.00* TR(34)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=  2.00* TR(34)
C         **** FROM PCO            TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(53)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP  22 ****
C
C         **** FROM TRAFFIC        TO BUYER
  598 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(36)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S8 STEP  23 ****
C
C         **** FROM TRAFFIC        TO BUYER
  599 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  8.00* TR(55)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S8 STEP  24 ****
C
C         **** FROM TRAFFIC        TO BUYER
  600 ATT( 6)=1
C           BUYER          SERVICE TIME
```

```
      ATT(42)=  9.00* TR(35)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  4.50* TR(23)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP  25 ****
C
C        **** FROM TRAFFIC        TO BUYER
  601 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(54)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP  26 ****
C
C        **** FROM TRAFFIC        TO BUYER
  602 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=  2.50* TR(23)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S8 STEP  27 ****
C
C        **** FROM TRAFFIC        TO BUYER
  603 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(43)
C        **** FROM CLERK          TO TRAFFIC
```

```
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP  28 ****
C
C         **** FROM TRAFFIC       TO BUYER
  604 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(66)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR( 7)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S8 STEP  29 ****
C
C         **** FROM TRAFFIC       TO BUYER
  605 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO JAG
      ATT(16)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(35)
      GOTO 9999
C
C       **** S8 STEP  30 ****
C
C         **** FROM JAG           TO BUYER
  606 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S8 STEP  31 ****
C
C         **** FROM TRAFFIC       TO BUYER
  607 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(66)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
```

```
      ATT(44)=   .80* TR(33)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP  32 ****
C
C        **** FROM TRAFFIC        TO BUYER
  608 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(34)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR(37)
C        **** FROM PCO            TO COMMITTEE
      ATT(51)=1
C           COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(35)
C        **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** S8 STEP  33 ****
C
C        **** FROM TRAFFIC        TO BUYER
  609 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(54)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP  34 ****
C
C        **** FROM TRAFFIC        TO BUYER
  610 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C        **** FROM PCO            TO TRAFFIC
```

```
      ATT(36)=1
      GOTO 9999
C
C       **** S8 STEP  35 ****
C
C         **** FROM TRAFFIC       TO BUYER
  611 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO COMMITTEE
      ATT(15)=1
C             COMMITTEE     SERVICE TIME
      ATT(51)= 32.00* TR(65)
C         **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** S8 STEP  36 ****
C
C         **** FROM TRAFFIC       TO BUYER
  612 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** S8 STEP  37 ****
C
C         **** FROM TRAFFIC       TO BUYER
  613 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(46)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(44)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** S8 STEP  38 ****
C
C         **** FROM TRAFFIC       TO BUYER
  614 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCC
```

```
      ATT(14)=1
C           PCO           SERVICE TIME
      ATT(43)=  1.00* TR(54)
C        **** FROM PCO           TO CLERK
      ATT(33)=1
C           CLERK         SERVICE TIME
      ATT(44)=  1.00* TR(13)
C        **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR    SERVICE TIME
      ATT(48)= 80.00* TR(56)
      GOTO 9999
C
C       **** S2 STEP  39 ****
C
C        **** FROM CONTRACTOR    TO BUYER
  615 ATT( 6)=1
C           BUYER         SERVICE TIME
      ATT(42)=   .70* TR(27)
C        **** FROM BUYER         TO PCO
      ATT(14)=1
C           PCO           SERVICE TIME
      ATT(43)=  1.00* TR(55)
C        **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** S6 STEP  40 ****
C
C        **** FROM TRAFFIC       TO BUYER
  616 ATT( 6)=1
C           BUYER         SERVICE TIME
      ATT(42)=  3.00* TR(83)
C        **** FROM BUYER         TO CLERK
      ATT(12)=1
C           CLERK         SERVICE TIME
      ATT(44)=   .30* TR( 5)
C        **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** S8 STEP  41 ****
C
C        **** FROM REPRODUCTION TO CLERK
  617 ATT(12)=1
C           CLERK         SERVICE TIME
```

```
      ATT(44)=  1.00* TR( 4)
C        **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
C       END OF S6 NETWORK
C       **** C9 NETWORK ****
  618 GOTO(619,620,621,622,623,624,625,626,627,628,629,630,
     *631,632,633,634,635,636,637,638,639,640,641,642,
     *643,644,645,646,647,648,649,650,651,652,653,654,
     *655,656,657,658),STEP
C        **** C9 STEP   1 ****
C          **** FROM TRAFFIC        TO BUYER
  619 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)= 12.00* TR(55)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)= 11.00* TR(22)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C9 STEP   2 ****
C
C          **** FROM TRAFFIC        TO BUYER
  620 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(57)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(48)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** C9 STEP   3 ****
C
C          **** FROM TRAFFIC        TO BUYER
  621 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
```

```
      ATT(43)=  3.00* TR(63)
C        **** FROM PCO          TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C9 STEP   4 ****
C
C        **** FROM TRAFFIC      TO BUYER
  622 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER        TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(46)
C        **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C9 STEP   5 ****
C
C        **** FROM TRAFFIC      TO BUYER
  623 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(56)
C        **** FROM BUYER        TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR(67)
C        **** FROM PCO          TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C9 STEP   6 ****
C
C        **** FROM TRAFFIC      TO BUYER
  624 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C        **** FROM BUYER        TO JAG
      ATT(18)=1
C           JAG            SERVICE TIME
      ATT(49)= 24.00* TR(36)
      GOTO 9999
C
C       **** C9 STEP   7 ****
C
C        **** FROM JAG          TO BUYER
```

```
  625 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR( 6)
C           **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** C9 STEP   8 ****
C
C           **** FROM TRAFFIC        TO BUYER
  626 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(58)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C9 STEP   9 ****
C
C           **** FROM TRAFFIC        TO BUYER
  627 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .30* TR(33)
C           **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=   .80* TR(33)
C           **** FROM PCC            TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(56)
C           **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** C9 STEP  10 ****
C
C           **** FROM TRAFFIC        TO BUYER
  628 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(65)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
```

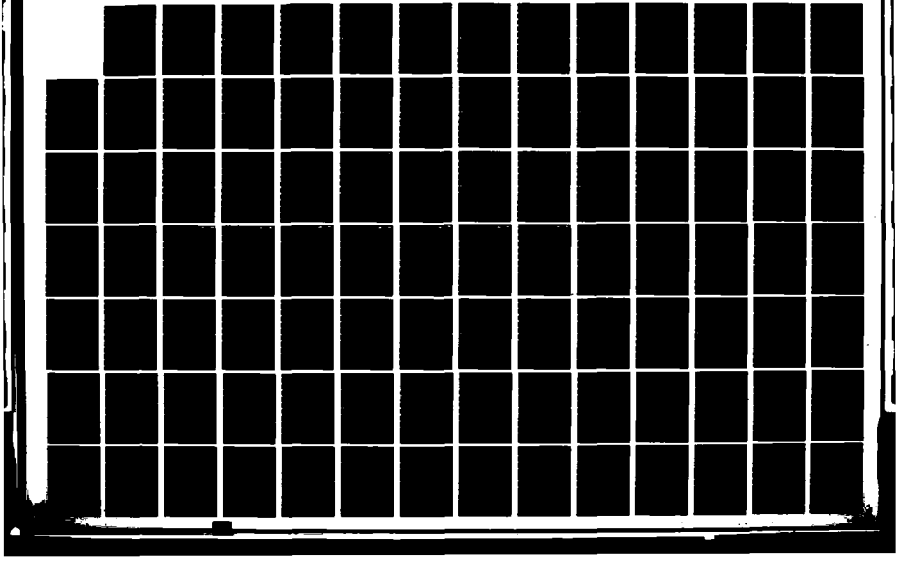
```
      ATT(44)=  2.00* TR(34)
C        **** FROM CLERK.          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** C9 STEP  11 ****
C
C        **** FROM TRAFFIC         TO BUYER
  629 ATT( 6)=1
C            BUYER                SERVICE TIME
      ATT(42)=  1.00* TR(36)
C        **** FROM BUYER           TO PCO
      ATT(14)=1
C            PCO                  SERVICE TIME
      ATT(43)=   .50* TR(45)
C        **** FROM PCO             TO CLERK
      ATT(33)=1
C            CLERK                SERVICE TIME
      ATT(44)=  1.00* TR(53)
C        **** FROM CLERK           TO CONTRACTOR
      ATT(27)=1
C            CONTRACTOR           SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** C9 STEP  12 ****
C
C        **** FROM CONTRACTOR      TO BUYER
  630 ATT( 6)=1
C            BUYER                SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER           TO PCO
      ATT(14)=1
C            PCO                  SERVICE TIME
      ATT(43)=  1.00* TR(27)
C        **** FROM PCO             TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** C9 STEP  13 ****
C
C        **** FROM TRAFFIC         TO BUYER
  631 ATT( 6)=1
C            BUYER                SERVICE TIME
      ATT(42)=  1.00* TR(76)
C        **** FROM BUYER           TO CLERK
      ATT(12)=1
C            CLERK                SERVICE TIME
```

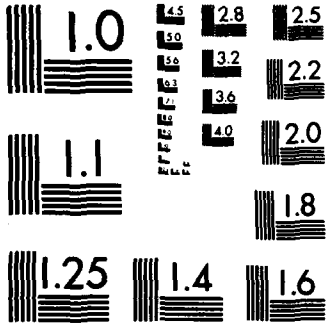
```
      ATT(44)=    .30* TR( 1)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** C9 STEP  14 ****
C
C          **** FROM REPRODUCTION TO CLERK
  632 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  633 GOTO 9999
  634 GOTO 9999
  635 GOTO 9999
  636 GOTO 9999
  637 GOTO 9999
  638 GOTO 9999
  639 GOTO 9999
  640 GOTO 9999
  641 GOTO 9999
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  652 GOTO 9999
  653 GOTO 9999
  654 GOTO 9999
  655 GOTO 9999
  656 GOTO 9999
  657 GOTO 9999
  658 GOTO 9999
C        END OF C9 NETWORK
C       **** F1 NETWORK ****
  659 GOTO(660,661,662,663,664,665,666,667,668,669,670,671,
     *672,673,674,675,676,677,678,679,680,681,682,683,
```

```
     *684,685,686,687,688,689,690,691,692,693,694,695,
     *696,697,698,699),STEP
C       **** F1 STEP   1 ****
C         **** FROM TRAFFIC       TO BUYER
  660 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .60* TR(34)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F1 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
  661 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .20* TR(54)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F1 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
  662 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .25* TR( 9)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C         **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 16.0(* TR(57)
C         **** FROM COMMITTEE     TO CLERK
      ATT(40)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .10* TR( 1)
C         **** FROM CLERK         TO TRAFFIC
```

AD-A135 639 Q-GERT MODEL OF THE CONTRACTING CYCLE(U) AIR FORCE INST 4/8
OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND
LOGISTICS C D MILLER SEP 83 AFIT-LSSR-118-83

UNCLASSIFIED F/G 5/1 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
      ATT(28)=1
      GOTO 9999
C
C       **** F1 STEP   4 ****
C
C          **** FROM TRAFFIC      TO BUYER
  663 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR(46)
C          **** FROM BUYER        TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .20* TR(54)
C          **** FROM PCO          TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .20* TR(54)
C          **** FROM CLERK        TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 15.00* TR(54)
      GOTO 9999
C
C       **** F1 STEP   5 ****
C
C          **** FROM REPRODUCTION TO CLERK
  664 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .20* TR(54)
C          **** FROM CLERK        TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  665 GOTO 9999
  666 GOTO 9999
  667 GOTO 9999
  668 GOTO 9999
  669 GOTO 9999
  670 GOTO 9999
  671 GOTO 9999
  672 GOTO 9999
  673 GOTO 9999
  674 GOTO 9999
  675 GOTO 9999
  676 GOTO 9999
  677 GOTO 9999
  678 GOTO 9999
```

```
  679 GOTO 9999
  680 GOTO 9999
  681 GOTO 9999
  682 GOTO 9999
  683 GOTO 9999
  684 GOTO 9999
  685 GOTO 9999
  686 GOTO 9999
  687 GOTO 9999
  688 GOTO 9999
  689 GOTO 9999
  690 GOTO 9999
  691 GOTO 9999
  692 GOTO 9999
  693 GOTO 9999
  694 GOTO 9999
  695 GOTO 9999
  696 GOTO 9999
  697 GOTO 9999
  698 GOTO 9999
  699 GOTO 9999
C       END OF F1 NETWORK
C       **** M2 NETWORK ****
  700 GOTO(701,702,703,704,705,706,707,708,709,710,711,712,
     *713,714,715,716,717,718,719,720,721,722,723,724,
     *725,726,727,728),STEP
C         **** M2 STEP   1 ****
C           **** FROM TRAFFIC       TO BUYER
  701 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(56)
C           **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(35)
C           **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M2 STEP   2 ****
C
C           **** FROM TRAFFIC       TO BUYER
  702 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(51)
C           **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
```

```
      ATT(44)=    .50* TR(46)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M2 STEP   3 ****
C
C        **** FROM TRAFFIC        TO BUYER
  703 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=    .50* TR(46)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M2 STEP   4 ****
C
C        **** FROM TRAFFIC        TO BUYER
  704 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   1.00* TR(56)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=    .30* TR(35)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M2 STEP   5 ****
C
C        **** FROM TRAFFIC        TO BUYER
  705 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=    .50* TR(46)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=    .30* TR(35)
C        **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C           CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(34)
      GOTO 9999
```

```
C
C       **** M2 STEP   6 ****
C
C         **** FROM CONTRACTOR   TO BUYER
  706 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(13)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** M2 STEP   7 ****
C
C         **** FROM TECH.EVAL    TO BUYER
  707 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M2 STEP   8 ****
C
C         **** FROM TRAFFIC      TO BUYER
  708 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(36)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(45)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M2 STEP   9 ****
C
C         **** FROM TRAFFIC      TO BUYER
  709 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(37)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M2 STEP  10 ****
```

```
C
C          **** FROM TRAFFIC       TO BUYER
  710 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  3.00* TR(35)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK           SERVICE TIME
      ATT(44)=  2.00* TR(54)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M2 STEP  11 ****
C
C          **** FROM TRAFFIC       TO BUYER
  711 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C              CLERK           SERVICE TIME
      ATT(44)=   .50* TR(45)
C          **** FROM CLERK         TO TRAFFIC
      ATT(29)=1
      GOTO 9999
C
C        **** M2 STEP  12 ****
C
C          **** FROM TRAFFIC       TO BUYER
  712 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=   .75* TR(33)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C              PCO             SERVICE TIME
      ATT(43)=  1.00* TR(26)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M2 STEP  13 ****
C
C          **** FROM TRAFFIC       TO BUYER
  713 ATT( 6)=1
C              BUYER           SERVICE TIME
      ATT(42)=   .50* TR(49)
C          **** FROM BUYER         TO CLERK
```

```
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .30* TR(36)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M2 STEP  14 ****
C
C        **** FROM TRAFFIC       TO BUYER
  714 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(66)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C        **** FROM PCO            TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR(25)
C        **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR     SERVICE TIME
      ATT(43)= 30.00* TR(54)
      GOTO 9999
C
C       **** M2 STEP  15 ****
C
C        **** FROM CONTRACTOR    TO BUYER
  715 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(53)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR(31)
C        **** FROM PCO            TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .20* TR( 4)
C        **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** M2 STEP  16 ****
```

```
C
C       **** FROM REPRODUCTION TO CLERK
  716 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C       **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  717 GOTO 9999
  718 GOTO 9999
  719 GOTO 9999
  720 GOTO 9999
  721 GOTO 9999
  722 GOTO 9999
  723 GOTO 9999
  724 GOTO 9999
  725 GOTO 9999
  726 GOTO 9999
  727 GOTO 9999
  728 GOTO 9999
C       END OF M2 NETWORK
C       **** M3 NETWORK ****
  729 GOTO(730,731,732,733,734,735,736,737,738,739,740,741,
     *742,743,744,745,746,747,748,749,750,751,752,753,
     *754,755,756,757),STEP
C       **** M3 STEP   1 ****
C       **** FROM TRAFFIC        TO BUYER
  730 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(53)
C       **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C       **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M3 STEP   2 ****
C
C       **** FROM TRAFFIC        TO BUYER
  731 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(51)
C       **** FROM BUYER          TO CLERK
      ATT(12)=1
```

```
C            CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M3 STEP   3 ****
C
C          **** FROM TRAFFIC        TO BUYER
  732 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .40* TR(25)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M3 STEP   4 ****
C
C          **** FROM TRAFFIC        TO BUYER
  733 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .30* TR(35)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M3 STEP   5 ****
C
C          **** FROM TRAFFIC        TO BUYER
  734 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C          **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(34)
```

```
      GOTO 9999
C
C       **** M3 STEP   6 ****
C
C          **** FROM CONTRACTOR    TO BUYER
  735 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL       SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** M3 STEP   7 ****
C
C          **** FROM TECH.EVAL     TO BUYER
  736 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  2.00* TR(55)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M3 STEP   8 ****
C
C          **** FROM TRAFFIC       TO BUYER
  737 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  3.00* TR(36)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=   .50* TR(44)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M3 STEP   9 ****
C
C          **** FROM TRAFFIC       TO BUYER
  738 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  2.00* TR(55)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
```

```
C       **** M3 STEP  10 ****
C
C         **** FROM TRAFFIC       TO BUYER
  739 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(35)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(54)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M3 STEP  11 ****
C
C         **** FROM TRAFFIC       TO BUYER
  740 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.30* TR(36)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M3 STEP  12 ****
C
C         **** FROM TRAFFIC       TO BUYER
  741 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C         **** FROM BUYER         TO PCC
      ATT(24)=1
C             PCC            SERVICE TIME
      ATT(43)=  1.00* TR(45)
C         **** FROM PCC           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M3 STEP  13 ****
C
C         **** FROM TRAFFIC       TO BUYER
  742 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
```

```
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .30* TR(36)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M3 STEP  14 ****
C
C         **** FROM TRAFFIC        TO  UYER
  743 ATT( 6)=1
C             BUYER          SERVICE T
      ATT(42)=    .50* TR(66)
C         **** FROM BUYER          TO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M3 STEP  15 ****
C
C         **** FROM TRAFFIC        TO BUYER
  744 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .80* TR(33)
C         **** FROM BUYER          TO JAG
      ATT(18)=1
C             JAG            SERVICE TIME
      ATT(43)= 24.00* TR(55)
      GOTO 9999
C
C       **** M3 STEP  16 ****
C
C         **** FROM JAG            TO BUYER
  745 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR(33)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M3 STEP  17 ****
C
C         **** FROM TRAFFIC        TO BUYER
  746 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M3 STEP  16 ****
C
C          **** FROM TRAFFIC        TO BUYER
  747 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .40* TR(56)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .50* TR(20)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)= 30.00* TR(54)
      GOTO 9999
C
C        **** M3 STEP  19 ****
C
C          **** FROM CONTRACTOR     TO BUYER
  748 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(53)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(31)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .20* TR( 4)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C            REPRODUCTION SERVICE TIME
      ATT(53)= 15.00* TR(54)
```

```
      GOTO 9999
C
C       **** M3 STEP  20 ****
C
C         **** FROM REPRODUCTION TO CLERK
  749 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  750 GOTO 9999
  751 GOTO 9999
  752 GOTO 9999
  753 GOTO 9999
  754 GOTO 9999
  755 GOTO 9999
  756 GOTO 9999
  757 GOTO 9999
C       END OF M3 NETWORK
C       **** M4 NETWORK ****
  758 GOTO(759,760,761,762,763,764,765,766,767,768,769,770,
     *771,772,773,774,775,776,777,778,779,780,781,782,
     *783,784,785,786),STEP
C         **** M4 STEP   1 ****
C         **** FROM TRAFFIC        TO BUYER
  759 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(26)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M4 STEP   2 ****
C
C         **** FROM TRAFFIC        TO BUYER
  760 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(53)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
```

```
      ATT(44)=    .50* TR(46)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M4 STEP   3 ****
C
C          **** FROM TRAFFIC        TO BUYER
  761 ATT( 6)=1
C            BUYER                 SERVICE TIME
      ATT(42)=    .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO                   SERVICE TIME
      ATT(43)=    .50* TR(44)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M4 STEP   4 ****
C
C          **** FROM TRAFFIC        TO BUYER
  762 ATT( 6)=1
C            BUYER                 SERVICE TIME
      ATT(42)=   1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK                 SERVICE TIME
      ATT(44)=    .30* TR(35)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M4 STEP   5 ****
C
C          **** FROM TRAFFIC        TO BUYER
  763 ATT( 6)=1
C            BUYER                 SERVICE TIME
      ATT(42)=    .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO                   SERVICE TIME
      ATT(43)=    .30* TR(35)
C          **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C            CONTRACTOR            SERVICE TIME
      ATT(48)=176.00* TR(34)
      GOTO 9999
```

```
C
C       **** M4 STEP   6 ****
C
C       **** FROM CONTRACTOR    TO BUYER
  764 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C       **** FROM BUYER         TO TECH.EVAL
      ATT(19)=1
C           TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** M4 STEP   7 ****
C
C       **** FROM TECH.EVAL     TO BUYER
  765 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C       **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M4 STEP   8 ****
C
C       **** FROM TRAFFIC       TO BUYER
  766 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(34)
C       **** FROM BUYER         TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .50* TR(45)
C       **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M4 STEP   9 ****
C
C       **** FROM TRAFFIC       TO BUYER
  767 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C       **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M4 STEP  10 ****
```

```
C
C          **** FROM TRAFFIC       TO BUYER
  768 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(22)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.30* TR(44)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M4 STEP  11 ****
C
C          **** FROM TRAFFIC       TO BUYER
  769 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(46)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M4 STEP  12 ****
C
C          **** FROM TRAFFIC       TO BUYER
  770 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(45)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M4 STEP  13 ****
C
C          **** FROM TRAFFIC       TO BUYER
  771 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C          **** FROM BUYER         TO CLERK
```

```
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=    .30* TR(36)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M4 STEP  14 ****
C
C           **** FROM TRAFFIC        TO BUYER
  772 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .50* TR(66)
C           **** FROM BUYER          TO PCC
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C           **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M4 STEP  15 ****
C
C           **** FROM TRAFFIC        TO BUYER
  773 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .80* TR(33)
C           **** FROM BUYER          TO JAG
      ATT(18)=1
C             JAG            SERVICE TIME
      ATT(49)= 24.00* TR(55)
      GOTO 9999
C
C       **** M4 STEP  16 ****
C
C           **** FROM JAG            TO BUYER
  774 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=    .80* TR(33)
C           **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M4 STEP  17 ****
C
C           **** FROM TRAFFIC        TO BUYER
  775 ATT( 6)=1
C             BUYER          SERVICE TIME
```

```
      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER.        TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C        **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M4 STEP  18 ****
C
C        **** FROM TRAFFIC       TO BUYER
  776 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER         TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .40* TR(56)
C        **** FROM PCO           TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR(25)
C        **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** M4 STEP  19 ****
C
C        **** FROM CONTRACTOR    TO BUYER
  777 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER         TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR(33)
C        **** FROM PCO           TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .20* TR( 4)
C        **** FROM CLERK         TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
```

```
C
C       **** M4 STEP  20.****
C
C         **** FROM REPRODUCTION TO CLERK
  778 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  779 GOTO 9999
  780 GOTO 9999
  781 GOTO 9999
  782 GOTO 9999
  783 GOTO 9999
  784 GOTO 9999
  785 GOTO 9999
  786 GOTO 9999
C       END OF M4 NETWORK
C       **** M5 NETWORK ****
  787 GOTO(788,789,790,791,792,793,794,795,796,797,798,799,
     *800,801,802,803,804,805,806,807,808,809,810,811,
     *812,813,814,815),STEP
C         **** M5 STEP   1 ****
C         **** FROM TRAFFIC        TO BUYER
  788 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  7.00* TR(12)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M5 STEP   2 ****
C
C         **** FROM TRAFFIC        TO BUYER
  789 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(46)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
```

```
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M5 STEP   3 ****
C
C          **** FROM TRAFFIC        TO BUYER
  790 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO                   SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M5 STEP   4 ****
C
C          **** FROM TRAFFIC        TO BUYER
  791 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK                 SERVICE TIME
      ATT(44)=   .30* TR(35)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M5 STEP   5 ****
C
C          **** FROM TRAFFIC        TO BUYER
  792 ATT( 6)=1
C             BUYER                 SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO                   SERVICE TIME
      ATT(43)=   .30* TR(35)
C          **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C             CONTRACTOR            SERVICE TIME
      ATT(46)=17.00* TR(34)
      GOTO 9999
C
```

```
C       **** M5 STEP   6 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  793 ATT( 6)=1
C             BUYER          SERVICE TIME  ,
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** M5 STEP   7 ****
C
C         **** FROM TECH.EVAL     TO BUYER
  794 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M5 STEP   8 ****
C
C         **** FROM TRAFFIC       TO BUYER
  795 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(22)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(45)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M5 STEP   9 ****
C
C         **** FROM TRAFFIC       TO BUYER
  796 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.50* TR(64)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M5 STEP  10 ****
C
```

```
C          **** FROM TRAFFIC       TO BUYER
  797 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(22)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.30* TR(44)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M5 STEP  11 ****
C
C          **** FROM TRAFFIC       TO BUYER
  798 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(54)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C          **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M5 STEP  12 ****
C
C          **** FROM TRAFFIC       TO BUYER
  799 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C          **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.30* TR(35)
C          **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M5 STEP  13 ****
C
C          **** FROM TRAFFIC       TO BUYER
  800 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C          **** FROM BUYER         TO CLERK
      ATT(12)=1
```

```
C            CLERK          SERVICE TIME
      ATT(44)=    .30* TR(36)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M5 STEP  14 ****
C
C          **** FROM TRAFFIC        TO BUYER
  801 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TR(66)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M5 STEP  15 ****
C
C          **** FROM TRAFFIC        TO BUYER
  802 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .80* TR(33)
C          **** FROM BUYER          TO JAG
      ATT(18)=1
C            JAG            SERVICE TIME
      ATT(49)= 24.00* TR(55)
      GOTO 9999
C
C        **** M5 STEP  16 ****
C
C          **** FROM JAG            TO BUYER
  803 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .80* TR(33)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** M5 STEP  17 ****
C
C          **** FROM TRAFFIC        TO BUYER
  804 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   1.00* TR(56)
```

```
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M5 STEP  18 ****
C
C         **** FROM TRAFFIC        TO BUYER
  805 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C               PCO            SERVICE TIME
      ATT(43)=   .40* TR(56)
C         **** FROM PCO            TO COMMITTEE
      ATT(51)=1
C               COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(35)
C         **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** M5 STEP  19 ****
C
C         **** FROM TRAFFIC        TO BUYER
  806 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(74)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M5 STEP  20 ****
C
C         **** FROM TRAFFIC        TO BUYER
  807 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(51)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
```

```
C            PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME,
      ATT(44)=   .50* TR(25)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C        **** M5 STEP  21 ****
C
C          **** FROM CONTRACTOR     TO BUYER
  808 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(33)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .20* TR( 4)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** M5 STEP  22 ****
C
C          **** FROM REPRODUCTION TO CLERK
  809 ATT(10)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C            DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  810 GOTO 9999
  811 GOTO 9999
  812 GOTO 9999
  813 GOTO 9999
  814 GOTO 9999
```

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  815 GOTO 9999
C       END OF M5 NETWORK
C      **** M5 NETWORK ****
  816 GOTO(817,818,819,820,821,822,823,824,825,826,827,828,
     *829,830,831,832,833,834,835,836,837,838,839,840,
     *841,842,843,844),STEP
C       **** M6 STEP   1 ****
C         **** FROM TRAFFIC       TO BUYER
  817 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  4.00* TR(36)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=   .60* TR(14)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M6 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
  818 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .80* TR(63)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M6 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
  819 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC             SERVICE TIME
      ATT(43)=   .80* TR(35)
C         **** FROM PCC           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M6 STEP   4 ****
```

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C
C       **** FROM TRAFFIC       TO BUYER
  820 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  1.00* TR(56)
C       **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=   .30* TR(35)
C       **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** MS STEP   5 ****
C
C       **** FROM TRAFFIC       TO BUYER
  821 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR(46)
C       **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO               SERVICE TIME
      ATT(43)=   .30* TR(35)
C       **** FROM PCO           TO CONTRACTOR
      ATT(35)=1
C             CONTRACTOR        SERVICE TIME
      ATT(48)=176.00* TR(34)
      GOTO 9999
C
C       **** MS STEP   6 ****
C
C       **** FROM CONTRACTOR    TO BUYER
  822 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  1.00* TR(54)
C       **** FROM BUYER         TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL         SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** MS STEP   7 ****
C
C       **** FROM TECH.EVAL     TO BUYER
  823 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=  2.00* TR(55)
C       **** FROM BUYER         TO AUDIT
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      ATT(20)=1
C             AUDIT          SERVICE TIME
      ATT(55)=352.00* TR(54)
      GOTO 9999
C
C       **** M6 STEP   8 ****
C
C         **** FROM AUDIT          TO BUYER
  824 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(56)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .80* TR(35)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M6 STEP   9 ****
C
C         **** FROM TRAFFIC        TO BUYER
  825 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C         **** FROM BUYER          TO TRAFFIC
      ATT(15)=1
      GOTO 9999
C
C       **** M6 STEP  10 ****
C
C         **** FROM TRAFFIC        TO BUYER
  826 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(35)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.30* TR(44)
C         **** FROM CLERK          TO TRAFFIC
      ATT(29)=1
      GOTO 9999
C
C       **** M6 STEP  11 ****
C
C         **** FROM TRAFFIC        TO BUYER
  827 ATT( 6)=1
C             BUYER          SERVICE TIME
```

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      ATT(42)=  2.00* TR(56)
C        **** FROM BUYER.          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C        **** FROM CLERK           TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M6 STEP  12 ****
C
C        **** FROM TRAFFIC         TO BUYER
  828 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C        **** FROM BUYER           TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.00* TR(26)
C        **** FROM PCO             TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M6 STEP  13 ****
C
C        **** FROM TRAFFIC         TO BUYER
  829 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C        **** FROM BUYER           TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR(36)
C        **** FROM CLERK           TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M6 STEP  14 ****
C
C        **** FROM TRAFFIC         TO BUYER
  830 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(66)
C        **** FROM BUYER           TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C        **** FROM PCO             TO TRAFFIC
```

```
      ATT(36)=1
      GOTO 9999
C
C       **** M6 STEP  15 ****
C
C         **** FROM TRAFFIC       TO BUYER
  831 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .80* TR(33)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG             SERVICE TIME
      ATT(49)= 24.00* TR(55)
      GOTO 9999
C
C       **** M6 STEP  16 ****
C
C         **** FROM JAG           TO BUYER
  832 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .80* TR(33)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M6 STEP  17 ****
C
C         **** FROM TRAFFIC       TO BUYER
  833 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=   .30* TR( 3)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M6 STEP  18 ****
C
C         **** FROM TRAFFIC       TO BUYER
  834 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC             SERVICE TIME
```

```
      ATT(43)=    .40* TR(56)
C        **** FROM PCO.          TO COMMITTEE
      ATT(61)=1
C             COMMITTEE     SERVICE TIME
      ATT(51)= 24.00* TR(35)
C        **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** M6 STEP  19 ****
C
C        **** FROM TRAFFIC       TO BUYER
  835 ATT( 6)=1
C             BUYER         SERVICE TIME
      ATT(42)=  2.00* TR(74)
C        **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK         SERVICE TIME
      ATT(44)=    .80* TR(33)
C        **** FROM CLERK         TO TRAFFIC
      ATT(23)=1
      GOTO 9999
C
C       **** M6 STEP  20 ****
C
C        **** FROM TRAFFIC       TO BUYER
  836 ATT( 6)=1
C             BUYER         SERVICE TIME
      ATT(42)=  1.00* TR(51)
C        **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO           SERVICE TIME
      ATT(43)=    .50* TR(46)
C        **** FROM PCO           TO CLERK
      ATT(33)=1
C             CLERK         SERVICE TIME
      ATT(44)=    .50* TR(25)
C        **** FROM CLERK         TO CONTRACTOR
      ATT(27)=1
C             CONTRACTOR    SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** M6 STEP  21 ****
C
C        **** FROM CONTRACTOR    TO BUYER
  837 ATT( 6)=1
C             BUYER         SERVICE TIME
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      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER .        TO PCO
      ATT(14)=1
C           PCO             SERVICE TIME
      ATT(43)=   .30* TR(37)
C        **** FROM PCO            TO CLERK
      ATT(33)=1
C           CLERK           SERVICE TIME
      ATT(44)=   .20* TR( 4)
C        **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** M6 STEP  22 ****
C
C        **** FROM REPRODUCTION TO CLERK
  838 ATT(10)=1
C           CLERK           SERVICE TIME
      ATT(44)=   .30* TR( 3)
C        **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C           DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  839 GOTO 9999
  840 GOTO 9999
  841 GOTO 9999
  842 GOTO 9999
  843 GOTO 9999
  844 GOTO 9999
C       END OF M6 NETWORK
C       **** M7 NETWORK ****
  845 GOTO(846,847,848,849,850,851,852,853,854,855,856,857,
     *858,859,860,861,862,863,864,865,866,867,868,869,
     *870,871,872,873),STEP
C        **** M7 STEP   1 ****
C         **** FROM TRAFFIC       TO BUYER
  846 ATT( 6)=1
C           BUYER           SERVICE TIME
      ATT(42)=  5.00* TR(44)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK           SERVICE TIME
      ATT(44)=   .90* TR(44)
C        **** FROM CLERK          TO TRAFFIC
      ATT(29)=1
```

```
      GOTO 9999
C
C       **** M7 STEP   2 ****
C
C         **** FROM TRAFFIC       TO BUYER
  847 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M7 STEP   3 ****
C
C         **** FROM TRAFFIC       TO BUYER
  848 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCC
      ATT(14)=1
C             PCC            SERVICE TIME
      ATT(43)=  1.00* TR(26)
C         **** FROM PCC           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M7 STEP   4 ****
C
C         **** FROM TRAFFIC       TO BUYER
  849 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR(35)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M7 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
  850 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C          **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(34)
      GOTO 9999
C
C        **** M7 STEP   6 ****
C
C          **** FROM CONTRACTOR     TO BUYER
  851 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C            TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C        **** M7 STEP   7 ****
C
C          **** FROM TECH.EVAL      TO BUYER
  852 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C          **** FROM BUYER          TO AUDIT
      ATT(20)=1
C            AUDIT          SERVICE TIME
      ATT(55)=352.00* TR(54)
      GOTO 9999
C
C        **** M7 STEP   8 ****
C
C          **** FROM AUDIT          TO BUYER
  853 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(33)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(45)
C          **** FROM CLERK          TO PCO
      ATT(23)=1
```

```
C            PCO            SERVICE TIME
      ATT(43)=  1.00* TR(26)
C            **** FROM PCO            TO TRAFFIC
      ATT(35)=1
      GOTO 9999
C
C       **** M7 STEP   9 ****
C
C            **** FROM TRAFFIC        TO BUYER
  854 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C            **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M7 STEP  10 ****
C
C            **** FROM TRAFFIC        TO BUYER
  855 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(24)
C            **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M7 STEP  11 ****
C
C            **** FROM TRAFFIC        TO BUYER
  856 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  6.00* TR(33)
C            **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  3.00* TR(33)
C            **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M7 STEP  12 ****
C
C            **** FROM TRAFFIC        TO BUYER
  857 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C            **** FROM BUYER          TO CLERK
      ATT(12)=1
```

```
C            CLERK          SERVICE TIME
      ATT(44)=    .50* TR(45)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M7 STEP  13 ****
C
C           **** FROM TRAFFIC        TO BUYER
  858 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .75* TR(33)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   1.00* TR(26)
C           **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M7 STEP  14 ****
C
C           **** FROM TRAFFIC        TO BUYER
  859 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TR(49)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=    .30* TR(36)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M7 STEP  15 ****
C
C           **** FROM TRAFFIC        TO BUYER
  860 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=    .50* TR(66)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=    .50* TR(46)
C           **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
```

```
C       **** M7 STEP  16 ****
C
C         **** FROM TRAFFIC       TO BUYER
  861 ATT( 6)=1
C             BUYER           SERVICE TIME '
      ATT(42)=   .80* TR(33)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG             SERVICE TIME
      ATT(49)= 24.00* TR(55)
      GOTO 9999
C
C       **** M7 STEP  17 ****
C
C         **** FROM JAG           TO BUYER
  862 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   .80* TR(33)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M7 STEP  18 ****
C
C         **** FROM TRAFFIC       TO BUYER
  863 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=   .30* TR( 3)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M7 STEP  19 ****
C
C         **** FROM TRAFFIC       TO BUYER
  864 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=   .40* TR(56)
C         **** FROM PCO           TO COMMITTEE
      ATT(61)=1
```

```
C            COMMITTEE    SERVICE TIME
      ATT(51)= 24.00* TR(35)
C          **** FROM COMMITTEE    TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C        **** M7 STEP  20 ****
C
C          **** FROM TRAFFIC      TO BUYER
  865 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(74)
C          **** FROM BUYER        TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C          **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** M7 STEP  21 ****
C
C          **** FROM TRAFFIC      TO BUYER
  866 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(51)
C          **** FROM BUYER        TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO          TO CLERK
      ATT(33)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .50* TR(25)
C          **** FROM CLERK        TO CONTRACTOR
      ATT(27)=1
C            CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C        **** M7 STEP  22 ****
C
C          **** FROM CONTRACTOR   TO BUYER
  867 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER        TO PCO
      ATT(14)=1
```

```
C            PCO              SERVICE TIME
      ATT(43)=   .30* TR(35)
C          **** FROM PCO              TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M7 STEP  23 ****
C
C          **** FROM TRAFFIC        TO BUYER
  868 ATT( 6)=1
C            BUYER            SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK            SERVICE TIME
      ATT(44)=   .20* TR( 4)
C          **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C            REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** M7 STEP  24 ****
C
C          **** FROM REPRODUCTION TO CLERK
  869 ATT(10)=1
C            CLERK            SERVICE TIME
      ATT(44)=   .30* TR( 3)
C          **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C            DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  870 GOTO 9999
  871 GOTO 9999
  872 GOTO 9999
  873 GOTO 9999
C        END OF M7 NETWORK
C        **** M8 NETWORK ****
  874 GOTO(875,876,877,878,879,880,881,882,883,884,885,886,
     *887,888,889,890,891,892,893,894,895,896,897,898,
     *899,900,901,902,903,904,905,906),STEP
C          **** M8 STEP   1 ****
C          **** FROM TRAFFIC        TO BUYER
  875 ATT( 6)=1
C            BUYER            SERVICE TIME
      ATT(42)=  8.00* TR(55)
C          **** FROM BUYER          TO CLERK
```

```
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP   2 ****
C
C        **** FROM TRAFFIC        TO BUYER
  876 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C        **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M8 STEP   3 ****
C
C        **** FROM TRAFFIC        TO BUYER
  877 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(56)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(45)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP   4 ****
C
C        **** FROM TRAFFIC        TO BUYER
  878 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(38)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP   5 ****
C
C        **** FROM TRAFFIC        TO BUYER
```

```
  879 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.80* TR(33)
C           **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C         **** MB STEP   6 ****
C
C           **** FROM TRAFFIC        TO BUYER
  880 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR(35)
C           **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C         **** MB STEP   7 ****
C
C           **** FROM TRAFFIC        TO BUYER
  881 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C           **** FROM PCO            TO COMMITTEE
      ATT(61)=1
C             COMMITTEE      SERVICE TIME
      ATT(51)= 24.00* TR(45)
C           **** FROM COMMITTEE      TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C         **** MB STEP   8 ****
C
C           **** FROM TRAFFIC        TO BUYER
  882 ATT( 6)=1
C             BUYER          SERVICE TIME
```

```
      ATT(42)=  2.00* TR(57)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .40* TR(54)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP   9 ****
C
C        **** FROM TRAFFIC        TO BUYER
  883 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .80* TR(65)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .80* TR(35)
C        **** FROM PCO            TO CONTRACTOR
      ATT(35)=1
C           CONTRACTOR     SERVICE TIME
      ATT(48)=176.00* TR(34)
      GOTO 9999
C
C       **** M8 STEP  10 ****
C
C        **** FROM CONTRACTOR     TO BUYER
  884 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C        **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C           TECH.EVAL      SERVICE TIME
      ATT(50)=104.00* TR(36)
      GOTO 9999
C
C       **** M8 STEP  11 ****
C
C        **** FROM TECH.EVAL      TO BUYER
  885 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(55)
C        **** FROM BUYER          TO AUDIT
      ATT(20)=1
C           AUDIT          SERVICE TIME
      ATT(55)=352.00* TR(54)
      GOTO 9999
```

```
C
C       **** M8 STEP  12 ****
C
C         **** FROM AUDIT          TO BUYER
  886 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(42)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.50* TR(45)
C         **** FROM CLERK          TO PCO
      ATT(23)=1
C             PCO            SERVICE TIME
      ATT(43)=  1.50* TR(33)
C         **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M8 STEP  13 ****
C
C         **** FROM TRAFFIC        TO BUYER
  887 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M8 STEP  14 ****
C
C         **** FROM TRAFFIC        TO BUYER
  888 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  8.00* TR(54)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M8 STEP  15 ****
C
C         **** FROM TRAFFIC        TO BUYER
  889 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  8.00* TR(25)
C         **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
```

```
      ATT(44)=  3.50* TR(23)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP  16 ****
C
C        **** FROM TRAFFIC        TO BUYER
  890 ATT( 6)=1
C           BUYER                SERVICE TIME
      ATT(42)=  3.00* TR(53)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK                SERVICE TIME
      ATT(44)=   .50* TR(45)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP  17 ****
C
C        **** FROM TRAFFIC        TO BUYER
  891 ATT( 6)=1
C           BUYER                SERVICE TIME
      ATT(42)=   .75* TR(33)
C        **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO                  SERVICE TIME
      ATT(43)=  1.80* TR(43)
C        **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M8 STEP  18 ****
C
C        **** FROM TRAFFIC        TO BUYER
  892 ATT( 6)=1
C           BUYER                SERVICE TIME
      ATT(42)=   .50* TR(49)
C        **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK                SERVICE TIME
      ATT(44)=   .30* TR(36)
C        **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP  19 ****
```

```
C
C          **** FROM TRAFFIC        TO BUYER
  893 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=   .50* TR(66)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C               PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** M8 STEP  20 ****
C
C          **** FROM TRAFFIC        TO BUYER
  894 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=   .50* TR(33)
C          **** FROM BUYER          TO JAG
      ATT(18)=1
C               JAG            SERVICE TIME
      ATT(49)= 24.00* TR(55)
      GOTO 9999
C
C        **** M8 STEP  21 ****
C
C          **** FROM JAG            TO BUYER
  895 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=   .80* TR(33)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** M8 STEP  22 ****
C
C          **** FROM TRAFFIC        TO BUYER
  896 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
```

```
C
C       **** M8 STEP  23 ****
C
C         **** FROM TRAFFIC       TO BUYER
  897 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=   .40* TR(56)
C         **** FROM PCO           TO COMMITTEE
      ATT(61)=1
C             COMMITTEE       SERVICE TIME
      ATT(51)= 24.00* TR(35)
C         **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** M8 STEP  24 ****
C
C         **** FROM TRAFFIC       TO BUYER
  898 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  2.00* TR(74)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=   .80* TR(33)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP  25 ****
C
C         **** FROM TRAFFIC       TO BUYER
  899 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=  1.00* TR(51)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=   .50* TR(46)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M8 STEP  26 ****
```

```
C
C         **** FROM TRAFFIC       TO BUYER
  900 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=    .80* TR(33)
C         **** FROM BUYER         TO COMMITTEE
      ATT(15)=1
C             COMMITTEE     SERVICE TIME
      ATT(51)= 24.00* TR(36)
C         **** FROM COMMITTEE     TO TRAFFIC
      ATT(38)=1
      GOTO 9999
C
C       **** M8 STEP  27 ****
C
C         **** FROM TRAFFIC       TO BUYER
  901 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=    .80* TR(33)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** M8 STEP  28 ****
C
C         **** FROM TRAFFIC       TO BUYER
  902 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=   1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK           SERVICE TIME
      ATT(44)=    .60* TR(14)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** M8 STEP  29 ****
C
C         **** FROM TRAFFIC       TO BUYER
  903 ATT( 6)=1
C             BUYER           SERVICE TIME
      ATT(42)=    .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO             SERVICE TIME
      ATT(43)=   1.00* TR(54)
C         **** FROM PCO           TO CLERK
```

```
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR(25)
C           **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C           CONTRACTOR     SERVICE TIME
      ATT(48)= 80.00* TR(54)
      GOTO 9999
C
C       **** M8 STEP  30 ****
C
C           **** FROM CONTRACTOR     TO BUYER
  904 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)= 2.00* TR(54)
C           **** FROM BUYER          TO PCC
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .80* TR(33)
C           **** FROM PCC            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** M8 STEP  31 ****
C
C           **** FROM TRAFFIC        TO BUYER
  905 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .20* TR( 4)
C           **** FROM CLERK          TO REPRODUCTION
      ATT(25)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** M8 STEP  32 ****
C
C           **** FROM REPRODUCTION TO CLERK
  906 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C           **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C           DISTRIBUTION SERVICE TIME
```

```
      ATT(52)= 12.00* TR(35)
      GOTO 9999
C     END OF M8 NETWORK
C      **** F4 NETWORK ****
  907 GOTO(908,909,910,911,912,913,914,915,916,917,918,919,
     *920,921,922,923,924,925,926,927,928,929,930,931,
     *932,933,934,935),STEP
C       **** F4 STEP   1 ****
C         **** FROM TRAFFIC      TO BUYER
  908 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=  3.30* TR(33)
C         **** FROM BUYER        TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR(25)
C         **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F4 STEP   2 ****
C
C         **** FROM TRAFFIC      TO BUYER
  909 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .80* TR(33)
C         **** FROM BUYER        TO CLERK
      ATT(12)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .50* TR(46)
C         **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F4 STEP   3 ****
C
C         **** FROM TRAFFIC      TO BUYER
  910 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER        TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .50* TR(45)
C         **** FROM PCO          TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
```

```
C       **** F4 STEP   4 ****
C
C         **** FROM TRAFFIC       TO BUYER
  911 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR(35)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F4 STEP   5 ****
C
C         **** FROM TRAFFIC       TO BUYER
  912 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(37)
C         **** FROM PCO           TO CONTRACTOR
      ATT(35)=1
C             CONTRACTOR     SERVICE TIME
      ATT(48)=144.00* TR(43)
      GOTO 9999
C
C       **** F4 STEP   6 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  913 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER         TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)= 30.00* TR( 6)
      GOTO 9999
C
C       **** F4 STEP   7 ****
C
C         **** FROM TECH.EVAL     TO BUYER
  914 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.30* TR(56)
```

```
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** F4 STEP   8 ****
C
C          **** FROM TRAFFIC        TO BUYER
  915 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(54)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(45)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** F4 STEP   9 ****
C
C          **** FROM TRAFFIC        TO BUYER
  916 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.50* TR(46)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** F4 STEP  10 ****
C
C          **** FROM TRAFFIC        TO BUYER
  917 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  2.30* TR(44)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=  2.00* TR(24)
C          **** FROM CLERK          TO TRAFFIC
      ATT(26)=1
      GOTO 9999
C
C        **** F4 STEP  11 ****
C
C          **** FROM TRAFFIC        TO BUYER
  918 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .80* TR(55)
```

```
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK          SERVICE TIME
      ATT(44)=   .50* TR(45)
C          **** FROM CLERK          TO TRAFFIC
      ATT(23)=1
      GOTO 9999
C
C        **** F4 STEP  12 ****
C
C          **** FROM TRAFFIC        TO BUYER
  919 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=   .75* TR(33)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C               PCO            SERVICE TIME
      ATT(43)=  1.00* TR(53)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** F4 STEP  13 ****
C
C          **** FROM TRAFFIC        TO BUYER
  920 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=   .50* TR(49)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK          SERVICE TIME
      ATT(44)=   .30* TR(36)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** F4 STEP  14 ****
C
C          **** FROM TRAFFIC        TO BUYER
  921 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=   .50* TR(66)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C               PCO            SERVICE TIME
      ATT(43)=   .30* TR( 5)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
```

```
      GOTO 9999
C
C       **** F4 STEP  15 ****
C
C         **** FROM TRAFFIC       TO BUYER
  922 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=    .50* TR(33)
C         **** FROM BUYER         TO JAG
      ATT(18)=1
C             JAG               SERVICE TIME
      ATT(49)= 16.00* TR(56)
      GOTO 9999
C
C       **** F4 STEP  16 ****
C
C         **** FROM JAG           TO BUYER
  923 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=    .80* TR(33)
C         **** FROM BUYER         TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C       **** F4 STEP  17 ****
C
C         **** FROM TRAFFIC       TO BUYER
  924 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   1.00* TR(56)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=    .30* TR( 3)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F4 STEP  18 ****
C
C         **** FROM TRAFFIC       TO BUYER
  925 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   1.00* TR(54)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO               SERVICE TIME
      ATT(43)=    .30* TR( 5)
```

```
C          **** FROM PCC              TO CLERK
      ATT(33)=1
C               CLERK          SERVICE TIME
      ATT(44)=    .50* TR(25)
C          **** FROM CLERK            TO CONTRACTOR
      ATT(27)=1
C               CONTRACTOR     SERVICE TIME
      ATT(48)= 90.00* TR(54)
      GOTO 9999
C
C        **** F4 STEP  19 ****
C
C          **** FROM CONTRACTOR       TO BUYER
  926 ATT( 6)=1
C               BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER            TO PCC
      ATT(14)=1
C               PCC            SERVICE TIME
      ATT(43)=    .30* TR(35)
C          **** FROM PCC              TO CLERK
      ATT(33)=1
C               CLERK          SERVICE TIME
      ATT(44)=    .20* TR( 4)
C          **** FROM CLERK            TO REPRODUCTION
      ATT(26)=1
C               REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C        **** F4 STEP  20 ****
C
C          **** FROM REPRODUCTION TO CLERK
  927 ATT(13)=1
C               CLERK          SERVICE TIME
      ATT(44)=    .30* TR( 3)
C          **** FROM CLERK            TO DISTRIBUTION
      ATT(25)=1
C               DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  928 GOTO 9999
  929 GOTO 9999
  930 GOTO 9999
  931 GOTO 9999
  932 GOTO 9999
  933 GOTO 9999
  934 GOTO 9999
```

```
  935 GOTO 9999
C       END OF F4 NETWORK
C      **** A1 NETWORK ****
  936 GOTO(937,938),STEP
C       **** A1 STEP   1 ****
C         **** FROM TRAFFIC      TO BUYER
  937 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(57)
C         **** FROM BUYER        TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .60* TR(33)
C         **** FROM CLERK        TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** A1 STEP   2 ****
C
C         **** FROM TRAFFIC      TO BUYER
  938 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .30* TR(68)
C         **** FROM BUYER        TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR( 1)
C         **** FROM PCO          TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 3)
C         **** FROM CLERK        TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
C       END OF A1 NETWORK
C      **** F3 NETWORK ****
  939 GOTO(940,941,942,943,944,945,946,947,94 ,949,950,951,
     *952,953,954,955,956,957,958,959,960,961,962,963,
     *964,965,966,967),STEP
C       **** F3 STEP   1 ****
C         **** FROM TRAFFIC      TO PCO
  940 ATT(56)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C         **** FROM PCO          TO BUYER
      ATT(29)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=  5.00* TR(36)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  4.00* TR(23)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** F3 STEP   2 ****
C
C          **** FROM TRAFFIC        TO BUYER
  941 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .50* TR( 1)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** F3 STEP   3 ****
C
C          **** FROM TRAFFIC        TO BUYER
  942 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=  1.00* TR(44)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** F3 STEP   4 ****
C
C          **** FROM TRAFFIC        TO BUYER
  943 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  1.00* TR(51)
```

```
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** F3 STEP   5 ****
C
C         **** FROM TRAFFIC        TO BUYER
  944 ATT( 6)=1
C             BUYER                SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO                  SERVICE TIME
      ATT(43)=   .30* TR( 6)
C         **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK                SERVICE TIME
      ATT(44)=  1.50* TR(44)
C         **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** F3 STEP   6 ****
C
C         **** FROM TRAFFIC        TO BUYER
  945 ATT( 6)=1
C             BUYER                SERVICE TIME
      ATT(42)=  1.00* TR(54)
C         **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL            SERVICE TIME
      ATT(50)=100.00* TR(34)
      GOTO 9999
C
C         **** F3 STEP   7 ****
C
C         **** FROM TECH.EVAL      TO BUYER
  946 ATT( 6)=1
C             BUYER                SERVICE TIME
      ATT(42)=  2.00* TR(54)
C         **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C         **** F3 STEP   8 ****
C
C         **** FROM TRAFFIC        TO BUYER
  947 ATT( 6)=1
```

```
C            BUYER          SERVICE TIME
      ATT(42)=  4.00* TR(24)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C            PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C          **** FROM PCO            TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C        **** F3 STEP   9 ****
C
C          **** FROM TRAFFIC        TO BUYER
  948 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  2.00* TR(54)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** F3 STEP  10 ****
C
C          **** FROM TRAFFIC        TO BUYER
  949 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  8.00* TR(51)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=  3.00* TR(33)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** F3 STEP  11 ****
C
C          **** FROM TRAFFIC        TO BUYER
  950 ATT( 6)=1
C            BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C            CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
```

```
C       **** F3 STEP  12 ****
C
C         **** FROM TRAFFIC       TO BUYER
  951 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .80* TR(33)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO               SERVICE TIME
      ATT(43)=  1.00* TR(24)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** F3 STEP  13 ****
C
C         **** FROM TRAFFIC       TO BUYER
  952 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .50* TR(49)
C         **** FROM BUYER         TO CLERK
      ATT(12)=1
C             CLERK             SERVICE TIME
      ATT(44)=  1.00* TR(43)
C         **** FROM CLERK         TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C       **** F3 STEP  14 ****
C
C         **** FROM TRAFFIC       TO BUYER
  953 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .30* TR( 7)
C         **** FROM BUYER         TO PCO
      ATT(14)=1
C             PCO               SERVICE TIME
      ATT(43)=   .50* TR(45)
C         **** FROM PCO           TO TRAFFIC
      ATT(36)=1
      GOTO 9999
C
C       **** F3 STEP  15 ****
C
C         **** FROM TRAFFIC       TO BUYER
  954 ATT( 6)=1
C             BUYER             SERVICE TIME
      ATT(42)=   .90* TR( 6)
```

```
C          **** FROM BUYER          TO JAG
      ATT(18)=1
C               JAG                SERVICE TIME
      ATT(49)= 16.00* TR(56)
      GOTO 9999
C
C        **** F3 STEP  16 ****
C
C          **** FROM JAG            TO BUYER
  955 ATT( 6)=1
C               BUYER              SERVICE TIME
      ATT(42)=   .80* TR( 6)
C          **** FROM BUYER          TO TRAFFIC
      ATT(16)=1
      GOTO 9999
C
C        **** F3 STEP  17 ****
C
C          **** FROM TRAFFIC        TO BUYER
  956 ATT( 6)=1
C               BUYER              SERVICE TIME
      ATT(42)=  1.50* TR(56)
C          **** FROM BUYER          TO CLERK
      ATT(12)=1
C               CLERK              SERVICE TIME
      ATT(44)=   .80* TR(33)
C          **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C        **** F3 STEP  18 ****
C
C          **** FROM TRAFFIC        TO BUYER
  957 ATT( 6)=1
C               BUYER              SERVICE TIME
      ATT(42)=  1.00* TR(54)
C          **** FROM BUYER          TO PCO
      ATT(14)=1
C               PCO                SERVICE TIME
      ATT(43)=   .30* TR(35)
C          **** FROM PCO            TO CLERK
      ATT(33)=1
C               CLERK              SERVICE TIME
      ATT(44)=  1.00* TR(13)
C          **** FROM CLERK          TO CONTRACTOR
      ATT(27)=1
C               CONTRACTOR         SERVICE TIME
      ATT(48)= 54.00* TR(44)
```

```
      GOTO 9999
C
C       **** F3 STEP  19 ****
C
C         **** FROM CONTRACTOR    TO BUYER
  958 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .80* TR(33)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .30* TR(35)
C         **** FROM PCO            TO CLERK
      ATT(33)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR( 5)
C         **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C             REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** F3 STEP  20 ****
C
C         **** FROM REPRODUCTION TO CLERK
  959 ATT(10)=1
C             CLERK          SERVICE TIME
      ATT(44)=  1.00* TR( 4)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C             DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  960 GOTO 9999
  961 GOTO 9999
  962 GOTO 9999
  963 GOTO 9999
  964 GOTO 9999
  965 GOTO 9999
  966 GOTO 9999
  967 GOTO 9999
C       END OF F3 NETWORK
C       **** MU NETWORK ****
  968 GOTO(969,970,971,972,973,974,975,976,977,978,979,980,
     *981,982,983,984,985,986,987,988,989,990,991,992,
     *993,994,995,996),STEP
C         **** MU STEP   1 ****
C         **** FROM TRAFFIC        TO BUYER
```

```
  969 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  1.00* TR(56)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .30* TR(61)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** MO STEP   2 ****
C
C           **** FROM TRAFFIC        TO BUYER
  970 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .30* TR(65)
C           **** FROM BUYER          TO TECH.EVAL
      ATT(19)=1
C             TECH.EVAL      SERVICE TIME
      ATT(50)= 48.00* TR(46)
      GOTO 9999
C
C         **** MO STEP   3 ****
C
C           **** FROM TECH.EVAL      TO BUYER
  971 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=  3.00* TR(35)
C           **** FROM BUYER          TO CLERK
      ATT(12)=1
C             CLERK          SERVICE TIME
      ATT(44)=   .80* TR(33)
C           **** FROM CLERK          TO TRAFFIC
      ATT(28)=1
      GOTO 9999
C
C         **** MO STEP   4 ****
C
C           **** FROM TRAFFIC        TO BUYER
  972 ATT( 6)=1
C             BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C           **** FROM BUYER          TO PCO
      ATT(14)=1
C             PCO            SERVICE TIME
      ATT(43)=   .50* TR(46)
C           **** FROM PCO            TO CONTRACTOR
```

```
      ATT(35)=1
C           CONTRACTOR   SERVICE TIME
      ATT(43)= 80.00* TR(54)
      GOTO 9999
C
C       **** MO STEP   5 ****
C
C         **** FROM CONTRACTOR   TO BUYER
  973 ATT( 6)=1
C           BUYER          SERVICE TIME
      ATT(42)=   .50* TR(46)
C         **** FROM BUYER          TO PCO
      ATT(14)=1
C           PCO            SERVICE TIME
      ATT(43)=   .30* TR(61)
C         **** FROM PCO            TO CLERK
      ATT(33)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .30* TR(31)
C         **** FROM CLERK          TO REPRODUCTION
      ATT(26)=1
C           REPRODUCTION SERVICE TIME
      ATT(53)= 16.00* TR(54)
      GOTO 9999
C
C       **** MO STEP   6 ****
C
C         **** FROM REPRODUCTION TO CLERK
  974 ATT(10)=1
C           CLERK          SERVICE TIME
      ATT(44)=   .20* TR(51)
C         **** FROM CLERK          TO DISTRIBUTION
      ATT(25)=1
C           DISTRIBUTION SERVICE TIME
      ATT(52)= 12.00* TR(35)
      GOTO 9999
  975 GOTO 9999
  976 GOTO 9999
  977 GOTO 9999
  978 GOTO 9999
  979 GOTO 9999
  980 GOTO 9999
  981 GOTO 9999
  982 GOTO 9999
  983 GOTO 9999
  984 GOTO 9999
  985 GOTO 9999
  986 GOTO 9999
```

```
  987 GOTO 9999
  988 GOTO 9999
  989 GOTO 9999
  990 GOTO 9999
  991 GOTO 9999
  992 GOTO 9999
  993 GOTO 9999
  994 GOTO 9999
  995 GOTO 9999
  996 GOTO 9999
C       END OF MC NETWORK
C
C ****************************************
C     TABULATE RESULTS OF EACH SINK
 3000 XXXX = TMARK(IDUM)
      IF(TNOW.GT.START) THEN
      X = TNOW-XXXX
      DO 1088 K = 1,28
C       *** TOTALS FOR THIS RUN ***
      IF (ATT(2).EQ.K) THEN
      TOTX(K) = TOTX(K) + X
      ITTN(K) = ITTN(K) + 1
      SUMSQ(K) = SUMSQ(K) + X**2
C       *** TOTALS FOR ALL RUNS ***
      CTOTX(K) = CTOTX(K) + X
      NTOT(K) = NTOT(K) + 1
      CSSQ(K) = CSSQ(K) +  X**2
      ENDIF
 1088 CONTINUE
      ENDIF
      UF = 3
      RETURN
C
C     ********** RETURN **********
 9999 ATT(1) = STEP + 1.
C
C
C  TOTAL WORK TIME IS AUGMENTED WITH NON-PRODUCTIVE TIME
C   COMPOSED OF NON-DATACEN WORK, IDLENESS, AND LEAVE.
      ATT(42) = ATT(42) * 2.28
      ATT(43) = ATT(43) * 2.32
      ATT(44) = ATT(44) * 2.06
C
      ATT(62) = ATT(44) * BURDB
      ATT(63) = ATT(44) * BURDA
C         BUYER B
C
      IF(ATT(4).EQ.2) THEN
```

```
            ATT(7) = ATT(6)
            ATT(6) = 0
            ATT(22) = ATT(21)
            ATT(21) = 0
            ATT(30) = ATT(29)
            ATT(29) = 0
            ATT(46) =  ATT(45)
            ATT(45) = 0
         END IF
C
C           BUYER C
C
         IF(ATT(4).EQ.3) THEN
            ATT(6) = ATT(6)
            ATT(6) = 0
            ATT(56) = ATT(21)
            ATT(21) = 0
            ATT(31) = ATT(29)
            ATT(29) = 0
            ATT(47) = ATT(45)
            ATT(45) = 0
         ENDIF
C
C           BUYER D
C
         IF(ATT(4).EQ.4) THEN
            ATT(9) = ATT(6)
            ATT(6) = 0
            ATT(57) = ATT(21)
            ATT(21) = 0
            ATT(32) = ATT(29)
            ATT(29) = 0
            ATT(59) = ATT(45)
            ATT(45) = 0
         ENDIF
C
C WITHOUT THE NEXT FEW LINES ALL WORK WOULD GO TO CLERK-A.
C
         IF(ATT(4).GE.PATIC) THEN
            ATT(11) = ATT(10)
            ATT(10) = 0
            ATT(13) = ATT(12)
            ATT(12) = 0
            ATT(34) = ATT(33)
            ATT(33) = 0
            ATT(41) = ATT(40)
            ATT(40) = 0
         ENDIF
```

```
C
C
      CALL PUTAT(ATT)
      UF = 1
      RETURN
      END
C 000000003000000000000000300000000300000000000000000
      SUBROUTINE UI
      COMMON/QVAR/NDE,NFTBU(500),NREL(500),NRELP(500),NREL2(500),
     1NRUN,NRUNS,NTC(500),PARAM(100,4),TBEG,TNOW
      COMMON/CHRIS/TOTX(28),ITTN(28),SUMSQ(28),X,CTOTX(28),
     1NTOT(28),CSSQ(28)
      INTEGER I,J,K
      DO 17 K = 1,28
      TOTX(K) = 0
      ITTN(K) = 0
      SUMSQ(K) = 0
      IF(NRUN.EQ.1) THEN
        CTOTX(K) = 0
        NTOT(K) = 0
        CSSQ(K) = 0
      ENDIF
   17 CONTINUE
      IF(NRUN.EQ.1) THEN
      J=10
      DO 8888 I = 1,99
      IF(I.EQ.J) THEN
      J=J+10
      GOTO 8888
      ENDIF
      CALL CPTR(I)
 8888 CONTINUE
      ENDIF
      X = 0
      RETURN
      END
C
      SUBROUTINE UO
      REAL STDDEV, AVEX
      INTEGER K
       CHARACTER LIST(28)*2
      COMMON/QVAR/NDE,NFTBU(500),NREL(500),NRELP(500),NREL2(500),
     1NRUN,NRUNS,NTC(500),PARAM(100,4),TBEG,TNOW
      COMMON/CHRIS/TOTX(28),ITTN(28),SUMSQ(28),X,CTOTX(28),
     1NTOT(28),CSSQ(28)
      DATA LIST/'C2','C3','C4','C5','C6','C7','C8','F2','S2',
     *'S3','S4','S5','S6','S7','S8','C9','F1','M2','M3','M4',
     *'M5','M6','M7','M8','FA','A1','F3','M0'/
```

```
      WRITE(6,*) '  '
      WRITE(6,100) NRUN
      WRITE(6,102)
      DO 19 K = 1,28
      IF(ITTN(K).GT.0) THEN
      AVEX = TOTX(K) / ITTN(K)
      IF(ITTN(K).GT.1) THEN
      STDDEV=SQRT((SUMSQ(K)-((TOTX(K)**2)/ITTN(K)))/(ITTN(K)-1))
      ELSE
      STDDEV = 0
      ENDIF
      ELSE
      AVEX = 0
      STDDEV = 0
      ENDIF
      WRITE(6,104) LIST(K),ITTN(K),AVEX,STDDEV
  100 FORMAT(6X,'R U N   N U M B E R  ',I3)
  102 FORMAT(6X,'NETWORK',3X,'COMPLETIONS',3X,'AVE TIME',3X,
     1'STD DEVIATION')
  104 FORMAT(10X,A2,7X,I3,7X,F7.1,6X,F7.1)
   19 CONTINUE
      IF(NRUNS.EQ.NRUN) THEN
C******* PRINT OUT AFTER ALL RUNS ******
      WRITE(6,110)
      WRITE(6,112)
      DO 9998 K = 1,28
      IF(NTOT(K).GT.0) THEN
         AVEX = CTOTX(K) / NTOT(K)
         IF(NTOT(K).GT.1) THEN
      STDDEV=SQRT((CSSQ(K)-((CTOTX(K)**2)/NTOT(K)))/(NTOT(K)-1))
      IF(NTOT(K).GE.30) THEN
      CILP = AVEX - (1.645 * STDDEV)
      CIHP = AVEX + (1.645 * STDDEV)
      X = REAL(NTOT(K))
      CILM = AVEX - (1.645 * (STDDEV/SQRT(X)))
      CIHM = AVEX + (1.645 * (STDDEV/SQRT(X)))
      ELSE
      CILP = 0
      CIHP = 0
      CILM = 0
      CIHM = 0
      ENDIF
      ELSE
      STDDEV = 0
      CILM = 0
      CIHM = 0
      CILP = 0
```

```
      CIHP = 0
      ENDIF
      WRITE(6,114) LIST(K),NCT(K),AVE(K),STDDEV,CILM,CIHM,
     1CILP,CIHP
      ENDIF
  110 FORMAT(1X,///,1X,'GRAND TOTAL FOR ALL RUNS')
  112 FORMAT(4X,'NETWORK',3X,'COMPLETIONS',3X,'AVG TIME',
     13X,'STD DEV',3X,'90% CI-MEAN',3X,'90% CI-PREDICTION')
  114 FORMAT(7X,A2,9X,I4,5X,F7.1,3X,F7.1,4X,F7.1,1X,'-',1X,
     1F7.1,1X,F7.1,1X,'-',1X,F7.1)
 9995 CONTINUE
      ENDIF
      RETURN
      END
```

APPENDIX D

Q-GERT PROCEDURES (QGPROC)

```
CDM,T200,I0200,CM300000. TS30299,CHRIS
ATTACH,PROCFIL,ID=AS10171,SN=ASDAD.
BEGIN,NOSFILE.
ATTACH,PROCFIL,QGERTPROC,ID=AFIT.
GET,SUB,ID=MILLER.
GET,STAGE,ID=MILLER.
FTN5(I=SUB,LO=0,ANSI=0)
BEGIN,QGERT,,I=STAGE,L=DPOUT1,M=LGO,VER=5,MODE=X.
REPLACE,DPOUT1,ID=MILLER.
ROUTE,DPOUT1,TID=AF,DC=PR,FID=CDM,ST=CCA.
```

APPENDIX E

INTERVIEW

INTERVIEW

I am gathering data for a thesis which I am doing for AFIT. The purpose of my thesis is to develop a model of R&D Contracting. A model which will imitate the time it takes to award a contract. For example, if it takes your branch an average of 45 days to process a funding action, I want my model to come up with 45 days, also.

In order to get my model to do this, I need accurate estimates of the time to complete each step of the contracting process. This is where you come in. I would like you to provide me with your best estimate of the time it takes you to complete each step of the contracting process.

The questionaire is very lengthy, and will take some time to fill out. Please think carefully about each step. Because only twelve experts are filling out this questionaire, your estimates will have a large influence on the group average. Be as precise as you can. If one of your estimates is 10 minutes, don't round it to 'one-half hour', write it as '10 minutes'. Of course for long time periods (such as the RFP solicitation time), being precise may be specifying 35 days, rather than rounding it to one month. If any step is ambiguous, mark it, and ask me about it. I will try to check with you several times during the day.

Your estimates and answers to my questions will be kept anonymous and confidential.

If you find any step or anything in the step which you do not usually do, or if an important item has been left out, please let me know.

I would like you to make three estimates for each contract step. The first estimate is for the normal, or average, time to complete the step. The second estimate is for the optimistic, or short time that the step can be performed if there are few problems, and most things go smoothly. The third estimate is the pessimistic time, the long time that this step would take if there are many problems on this buy. Your estimates should be based on the time that you start working on that step to when you finish the step. Assume that you have nothing else to do and there are no interruptions.

On some of the steps, three extra estimates must be made: (1) the percentage of time the normal situation occurs, (2) the percentage of time the second situation occurs, and (3) the percentage of time the third situation occurs.

No one expects anyone to work 8 hours without taking breaks and socializing. Not counting your lunch time, what percentage of your day do you think you spend not working?

Thank you for your cooperation in this study.

APPENDIX F

CLERK QUESTIONNAIRE

C2 COMPETITIVE BUY $ 10,000 to $100,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- TPP (FI 8)
- Contract Type D&F (FI 9)

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO)

---

to buyer, PCO

STEP 4: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 5: Mail RFP

Check Reproduction

Type envelopes

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buyer

STEP 6: Type Technically Unacceptable Letters and/or single source justification (if required)

---

to Buyer

STEP 7: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 8: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 9: Make corrections to contract (buyer)

---

to Buyer, PCO

STEP 10: Make corrections to contract (PCO)

---

to Buyer, PCO

STEP 11: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 12: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 13: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

C3 COMPETITIVE BUY $ 100,000 to $ 250,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- TPP (FI 8)
- Contract Type D&F (FI 9)

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO)

---

to buyer, PCO

STEP 4: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 5: Mail RFP

Check Reproduction

Type envelopes

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buyer

STEP 6: Type Technically Unacceptable Letters and/or single source justification (if required)

---

to Buyer

STEP 7: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 8: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 9: Make corrections to contract (buyer's)

---

to Buyer, PCO

STEP 10: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 11: Make corrections to contract (JAG's)

STEP 12: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 13: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 14: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

C4 COMPETITIVE BUY $ 250,000 to $ 500,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- TPP (FI 8)
- Contract Type D&F (FI 9)

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 6: Mail RFP

Check Reproduction

Type envelopes

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buyer

STEP 7: Type Technically Unacceptable Letters and/or single source justification (if required)

---

to Buyer

STEP 8: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 9: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 10: Make corrections to contract (buyer's)

---

to Buyer, PCO

STEP 11: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 12: Make corrections to contract (JAG's)

STEP 13: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 14: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 15: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

C5 COMPETITIVE BUY $ 500,000 to $ 750,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- TPP (FI 8)
- Contract Type D&F (FI 9)

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: Make RFP Corrections (PMRC's)

---

to buyer, PCO

STEP 6: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 7: Mail RFP

Check Reproduction

Type envelopes, date stamp RFP

Put RFP in Mail

---

to offerors, request RFP Amendment

STEP 8: Type RFP Amendment and envelopes, mail

---

to offerors, buyer, Lab, buyer

STEP 9: Type Technically Unacceptable Letters and/or single source justification (if required)

---

to Buyer

STEP 10: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 11: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type DD1499

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 12: Make corrections to contract (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 13: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 14: Make corrections to contract (JAG's)

STEP 15: Make corrections to contract (PMRC's)

STEP 16: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 17: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 18: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

C6 COMPETITIVE BUY $ 750,000 to $ 1,000,000. Clerk's Steps

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- TPP (FI 8)
- Contract Type D&F (FI 9)

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: Make RFP Corrections (PMRC's)

---

to buyer, PCO

STEP 6: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 7: Mail RFP

Check Reproduction

Type envelopes

Date stamp RFP

Put RFP in Mail

---

to offerors, request RFP Amendment

STEP 8: Type RFP Amendment and envelopes, mail

---

to offerors, buyer, Lab, buyer

STEP 9: Type Technically Unacceptable Letters and/or single source justification (if required)

---

to Buyer

STEP 10: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 11: Type Contract Award

Type Contract

Type ROCA

Type DD350, DD1499, JAG sheet, Committee sheet

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 12: Make corrections to contract (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 13: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 14: Make corrections to contract (JAG's)

STEP 15: Make corrections to contract (PMRC's)

STEP 16: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 17: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 18: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

C7 COMPETITIVE BUY $ 1,000,000 to $ 3,500,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- TPP (FI 8)
- Contract Type D&F (FI 9)
- FI 59 - JAG review sheet
- FI 66 - Committee review sheet

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: Make RFP Corrections (PMRC's)

---

to buyer, PCO

STEP 6: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 7: Mail RFP

Check Reproduction

Type envelopes

Date stamp RFP

Put RFP in Mail

---

to offerors, request RFP Amendment

STEP 8: Type RFP Amendment and envelopes, mail

---

to offerors, buyer, Lab, buyer

STEP 9: Type Technically Unacceptable Letters and/or single source justification (if required)

and type pre-negotiation presentation documents

---

to Buyer

STEP 10: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 11: Type Contract Award

EEO TWX

Type Contract

Type ROCA (pricing is typing PNM)

Type DD1499

Type DD350

Type FI 39 - Patent Rights

FI 59 - JAG review sheet

FI 66 - Committee review sheet

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 12: Make corrections to contract (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 13: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 14: Make corrections to contract (JAG's)

STEP 15: Make corrections to contract (PMRC's)

STEP 16: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 17: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 18: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

C8 COMPETITIVE BUY $ 3,500,000 to $10,000,000. Clerk's Steps

STEP 1: Type-up BSP Minutes Agenda

---

get RFP from Buyer

STEP 2: RFP

Type BSP Minutes for ASD/PMR signature

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- D&F (FI 8)
- Contract Type D&F (FI 9)
- FI 59 - JAG review sheet
- FI 66 - Committee review sheet
- ASD/PMC review sheet

Set-up Contract File

---

to buyer

STEP 3: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 4: Make RFP Corrections (PCO's)

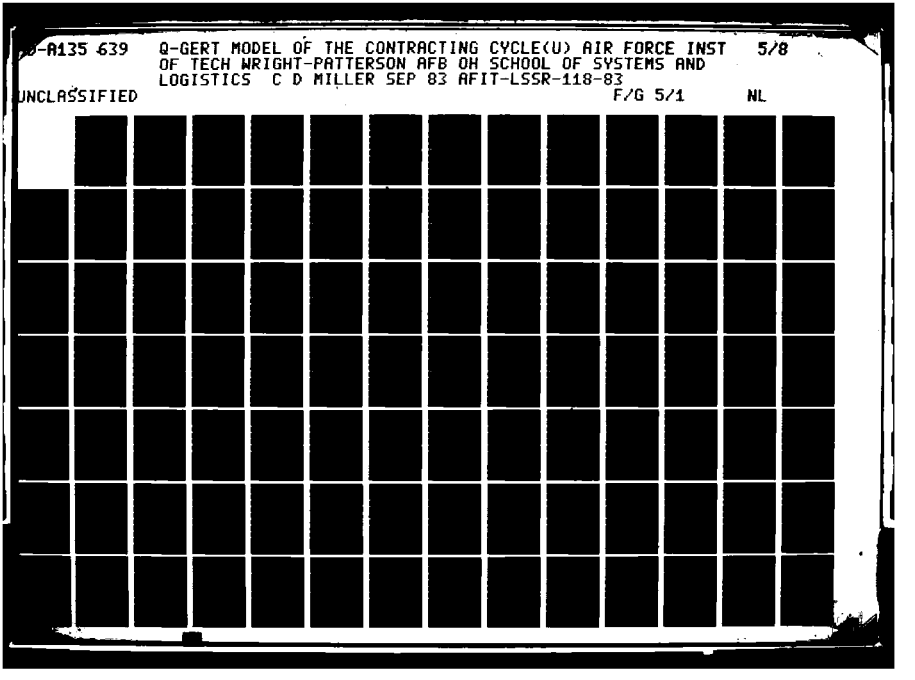
---

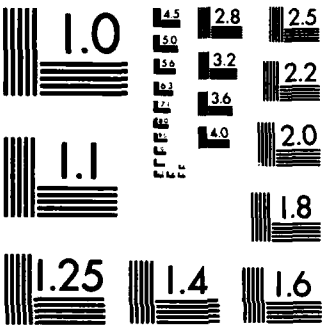
to buyer, PCO, JAG

STEP 5: Make RFP Corrections (JAG's)

---

to buyer, PCO


0-A135 639 Q-GERT MODEL OF THE CONTRACTING CYCLE(U) AIR FORCE INST 5/8
OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND
LOGISTICS C D MILLER SEP 83 AFIT-LSSR-118-83
UNCLASSIFIED F/G 5/1 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

STEP 6: Make RFP Corrections (PMRC's)

---

to buyer, PCC

STEP 7: Make RFP Corrections (ASD/PMC)

---

to buyer, PCO

STEP 8: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 9: Mail RFP

Check Reproduction

Type envelopes

Date stamp RFP

Put RFP in Mail

---

to offerors, request RFP Amendment

STEP 10: Type RFP Amendment and envelopes, mail

---

to offerors, buyer, Lab, buyer

STEP 11: Type Technically Unacceptable Letters and/or single source justification (if required)

and type pre-negotiation presentation documents

---

to Buyer

STEP 12: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 13: Type Contract Award

EEO TWX

Type Contract

Type ROCA (pricing is typing PNM)

Type DD1499

Type DD350

Type FI 39 - Patent Rights

FI 59 - JAG review sheet

FI 66 - Committee review sheet

ASD/PMC review sheet and file

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 14: Make corrections to contract (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 15: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 16: Make corrections to contract (JAG's)

STEP 17: Make corrections to contract (PMRC's)

STEP 18: Make corrections to contract (ASD/PMC)

STEP 19: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 20: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 21: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

S2 SOLE SOURCE BUY $ 10,000 to $100,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP (letter or full)
- DD254 corrections
- Acquisition Plan
- D&F (FI 8)
- Contract Type D&F (FI 9)
- Sole Source Justification (FI 2)

Set-up Contract File

---

to buyer

STEP 2: Make RFP Corrections (Buyer)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO)

---

to buyer, PCO

STEP 4: Mail RFP

Xerox RFP

Type envelope

Date stamp RFP

Put RFP in Mail

---

to offeror, buyer, Lab, buyer

STEP 5: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 6: Make corrections to contract (buyer)

---

to Buyer, PCO

STEP 7: Make corrections to contract (PCO)

---

to Buyer, PCO

STEP 8: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 9: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 10: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

S3 SOLE SOURCE BUY $ 100,000 to $ 250,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- D&F (FI 8)
- Contract Type D&F (FI 9)
- Sole Source Justification (FI 2)

Set-up Contract File

---

to buyer

STEP 2: Make RFP Corrections (Buyer)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO)

---

to buyer, PCO

STEP 4: Mail RFP

Xerox RFP

Type envelope

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buyer

STEP 5: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 6: Make corrections to contract (buyer's)

---

to Buyer, PCO

STEP 7: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 8: Make corrections to contract (JAG's)

STEP 9: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 10: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 11: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

S4 SOLE SOURCE BUY $ 250,000 to $ 500,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
RFP
DD254 corrections
Acquisition Plan
Sole Source Justification (FI 2)
D&F (FI 8)
Contract Type D&F (FI 9)

Set-up Contract File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: Mail RFP

Xerox RFP

Type envelope

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buyer

STEP 6: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 7: Make corrections to contract (buyer's)

---

to Buyer, PCO

STEP 8: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 9: Make corrections to contract (JAG's)

STEP 10: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 11: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 12: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

S5 SOLE SOURCE BUY $ 500,000 to $ 750,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
RFP
DD254 corrections
Acquisition Plan
Sole Source Justification (FI 2)
TPP (FI 8)
Contract Type D&F (FI 9)

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: Make RFP Corrections (PMRC's)

---

to buyer, PCO

STEP 6: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 7: Mail RFP

Check Reproduction

Type envelope

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buyer

STEP 8: Type Contract Award

Type Contract

Type ROCA

Type DD350, DD1499, JAG sheet, Committee sheet

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 9: Make corrections to contract (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 10: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 11: Make corrections to contract (JAG's)

STEP 12: Make corrections to contract (PMRC's)

STEP 13: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 14: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 15: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

S6 SOLE SOURCE BUY $ 750,000 to $ 1,000,000. Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
RFP
DD254 corrections
Acquisition Plan
Sole Source Justification (FI 2)
TPP (FI 8)
Contract Type D&F (FI 9)

Set-up RFP File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: Make RFP Corrections (PMRC's)

---

to buyer, PCO

STEP 6: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 7: Mail RFP

Check Reproduction

Type envelope

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buver

STEP 8: Type Contract Award

Type Contract

Type ROCA

Type DD350, DD1499, JAG sheet, Committee sheet

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 9: Make corrections to contract (buver's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 10: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 11: Make corrections to contract (JAG's)

STEP 12: Make corrections to contract (PMRC's)

STEP 13: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 14: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 15: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

S7 SOLE SOURCE BUY $ 1,000,000 to $ 3,500,000. Clerk's Steps

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Sole Source Justification (FI 2)
- D&F (FI 8)
- Contract Type D&F (FI 9)
- FI 59 - JAG review sheet
- FI 66 - Committee review sheet

Set-up Contract File

---

to buyer

STEP 2: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 4: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 5: Make RFP Corrections (PMRC's)

---

to buyer, PCO

STEP 6: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 7: Mail RFP

Check Reproduction

Type envelope

Date stamp RFP

Put RFP in Mail

---

to offeror, request RFP Amendment

STEP 8: Type RFP Amendment and envelope, mail

---

to offeror, buyer, Lab, buyer

STEP 9: Type Contract Award

EEO TWX

Type Contract

Type ROCA (pricing is typing PNM)

Type DD1499

Type DD350

Type FI 39 - Patent Rights

FI 59 - JAG review sheet

FI 66 - Committee review sheet

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 10: Make corrections to contract (buyer's)
and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 11: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 12: Make corrections to contract (JAG's)

STEP 13: Make corrections to contract (PMRC's)

STEP 14: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 15: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 16: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

S8 SOLE SOURCE BUY $ 3,500,000 to $10,000,000. Clerk's Steps

STEP 1: Type-up BSP Minutes Agenda

---

get RFP from Buyer

STEP 2: RFP

Type BSP Minutes for ASD/PMR signature

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Sole Source Justification (FI 2)
- D&F (FI 8)
- Contract Type D&F (FI 9)
- FI 59 - JAG review sheet
- FI 66 - Committee review sheet
- ASD/PMC review sheet

Set-up Contract File

---

to buyer

STEP 3: Make RFP Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 4: Make RFP Corrections (PCO's)

---

to buyer, PCO, JAG

STEP 5: Make RFP Corrections (JAG's)

---

to buyer, PCO

STEP 6: Make RFP Corrections (PMRC's)

---

to buyer, PCO

STEP 7: Make RFP Corrections (ASD/PMC)

---

to buyer, PCO

STEP 8: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 9: Mail RFP

Check Reproduction

Type envelope

Date stamp RFP

Put RFP in Mail

---

to offeror, request RFP Amendment

STEP 10: Type RFP Amendment and envelope, mail

---

to offeror, buyer, Lab, buyer

STEP 11: Type pre-negotiation presentation documents

---

to Buyer who writes contract award

STEP 12: Type Contract Award

EEO TWX

Type Contract

Type ROCA (pricing is typing PNM)

Type DD1499

Type DD350

Type FI 39 - Patent Rights

FI 59 - JAG review sheet

FI 66 - Committee review sheet

ASD/PMC review sheet and file

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 13: Make corrections to contract (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 14: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 15: Make corrections to contract (JAG's)

STEP 16: Make corrections to contract (PMRC's)

STEP 17: Make corrections to contract (ASD/PMC)

STEP 18: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 19: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 20: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

M2 CONTRACT MOD $ 10,000 to $100,000. Clerk's Steps

---

get letter from Buyer

STEP 1: Type letter to contractor with Statement of Work changes. Envelope. Carbons.

---

to buyer

STEP 2: Make Corrections (Buyer)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make Corrections (PCO)

---

to buyer, PCO

---

to offeror, buyer, Lab, buyer

STEP 4: Type Modification

Type Modification

Type ROCA

Type DD350

FI 53

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Set-up contract file

---

to Buyer

STEP 5: Make corrections to Mod (buyer)

---

to Buyer, PCO

STEP 6: Make corrections to Mod (PCO)

---

to Buyer, PCO

STEP 7: Mail Mod to Contractor

Input 68X, 70E, 70H, 69K (BV2)

Xerox mod, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 8: Send Modification to Repro

Type DD 843, send contract to Bldg 5

STEP 9: Send Modification to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

M3 MODIFICATION $ 100,000 to $ 250,000. Clerk's Steps

---

get letter from Buyer

STEP 1: Type letter to contractor with Statement of Work changes. Envelope. Carbons.

---

to buyer

STEP 2: Make Corrections (Buyer)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make Corrections (PCO)

---

to buyer, PCO

---

to offerors, buyer, Lab, buyer

STEP 4: Type Contract Modification

Type modification

Type ROCA

Type DD350

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Set-up Contract File

---

to Buyer

STEP 5: Make corrections to modification (buyer's)

---

to Buyer, PCO

STEP 6: Make corrections to modification (PCO's)

---

to Buyer, PCO

STEP 7: Make corrections to modification (JAG's)

STEP 8: Mail modification to Contractor

Input 68X, 70E, 70H, 69K (BV2)

Xerox modification, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 9: Send modification to Repro

Type DD 843, send modification to Bldg 5

STEP 10: Send to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)

M4 MODIFICATION $ 250,000 to $ 500,000. Clerk's Steps

---

get letter from Buyer

STEP 1: Type letter to contractor with Statement of Work changes. Envelope. Carbons.

---

to buyer

STEP 2: Make Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make Corrections (PCO's)

---

to buyer, PCO

STEP 4: Type Modification

Type Modification

Type ROCA

Type DD350

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Set-up Contract File

---

to Buyer

STEP 5: Make corrections to Modification (buyer's)

---

to Buyer, PCO

STEP 6: Make corrections to Modification (PCO's)

to Buyer, PCO

STEP 7: Make corrections to Modification (JAG's)

STEP 8: Mail Modification to Contractor

Input 68X, 70E, 70H, 69K (BV2)

Xerox Modification, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 9: Send Modification to Repro

Type DD 843, send Modification to Bldg 5

STEP 10: Send Modification to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

M5 MODIFICATION $ 500,000 to $ 750,000. Clerk's Steps

---

get letter from Buyer

STEP 1: Type letter to contractor with Statement of Work changes. Envelope. Carbons.

---

to buyer

STEP 2: Make Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make Corrections (PCO's)

---

to buyer, PCO

---

to offerors, buyer, Lab, buyer

STEP 4: Type Modification

Type Modification

Type ROCA

Type DD350

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Set-up Contract File

---

to Buyer

STEP 5: Make corrections to Modification (buyer's)

and Type-up Small Business Contracting Plan evaluation

to Buyer, PCO

STEP 6: Make corrections to Modification (PCO's)

---

to Buyer, PCO

STEP 7: Make corrections (JAG's)

STEP 8: Make corrections (PMRC's)

STEP 9: Mail Modification to Contractor

Input 68X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 10: Send Modification to Repro

Type DD 843, send Modification to Bldg 5

STEP 11: Send Modification to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

M6 MODIFICATION $ 750,000 to $ 1,000,000. Clerk's Steps

---

get letter from Buyer

STEP 1: Type letter to contractor with Statement of Work changes. Envelope. Carbons.

---

to buyer

STEP 2: Make Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make Corrections (PCO's)

---

to buyer, PCO

---

to offerors, buyer, Lab, buyer

STEP 4: Type Modification Award

Type Modification

Type ROCA

Type DD350, DD1499

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Set-up Contract File

---

to Buyer

STEP 5: Make corrections to Modification (buyer's)

and Type-up Small Business Contracting Plan evaluation

to Buyer, PCO

STEP 6: Make corrections to Modification (PCO's)

---

to Buyer, PCO

STEP 7: Make corrections to Modification (JAG's)

STEP 8: Make corrections to Modification (PMRC's)

STEP 9: Mail Modification to Contractor

Input 68X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 10: Send Modification to Repro

Type DD 843, send Modification to Bldg 5

STEP 11: Send Modification to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

M7 MODIFICATION $ 1,000,000 to $ 3,500,000. Clerk's Steps

---

get Letter from Buyer

STEP 1: Type letter to contractor with statement of Work changes. Envelope. Carbons.

---

to buyer

STEP 2: Make Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make Corrections (PCO's)

STEP 4: Type pre-negotiation presentation documents

---

to Buyer

STEP 5: Type Modification

Type Modification

Type ROCA (pricing is typing PNM)

Type DD1499

Type DD350

FI 59 - JAG review sheet

FI 66 - Committee review sheet

Set-up Contract File

---

to buyer

STEP 6: Make corrections to Modification (buyer's)

STEP 7: Make corrections to Modification (PCO's)

---

to Buyer, PCO

STEP 8: Make corrections to Modification (JAG's)

STEP 9: Make corrections to Modification (PMRC's)

STEP 10: Mail Modification to Contractor

Input 68X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 11: Send Modification to Repro

Type DD 843, send Modification to Bldg 5

STEP 12: Send Modification to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

M8 MODIFICATION $ 3,500,000 to $10,000,000. Clerk's Steps

STEP 1: Type-up BSP Minutes Agenda

---

get RFP letter from Buyer

STEP 2: RFP Letter

Type BSP Minutes for ASD/PMR signature

Prepare:
RFP letter

---

to buyer

STEP 3: Make Corrections (Buyer's)

Type buyer's changes

---

to buyer, PCO

STEP 4: Make Corrections (PCO's)

STEP 5: Make Corrections to BSP Minutes (PMRC's)

---

to buyer, PCO

STEP 6: Type pre-negotiation presentation documents

---

to Buyer who writes contract award

STEP 7: Type Contract Mod

Type Modification

Type ROCA (pricing is typing PNM)

Type DD1499

Type DD350

FI 59 - JAG review sheet

FI 66 - Committee review sheet

ASD/PMC review sheet and file

Type Form Letter 8 (For Contractor's signature on contract) with envelope

---

to Buyer

STEP 8: Make corrections to modification (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 9: Make corrections to modification (PCO's)

---

to Buyer, PCO

STEP 10: Make corrections to modification (JAG's)

STEP 11: Make corrections to modification (PMRC's)

STEP 12: Make corrections to modification (ASD/PMC)

STEP 13: Mail Modification to Contractor

Input 55X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 14: Send modification to Repro

Type DD 843, send mod. to Bldg 5

STEP 15: Send Modification to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

C9 COMPETITIVE BUY DUAL AWARD Clerk's Steps

STEP 1: Type Contract Award

Xerox entire file, set-up file

EEO TWX

Type Contract

Type ROCA (pricing is typing PNM)

Type DD1499

Type DD350

Type FI 39 - Patent Rights

FI 59 - JAG review sheet

FI 66 - Committee review sheet

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 2: Make corrections to contract (buyer's)

and Type-up Small Business Contracting Plan evaluation

---

to Buyer, PCO

STEP 3: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 4: Make corrections to contract (JAG's)

STEP 5: Make corrections to contract (PMRC's)

STEP 6: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 7: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 8: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

F1 FUNDING CLERK's STEPS

Receive PR from buyer

STEP 1: Type-up Funding. DD350. FI 53. FI 66.
Set-up File.

---

to buyer

STEP 2: Make corrections (buyer)

---

to buyer, PCO, PMRC

STEP 3: Make corrections (PMRC)

---

to buyer, PCO

STEP 4: Send to REPRO

DD843 (Repro)
Input 68X and 69K (BV2)

STEP 5: Send to Distribution

Type ASD258, attach BV2, CRO1, DD350

F2 COMPETITIVE BUY FAST TRACK — Clerk's Steps

---

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- Source List (FI 5)
- D&F (FI 8)
- Contract Type D&F (FI 9)

Set-up Contract File

---

to buyer

STEP 2: Make RFP Corrections (Buyer)

Type buyer's changes

---

to buyer, PCO

STEP 3: Make RFP Corrections (PCO)

---

to buyer, PCO

STEP 4: RFP to Repro

Prepare document for Repro
Type DD 843 (Repro form)

---

to Repro

STEP 5: Mail RFP

Check Reproduction

Type envelopes

Date stamp RFP

Put RFP in Mail

---

to offerors, buyer, Lab, buyer

STEP 6: Type Technically Unacceptable Letters and/or single source justification (if required)

---

to Buyer

STEP 7: Type BAFO Request Letters

---

to Buyer who writes contract award

STEP 8: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 9: Make corrections to contract (buyer's)

---

to Buyer, PCO

STEP 10: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 11: Make corrections to contract (JAG's)

STEP 12: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 13: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 14: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Sorry Letters

Type Form Letters 12, 13, 87 for PCO signature

Send proposals to Staging

get RFP from Buyer

STEP 1: RFP

Prepare:
- RFP
- DD254 corrections
- Acquisition Plan
- D&F (FI 8)
- Contract Type D&F (FI 9)
- Sole Source Justification (FI 2)

Set-up Contract File

to buyer

STEP 2: Make RFP Corrections (Buyer)

Type buyer's changes

to buyer, PCO

STEP 3: Make RFP Corrections (PCO)

to buyer, PCO

STEP 4: Mail RFP

Xerox RFP

Type envelope

Date stamp RFP

Put RFP in Mail

to offerors, buyer, Lab, buyer

STEP 5: Type Contract Award

Type Contract

Type ROCA

Type DD350

Type FI 39 - Patent Rights

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Get contractor's Administrative data (code, ACO, finance office, etc.)

---

to Buyer

STEP 6: Make corrections to contract (buyer's)

---

to Buyer, PCO

STEP 7: Make corrections to contract (PCO's)

---

to Buyer, PCO

STEP 8: Make corrections to contract (JAG's)

STEP 9: Mail Contract to Contractor

Input 67X, 70E, 70H, 69K (BV2)

Xerox contract, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 10: Send Contract to Repro

Type DD 843, send contract to Bldg 5

STEP 11: Send Contract to Distribution

Xerox 4 copies of ROCA

Type ASD 258 (distribution)
attach BV2 validation, CR01, DD350, contract, ROCA

Type Form Letters 12, 13, 87 for PCO signature

F4 MODIFICATION FAST TRACK Clerk's Steps

get letter from Buyer

STEP 1: Type letter to contractor with Statement of Work changes. Envelope. Carbons.

to buyer

STEP 2: Make Corrections (Buyer)

Type buyer's changes

to buyer, PCO

STEP 3: Make Corrections (PCO)

to buyer, PCO

to offerors, buyer, Lab, buyer

STEP 4: Type Contract Modification

Type modification

Type ROCA

Type DD350

Type Form Letter 8 (For Contractor's signature on contract) with envelope

Set-up Contract File

to Buyer

STEP 5: Make corrections to modification (buyer's)

to Buyer, PCO

STEP 6: Make corrections to modification (PCO's)

---

to Buyer, PCO

STEP 7: Make corrections to modification (JAG's)

STEP 8: Mail modification to Contractor

Input 55X, 70E, 70H, 69K (BV2)

Xerox modification, attach to Form Letter 8

Mail to Contractor

---

to contractor, buyer, PCO

STEP 9: Send modification to Repro

Type DD 843, send modification to Bldg 5

MO NO COST SUPPLEMENTAL AGREEMENT CLERK's STEPS

receive letter to lab

STEP 1: Type letter to lab with attachment (Xerox)

---

to buyer, Lab, buyer

STEP 2: Type up Modification

Type Mod

Type 1 page ROCA (FI 53)

Type form letter 8 with envelope to contractor

Set-up File

---

to buyer, PCO, contractor, buyer, PCO

STEP 3: Send to Repro

Type DD843
Input 68X (BV2)

STEP 4: Send to Distribution

Type ASD 258, attach BV2, CRO1, DD350

A1 ADMINISTRATIVE CHANGE CLERK'S STEPS

receive change from buyer

STEP 1: Type up change and set-up file.

to buyer, PCO

STEP 2: Xerox change.

Input BV2 (68X, 70E, 70H, or 69K)

Attach BV2, CR01, Xeroxed Mod, with ASD 258 to DIST.

OTHER DUTIES AS ASSIGNED

Mail - distribute

Timecards, morning report

Datacen Input

Validation

Manual records (PR's, others)

Post DIDS/AMSDL, DAR & SUPPS, Local Regs

Type for Branch Chief

Type letters for buyer (not connected with pending network)

Office supplies, forms

Sit-in for Divisional or Directorate Secretary

Filing

DD350 Input

Manhour Accounting (ASD 18)

APPENDIX G

ANALYSIS OF CLERK ESTIMATES

NETWORK C2

Step 1	Normal	Optimistic	Pessimistic
Mean	6.1	4.4	8.8
Std. Dev.	2.7	2.4	3.4
Median	6	4	8
Percent	54	26	20

Sample Size 11

Step 2	Normal	Optimistic	Pessimistic
Mean	1.4	1.0	2.7
Std. Dev.	1.3	1.2	2.3
Median	1	.5	2
Percent	62	19	19

Sample Size 11

Step 3	Normal	Optimistic	Pessimistic
Mean	3	1.7	4
Std. Dev.	5.7	2.9	5.4
Median	1	.5	3
Percent	71	16	13

Sample Size 11

Step 4	Normal	Optimistic	Pessimistic
Mean	.3	.2	.4
Std. Dev.	.1	.1	.3
Median	.3	.3	.3
Percent	78	15	7

Sample Size 11

Step 5	Normal	Optimistic	Pessimistic
Mean	1.2	.8	1.9
Std. Dev.	.4	.2	.6
Median	1	.8	2
Percent	74	15	11

Sample Size 9

Step 6	Normal	Optimistic	Pessimistic
Mean	.6	.4	1.1
Std. Dev.	.3	.3	.6
Median	.5	.3	1
Percent	75	12	13
Sample Size 10			

Step 7	Normal	Optimistic	Pessimistic
Mean	1.2	.8	1.8
Std. Dev.	.9	.8	1.3
Median	.8	.5	1.5
Percent	80	9	11
Sample Size 10			

Step 8	Normal	Optimistic	Pessimistic
Mean	3.1	3.9	7.7
Std. Dev.	2.8	2.7	3.6
Median	5	3	8.5
Percent	63	18	19
Sample Size 10			

Step 9	Normal	Optimistic	Pessimistic
Mean	1.7	1.3	2.8
Std. Dev.	1.7	1.6	2.1
Median	1	.6	3
Percent	65	20	15
Sample Size			

Step 10	Normal	Optimistic	Pessimistic
Mean	1.4	1	2.3
Std. Dev.	1.1	1.2	1.4
Median	1	.6	2
Percent	69	16	15
Sample Size 10			

Step 11	Normal	Optimistic	Pessimistic
Mean	1.3	1	2
Std. Dev.	1.3	.9	1.7
Median	1	.5	1.3
Percent	64	17	19
Sample Size 10			

Clerks' STEPS
NETWORK C2

Step 12	Normal	Optimistic	Pessimistic
Mean	.3	.2	.4
Std. Dev.	.1	.1	.3
Median	.3	.3	.3
Percent	89	5	6
Number in Sample	10		

Step 13	Normal	Optimistic	Pessimistic
Mean	2.1	1.7	2.9
Std. Dev.	.9	1.1	.9
Median	2	1.5	3
Percent	73	15	12
Number in Sample	10		

REPRO TIME	Normal	Optimistic	Pessimistic
Mean	19	11	27
Std. Dev.	4.1	4.1	4.1
Median	16	8	24
Percent	77	18	5
Number in Sample	8		

DISTRIBUTION	Normal	Optimistic	Pessimistic
Mean	12	8	19
Std. Dev.	4	0	1
Median	12	8	20
Percent	85	5	10
Number in Sample	4		

NETWORK C3

Step 1	Normal	Optimistic	Pessimistic
Mean	6.5	4.8	9.2
Std. Dev.	2.9	2.2	3.8
Median	6	4	9
Percent	-	-	-
Number in Sample	9		

Clerks' STEPS
NETWORK C3

Step 8	Normal	Optimistic	Pessimistic
Mean	5.7	4.5	8.7
Std. Dev.	2.6	2.7	4.2
Median	6	4	9
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.3
Std. Dev.	1	.6	1.1
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

NETWORK C4

Step 1	Normal	Optimistic	Pessimistic
Mean	6.6	4.9	9.3
Std. Dev.	2.6	2	3.6
Median	6	4.5	9
Percent			
Number in Sample	10		

Step 4	Normal	Optimistic	Pessimistic
Mean	.9	.7	1.5
Std. Dev.	.9	1	1.2
Median	.5	.3	1
Percent	-	-	-
Number in Sample	10		

Step 9	Normal	Optimistic	Pessimistic
Mean	5.6	4.5	8.5
Std. Dev.	2.5	2.7	4.3
Median	6	4.5	10
Percent	-	-	-
Number in Sample	10		

Clerks' STEPS
NETWORK C5

Step 1	Normal	Optimistic	Pessimistic
Mean	6.8	5.5	9.7
Std. Dev.	2.6	2.2	3.5
Median	7	6	9.5
Percent	-	-	-
Number in Sample	10		

Step 5	Normal	Optimistic	Pessimistic
Mean	2.7	1.7	4
Std. Dev.	3.1	1.8	4.5
Median	1	.5	2
Percent	-	-	-
Number in Sample	10		

Step 8	Normal	Optimistic	Pessimistic
Mean	1.3	.9	1.9
Std. Dev.	.7	.8	1
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	6	4.8	8.4
Std. Dev.	2.7	2.8	3.4
Median	7	6	10
Percent	-	-	-
Number in Sample	10		

Step 15	Normal	Optimistic	Pessimistic
Mean	2.5	1.6	3.5
d. Dev.	2.4	1.5	3.1
Median	2	1.3	2.8
Percent	-	-	-
Number in Sample	8		

Clerks' STEPS
NETWORK C6

Step 1	Normal	Optimistic	Pessimistic
Mean	7.8	5.8	10
Std. Dev.	3.7	2.6	4.6
Median	8	6	9.5
Percent	-	-	-
Number in Sample	10		

Step 11	Normal	Optimistic	Pessimistic
Mean	6.9	5.3	9.5
Std. Dev.	3.4	3.4	6
Median	7	5	8
Percent	-	-	-
Number in Sample	10		

NETWORK C7

Step 1	Normal	Optimistic	Pessimistic
Mean	8.5	6.3	10.8
Std. Dev.	3.9	3.1	4.9
Median	8.5	7	11
Percent	-	-	-
Number in Sample	10		

Step 11	Normal	Optimistic	Pessimistic
Mean	8.3	6.2	10.9
Std. Dev.	4.2	3.3	6.1
Median	8.5	7	11
Percent	-	-	-
Number in Sample	10		

NETWORK C8

Step 1	Normal	Optimistic	Pessimistic
Mean	1.7	1.5	2.2
Std. Dev.	2.4	2.5	2.6
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	9.3	7.3	12.3
Std. Dev.	4	2.9	6.4
Median	10	8	12
Percent	-	-	-
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	2.6	2.2	3.2
Std. Dev.	2.5	2.5	3.6
Median	2	1	3
Percent	-	-	-
Number in Sample	9		

Step 13	Normal	Optimistic	Pessimistic
Mean	9.6	7.7	12.7
Std. Dev.	5	4.3	7.7
Median	10	8	11.5
Percent	-	-	-
Number in Sample	8		

Step 18	Normal	Optimistic	Pessimistic
Mean	2	1.8	2.6
Std. Dev.	3	3.1	2.9
Median	1	.5	2
Percent	-	-	-
Number in Sample	8		

NETWORK S2

Step 1	Normal	Optimistic	Pessimistic
Mean	5.1	3.5	7.2
Std. Dev.	4.6	2.7	7
Median	3	2	4
Percent	60	22	18
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.1	.6	1.4
Std. Dev.	1.2	.6	1.5
Median	.5	.5	.5
Percent	54	32	14
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	.9	.6	1.2
Std. Dev.	.7	.5	1.1
Median	1	.5	1
Percent	40	41	19
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.4	1	1.9
Std. Dev.	1	.8	1.2
Median	1.5	.8	2.3
Percent	65	23	12
Number in Sample	8		

Step 5	Normal	Optimistic	Pessimistic
Mean	4.9	3.8	7.1
Std. Dev.	2.9	2.9	4.9
Median	4.5	3	6
Percent	64	19	17
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.1	.8	1.5
Std. Dev.	1	.9	1.2
Median	.8	.5	1
Percent	49	32	19
Number in Sample	8		

Clerks' STEPS

Step 7	Normal	Optimistic	Pessimistic
Mean	.9	.7	1.4
Std. Dev.	.6	.5	.9
Median	1	.6	1.3
Percent	51	31	18
Number in Sample	8		

Step 8	Normal	Optimistic	Pessimistic
Mean	1.1	.9	1.7
Std. Dev.	.9	.9	1.3
Median	1	.9	1.3
Percent	63	21	16
Number in Sample	8		

Step 9	Normal	Optimistic	Pessimistic
Mean	.4	.3	.5
Std. Dev.	.2	.2	.2
Median	.3	.3	.5
Percent	75	17	8
Number in Sample	8		

Step 10	Normal	Optimistic	Pessimistic
Mean	1.1	.8	1.5
Std. Dev.	.6	.4	.8
Median	1	1	1.5
Percent	50	31	19
Number in Sample	8		

NETWORK S3

Step 1	Normal	Optimistic	Pessimistic
Mean	5.8	4.6	7.5
Std. Dev.	3.4	3	4.6
Median	5	3.5	6.5
Percent	-	-	-
Number in Sample	8		

Step 5	Normal	Optimistic	Pessimistic
Mean	5.1	3.6	7.4
Std. Dev.	2.6	2.4	4.6
Median	5	3	6.5
Percent	-	-	-
Number in Sample	8		

Step 8	Normal	Optimistic	Pessimistic
Mean	1.2	.8	1.7
Std. Dev.	1	.7	1.4
Median	.8	.5	1.1
Percent	-	-	-
Number in Sample	8		

NETWORK S4

Step 1	Normal	Optimistic	Pessimistic
Mean	5.7	4.5	7.6
Std. Dev.	3.1	3.4	4.9
Median	5	3.5	6
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.9	1.4	2.4
Std. Dev.	2.3	2	2.7
Median	.8	.5	1.1
Percent	-	-	-
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	5.6	4.4	7.7
Std. Dev.	3.3	3.5	5
Median	5	3.5	6
Percent	-	-	-
Number in Sample	8		

Clerks' STEPS
NETWORK S5

Step 1	Normal	Optimistic	Pessimistic
Mean	5.8	4.4	7.1
Std. Dev.	3.6	2.9	4.5
Median	4	3	5
Percent	-	-	-
Number in Sample	7		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.7	1.2	2.3
Std. Dev.	1.1	1	1.3
Median	2	1	3
Percent	-	-	-
Number in Sample	7		

Step 6	Normal	Optimistic	Pessimistic
Mean	.4	.3	.6
Std. Dev.	.2	.2	.3
Median	.5	.3	.5
Percent	-	-	-
Number in Sample	7		

Step 8	Normal	Optimistic	Pessimistic
Mean	5.6	4.3	8.1
Std. Dev.	3.9	3	7.6
Median	4	3	5
Percent	-	-	-
Number in Sample	7		

Step 12	Normal	Optimistic	Pessimistic
Mean	1.2	.8	1.8
Std. Dev.	1	.8	1.3
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	7		

NETWORK S6

Step 1	Normal	Optimistic	Pessimistic
Mean	6.1	4.6	7.6
Std. Dev.	3.7	3.1	4.7
Median	4.5	3.5	5.5
Percent	-	-	-
Number in Sample	7		

Step 8	Normal	Optimistic	Pessimistic
Mean	6	4.6	7.6
Std. Dev.	4.3	3.4	5.4
Median	4	3	5
Percent	-	-	-
Number in Sample	7		

NETWORK S7

Step 1	Normal	Optimistic	Pessimistic
Mean	6.6	5.2	8.1
Std. Dev.	3.8	3.1	4.7
Median	5	4	6
Percent	-	-	-
Number in Sample	7		

Step 8	Normal	Optimistic	Pessimistic
Mean	1.3	.9	1.7
Std. Dev.	1.2	.9	1.5
Median	1	.8	1.3
Percent	-	-	-
Number in Sample	7		

Step 9	Normal	Optimistic	Pessimistic
Mean	6.9	5.2	8.9
Std. Dev.	4.4	3.6	5.8
Median	5.5	4.5	6.5
Percent	-	-	-
Number in Sample	7		

NETWORK S8

Step 1	Normal	Optimistic	Pessimistic
Mean	2.3	1.9	2.9
Std. Dev.	3.8	3.5	4.5
Median	.8	.5	1.3
Percent	-	-	-
Number in Sample	6		

Step 2	Normal	Optimistic	Pessimistic
Mean	5.3	4.3	6.6
Std. Dev.	2.8	2.2	3
Median	5	4	6
Percent	-	-	-
Number in Sample	6		

Step 7	Normal	Optimistic	Pessimistic
Mean	1.7	1.1	2.6
Std. Dev.	1.2	.8	1.7
Median	1.5	.9	2.5
Percent	-	-	-
Number in Sample	6		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.2	.7	1.5
Std. Dev.	.7	.5	.8
Median	1	.5	1.3
Percent	-	-	-
Number in Sample	6		

Step 12	Normal	Optimistic	Pessimistic
Mean	4.9	4	5.9
Std. Dev.	3	2.4	3.6
Median	4.5	3.5	5.5
Percent	-	-	-
Number in Sample	6		

Step 17	Normal	Optimistic	Pessimistic
Mean	1	.8	1.6
Std. Dev.	.6	.7	1
Median	1	.6	1.5
Percent	-	-	-
Number in Sample	5		

Clerks' STEPS

NETWORK M2

Step 1	Normal	Optimistic	Pessimistic
Mean	.9	.7	1.5
Std. Dev.	.6	.7	.9
Median	.8	.5	1.3
Percent	71	14	15
Number in Sample	6		

Step 2	Normal	Optimistic	Pessimistic
Mean	.8	.6	1.1
Std. Dev.	.7	.8	.8
Median	.5	.3	1
Percent	63	14	23
Number in Sample	6		

Step 3	Normal	Optimistic	Pessimistic
Mean	.9	.8	1.2
Std. Dev.	.7	.8	.8
Median	.3	.2	.5
Percent	69	13	28
Number in Sample	5		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.9	1.3	2.5
Std. Dev.	1.2	1.3	1.2
Median	2	1	3
Percent	76	18	6
Number in Sample	6		

Step 5	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.4
Std. Dev.	1.1	.7	1.4
Median	.5	.3	.8
Percent	59	28	13
Number in Sample	6		

Clerks' STEPS

Step 6	Normal	Optimistic	Pessimistic
Mean	.5	.3	.9
Std. Dev.	.4	.4	.6
Median	.3	.2	.7
Percent	64	26	10
Number in Sample	6		

Step 7	Normal	Optimistic	Pessimistic
Mean	.8	.5	1.1
Std. Dev.	.7	.4	1.0
Median	.5	.4	.8
Percent	80	13	7
Number in Sample	6		

Step 8	Normal	Optimistic	Pessimistic
Mean	.3	.2	.4
Std. Dev.	.1	.1	.2
Median	.2	.2	.3
Percent	67	28	5
Number in Sample	6		

Step 9	Normal	Optimistic	Pessimistic
Mean	.4	.3	.6
Std. Dev.	.3	.2	.5
Median	.3	.3	.4
Percent	69	28	3
Number in Sample	6		

NETWORK M3

Step 1	Normal	Optimistic	Pessimistic
Mean	.8	.6	1.2
Std. Dev.	.6	.7	.9
Median	.5	.3	.9
Percent	-	-	-
Number in Sample	6		

Clerks' STEPS

Step 4	Normal	Optimistic	Pessimistic
Mean	2	1.4	2.8
Std. Dev.	1.1	1.3	1.3
Median	2	1	3
Percent	-	-	-
Number in Sample	6		

Step 7	Normal	Optimistic	Pessimistic
Mean	.4	.3	.7
Std. Dev.	.3	.1	.7
Median	.3	.3	.4
Percent	-	-	-
Number in Sample	6		

NETWORK M4

Step 1	Normal	Optimistic	Pessimistic
Mean	.8	.6	1.0
Std. Dev.	.6	.7	.5
Median	.5	.3	.9
Percent	-	-	-
Number in Sample	6		

Step 4	Normal	Optimistic	Pessimistic
Mean	2.3	1.7	3.1
Std. Dev.	1.5	1.7	1.7
Median	2.3	1.3	3.3
Percent	-	-	-
Number in Sample	6		

NETWORK M5

Step 1	Normal	Optimistic	Pessimistic
Mean	.8	.6	1.1
Std. Dev.	.6	.7	.6
Median	.5	.3	.9
Percent	-	-	-
Number in Sample	6		

Step 4	Normal	Optimistic	Pessimistic
Mean	2.6	1.9	3.4
Std. Dev.	1.8	2.0	2.0
Median	2.3	1.3	3.3
Percent	-	-	-
Number in Sample	6		

Step 8	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.1
Std. Dev.	.3	.2	.6
Median	.8	.5	1.0
Percent	-	-	-
Number in Sample	5		

NETWORK M6

Step 1	Normal	Optimistic	Pessimistic
Mean	.8	.7	1.1
Std. Dev.	.6	.7	.6
Median	.6	.5	.9
Percent	-	-	-
Number in Sample	6		

Step 4	Normal	Optimistic	Pessimistic
Mean	2.6	2.0	3.6
Std. Dev.	1.8	2.0	2.3
Median	2.3	1.3	3.3
Percent	-	-	-
Number in Sample	6		

NETWORK M7

Step 1	Normal	Optimistic	Pessimistic
Mean	1.1	.9	1.6
Std. Dev.	1.0	1.0	1.3
Median	.9	.5	1.3
Percent	-	-	-
Number in Sample	6		

Clerks' STEPS

Step 4	Normal	Optimistic	Pessimistic
Mean	1.1	.9	1.6
Std. Dev.	1.0	1.0	1.3
Median	.9	.5	1.3
Percent	-	-	-
Number in Sample	6		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.8	1.4	2.6
Std. Dev.	1.4	1.4	1.7
Median	1.5	.8	2.5
Percent	-	-	-
Number in Sample	6		

Step 5	Normal	Optimistic	Pessimistic
Mean	3.5	2.7	4.3
Std. Dev.	3.2	3.0	3.4
Median	3	2	4
Percent	-	-	-
Number in Sample	5		

NETWORK M8

Step 1	Normal	Optimistic	Pessimistic
Mean	1.4	1.2	1.9
Std. Dev.	1.8	[illegible]	2
Median	.8	[illegible]	1
Percent	-	-	-
Number in Sample	6		

Step 2	Normal	Optimistic	Pessimistic
Mean	2.1	1.8	2.6
Std. Dev.	3.0	3.0	2.7
Median	1.0	.6	1.8
Percent	-	-	-
Number in Sample	6		

Clerks' STEPS

Step 5	Normal	Optimistic	Pessimistic
Mean	.9	.6	1.1
Std. Dev.	1.5	1.2	1.4
Median	.4	.2	.6
Percent	-	-	-
Number in Sample	6		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.8	1.4	2.5
Std. Dev.	1.3	1.4	1.5
Median	1.5	.8	2.5
Percent	-	-	-
Number in Sample	6		

Step 7	Normal	Optimistic	Pessimistic
Mean	3.6	2.9	4.5
Std. Dev.	2.5	2.7	2.6
Median	3.5	2.5	4.5
Percent	-	-	-
Number in Sample	6		

Step 12	Normal	Optimistic	Pessimistic
Mean	1.0	.8	1.4
Std. Dev.	1.0	1.0	1.4
Median	.6	.5	.9
Percent	-	-	-
Number in Sample	6		

NETWORK C9

Step 1	Normal	Optimistic	Pessimistic
Mean	9.1	6.3	11.4
Std. Dev.	5.6	3.6	7.7
Median	11	8	12.5
Percent	70	18	12
Number in Sample	6		

Clerks' STEPS

NETWORK F1

Step 1	Normal	Optimistic	Pessimistic
Mean	.7	.5	1.1
Std. Dev.	.3	.2	.6
Median	.6	.4	.9
Percent	78	15	7
Number in Sample	6		

Step 2	Normal	Optimistic	Pessimistic
Mean	.3	.2	.5
Std. Dev.	.3	.2	.4
Median	.2	.1	.3
Percent	62	31	7
Number in Sample	6		

Step 3	Normal	Optimistic	Pessimistic
Mean	.2	.1	.4
Std. Dev.	.2	.1	.4
Median	.1	.1	.1
Percent	47	47	6
Number in Sample	6		

Step 4	Normal	Optimistic	Pessimistic
Mean	.3	.2	.5
Std. Dev.	.4	.3	.5
Median	.2	.1	.3
Percent	75	16	9
Number in Sample	6		

Step 5	Normal	Optimistic	Pessimistic
Mean	.3	.2	.5
Std. Dev.	.3	.2	.4
Median	.2	.1	.3
Percent	66	29	5
Number in Sample	6		

NETWORK F2

Step 1	Normal	Optimistic	Pessimistic
Mean	5	4.2	5.8
Std. Dev.	2	2.4	1.6
Median	4	3	5
Percent	75	16	9
Number in Sample	5		

Step 8	Normal	Optimistic	Pessimistic
Mean	4.6	3.8	5.6
Std. Dev.	2.7	3.0	2.7
Median	3	2	4
Percent	64	19	17
Number in Sample			

NETWORK F3

Step 1	Normal	Optimistic	Pessimistic
Mean	4.8	4	5.6
Std. Dev.	2.3	2.6	1.9
Median	4	3	5
Percent	79	15	6
Number in Sample	5		

Step 5	Normal	Optimistic	Pessimistic
Mean	4.5	3.6	5.4
Std. Dev.	2.8	2.9	3
Median	3	2	4
Percent	65	20	15
Number in Sample	5		

NETWORK F4

Step 1	Normal	Optimistic	Pessimistic
Mean	1.5	1.1	1.7
Std. Dev.	2.0	1.6	1.9
Median	.5	.4	.8
Percent	65	20	15
Number in Sample	5		

Step 4	Normal	Optimistic	Pessimistic
Mean	2.4	1.9	3.3
Std. Dev.	1.1	1.3	1.7
Median	2	1.5	3
Percent	66	21	13
Number in Sample	5		

NETWORK M0

Step 1	Normal	Optimistic	Pessimistic
Mean	.3	.2	.4
Std. Dev.	.2	.2	.2
Median	.3	.1	.3
Percent	81	14	5
Number in Sample	6		

Step 2	Normal	Optimistic	Pessimistic
Mean	.9	.6	1.1
Std. Dev.	.6	.3	.8
Median	.8	.5	1.0
Percent	59	29	12
Number in Sample	6		

Step 3	Normal	Optimistic	Pessimistic
Mean	.3	.2	.3
Std. Dev.	.1	.1	.2
Median	.3	.2	.3
Percent	46	40	14
Number in Sample	6		

Step 4	Normal	Optimistic	Pessimistic
Mean	.3	.2	.4
Std. Dev.	.2	.1	.4
Median	.2	.1	.2
Percent	40	53	7
Number in Sample	6		

NETWORK A1

Step 1	Normal	Optimistic	Pessimistic
Mean	.6	.4	.8
Std. Dev.	.3	.2	.4
Median	.6	.4	.8
Percent	75	18	7
Number in Sample	6		

Step 2	Normal	Optimistic	Pessimistic
Mean	.6	.3	.8
Std. Dev.	.7	.1	1.1
Median	.3	.3	.4
Percent	60	34	6
Number in Sample	6		

OTHER DUTIES 2.1 hours or 26% of day.

APPENDIX H

BUYER QUESTIONNAIRE

C2 COMPETITIVE BUY $ 10,000 to $ 100,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of Corrections

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 6: Receive Proposals

Review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

STEP 8: Price Proposals

For Each Proposal in the Competitive Range
Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO

Set-up Negotiation schedule with Engineer and Offerors

Draft Request for BAFO's

STEP 9: Negotiations (telephone)

For Each Proposal in the Competitive Range
Resolve technical issues
Discuss AF Objective

Mail Request for BAFO's

STEP 10: Write-up Award

Review BAFO's / discuss with Engineer/ Source Select with PCO

Write Contract

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO, Clerk, Contractor

STEP 15: Back from Contractor

Review / to PCO for Award

C3 COMPETITIVE BUY $ 100,000 to $ 250,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of Corrections

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 6: Receive Proposals

Review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

STEP 8: Price Proposals

For Each Proposal in the Competitive Range
Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offerors

Draft BAFO's

STEP 9: Negotiations (telephone)

For Each Proposal in the Competitive Range
Resolve technical issues
Discuss AF Objective

Mail BAFO's

STEP 10: Write-up Award

Review BAFO's / discuss with Engineer/ Source Select with PCO

Write Contract

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take Contract to JAG

STEP 16: Make JAG required corrections

---

to clerk

STEP 17: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 18: Back from Contractor

Review / to PCO for Award

C4 COMPETITIVE BUY $ 250,000 to $ 500,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of type Corrections (JAG's)

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 9: Receive Proposals

Review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 10: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

STEP 11: Price Proposals

For Each Proposal in the Competitive Range
Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offerors

Draft Request for BAFO's

STEP 12: Negotiations (telephone)

For Each Proposal in the Competitive Range
Resolve technical issues
Discuss AF Objective

Mail Request for BAFO's

STEP 13: Write-up Award

Review BAFO's / discuss with Engineer/ Source Select with PCO

Write Contract

Write ROCA and file items

---

to Clerk

STEP 14: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 15: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 16: Make PCO required Corrections

---

to clerk

STEP 17: Review typed corrections (PCO's)

---

to PCO

STEP 18: Take Contract to JAG

STEP 19: Make JAG required corrections

---

to clerk

STEP 20: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 21: Back from Contractor

Review / to PCO for Award

C5 COMPETITIVE BUY $ 500,000 to $ 750,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 9: Make PMRC required Corrections

---

to clerk

STEP 10: Review of type corrections (PMRC's)

---

to PCO, Clerk, Repro, Clerk, and offerors

STEP 11: RFP Amendment

Evaluate offeror's request/ discuss with engineer/ PCO
Get changes from engineer/ Write up amendment

---

to clerk

STEP 12: Review amendment

---

to PCO , clerk, offerors

STEP 13: Receive Proposals

Review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up proposals

---

to Technical Evaluation

STEP 14: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

STEP 15: Price Proposals

For Each Proposal in the Competitive Range
Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offerors

Draft Request for BAFO's

STEP 16: Negotiations (telephone)

For Each Proposal in the Competitive Range
Resolve technical issues
Discuss AF Objective

Mail Request for BAFO's

STEP 17: Write-up Award

Review BAFO's / discuss with Engineer/ Source Select with PCO

Write Contract

Write ROCA and file items

---

to Clerk

STEP 18: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 19: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 20: Make PCO required Corrections

---

to clerk

STEP 21: Review typed corrections (PCO's)

---

to PCO

STEP 22: Take Contract to JAG

STEP 23: Make JAG required corrections to Award

---

to clerk

STEP 24: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 25: Make PMRC required corrections to Award

---

to clerk

STEP 26: Review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 27: <u>Back from Contractor</u>

Review / to PCO for Award

C6 COMPETITIVE BUY $ 750,000 to $ 1,000,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 9: Make PMRC required Corrections

---

to clerk

STEP 10: Review of type corrections (PMRC's)

---

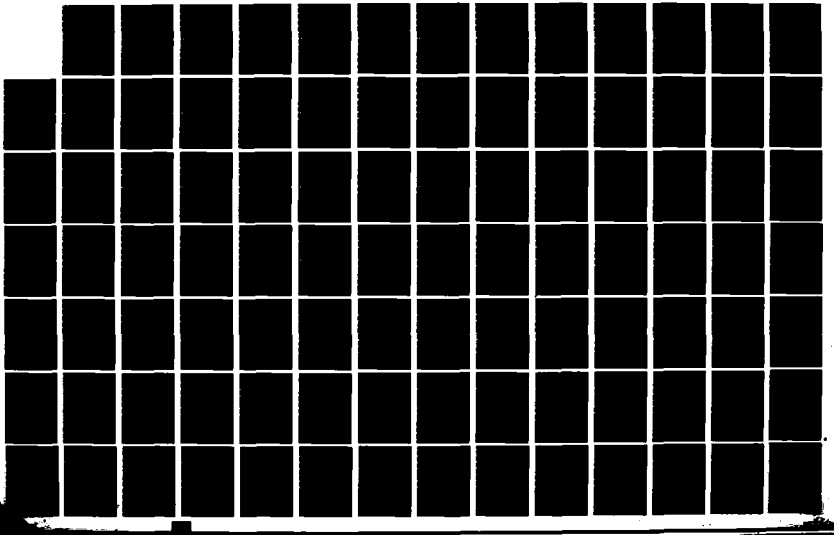
to PCO, Clerk, Repro, Clerk, and offerors

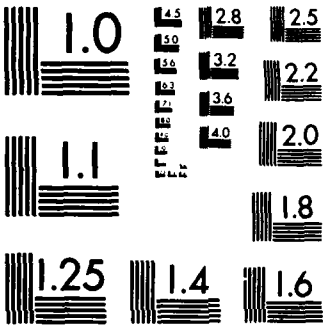
STEP 11: RFP Amendment

Evaluate offeror's request/ discuss with engineer/ PCO
Get changes from engineer/ Write up amendment

AD-A135 639 Q-GERT MODEL OF THE CONTRACTING CYCLE(U) AIR FORCE INST 6/8
OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND
LOGISTICS C D MILLER SEP 83 AFIT-LSSR-118-83

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MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

to clerk

STEP 12: Review amendment

---

to PCO , clerk, offerors

STEP 13: Receive Proposals

Review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 14: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

STEP 15: Price Proposals

For Each Proposal in the Competitive Range
Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Division Chief

Set-up Negotiation schedule with Engineer and Offerors

Draft BAFO's

STEP 16: Negotiations (telephone)

For Each Proposal in the Competitive Range
Resolve technical issues

Discuss AF Objective

Mail BAFO's

STEP 17: Write-up Award

Review BAFO's / discuss with Engineer/ Source Select with PCO

Request Small Business Subcontracting Plan

Write Contract

Write ROCA and file items

---

to Clerk

STEP 18: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 19: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 20: Make PCO required Corrections

---

to clerk

STEP 21: Review typed corrections (PCO's)

---

to PCO

STEP 22: Take Contract to JAG

STEP 23: Make JAG required corrections to Award

---

to clerk

STEP 24: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 25: Make PMRC required corrections to Award

---

to clerk

STEP 26: Review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 27: Back from Contractor

Review / to PCO for Award

C7 COMPETITIVE BUY $ 1,000,000 to $ 3,500,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 9: Make PMRC required Corrections

---

to clerk

STEP 10: Review of type corrections (PMRC's)

---

to PCO, Clerk, Repro, Clerk, and offerors

STEP 11: RFP Amendment

Evaluate offeror's request/ discuss with engineer/ PCO
Get changes from engineer/ Write up amendment

---

to clerk

STEP 12: Review amendment

---

to PCO , clerk, offerors

STEP 13: Receive Proposals

Review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 14: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

Request PMRP perform Pricing

STEP 15: Price Proposals

For Each Proposal in the Competitive Range
Review Exceptions to Terms and Conditions/ discuss with PCO/JAG

(PMRP performs pricing)

Set-up Negotiation schedule with Engineer and Offerors

Draft BAFO's

Draft documents for pre-negotiation meeting

---

clerk types pre-neg documents

STEP 16: Conduct Pre-negotiation Presentation for Director

STEP 17: Negotiations (telephone or face-to-face)

For Each Proposal in the Competitive Range
Resolve technical issues
Discuss AF Objective

Mail BAFO's

STEP 18: Write-up Award

Review BAFO's / discuss with Engineer/ discuss with price analyst/ Source Select with PCO

Request Small Business Subcontracting Plan

Write Contract

Write ROCA (Pricing is writing the PNM) and file items (including DD1499)

Request EEO clearance

---

to Clerk

STEP 19: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 20: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

to PCO

STEP 21: Make PCO required Corrections

to clerk

STEP 22: Review typed corrections (PCO's)

to PCO

STEP 23: Take Contract to JAG

STEP 24: Make JAG required corrections to Award

to clerk

STEP 25: Review typed corrections (JAG's)
(include time to carry to PMRC)

to PCO, PMRC

STEP 26: Make PMRC required corrections to Award

to clerk

STEP 27: Review of typed corrections (PMRC's)

to PCO, clerk, out-for-signature

STEP 28: Back from Contractor

Review / to PCO and PMRC for Final Review

STEP 29: Final Corrections for PMRC or Director/ to dist.

C8 COMPETITIVE BUY $ 3,500,000 to $10,000,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer
- Draft D&F

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Prepare for BSP with Director / draft minutes

---

to clerk

STEP 2: Conduct BSP with Director

STEP 3: Write Solicitation

Rewrite BSP Minutes

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 4: RFP back from Clerk

Review BSP Minutes

Review RFP

Review File

to Clerk

STEP 5: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

STEP 6: Make PCO required Corrections

---

to Clerk

STEP 7: Review of typed Corrections (PCO's)

---

to PCO

STEP 8: Take RFP to JAG

STEP 9: Make JAG required Corrections

---

to clerk

STEP 10: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 11: Make PMRC required Corrections

---

to clerk

STEP 12: Review of type corrections (PMRC's)

---

to PCO, ASD/PMC

STEP 13: Make ASD/PMC required Corrections

to clerk

STEP 14: Review of typed Corrections (ASD/PMC)

to PCO, Clerk, Repro, Clerk, and offerors

STEP 15: RFP Amendment

Evaluate offeror's request/ discuss with engineer/ PCO
Get changes from engineer/ Write up amendment

to clerk

STEP 16: Review amendment

to PCO , clerk, offerors

STEP 17: Receive Proposals

Review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up

to Technical Evaluation

STEP 18: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

Request PMRP perform Pricing

---

wait for audit

STEP 19: Price Proposals

For Each Proposal in the Competitive Range
Review Exceptions to Terms and Conditions/ discuss with PCO/JAG

(PMRP performs pricing)

Set-up Negotiation schedule with Engineer and Offerors

Draft BAFO's

Draft documents for pre-negotiation meeting

---

clerk types pre-neg documents

STEP 20: Conduct Pre-negotiation Presentation for Director and ASD/PM

STEP 21: Negotiations (telephone or face-to-face)

For Each Proposal in the Competitive Range
Resolve technical issues
Discuss AF Objective

Mail BAFO's

STEP 22: Write-up Award

Review BAFO's / discuss with Engineer/ discuss with price analyst/ Source Select with PCO

Request Small Business Subcontracting Plan

Write Contract

Write ROCA (Pricing is writing the PNM) and file items (including DD1499)

Request EEO clearance

---

to Clerk

STEP 23: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 24: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 25: Make PCO required Corrections

---

to clerk

STEP 26: Review typed corrections (PCO's)

---

to PCO

STEP 27: Take Contract to JAG

STEP 28: Make JAG required corrections to Award

---

to clerk

STEP 29: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 30: Make PMRC required corrections to Award

---

to clerk

STEP 31: Review of typed corrections (PMRC's)

---

to PCO, ASD/PMC

STEP 32: Make ASD/PMC required Corrections to Award

Prepare 3 day hold TWX

---

to clerk

STEP 33: Review of typed corrections (ASD/PMC)

---

to PCO, clerk, out-for-signature

STEP 34: Back from Contractor

Review / to PCO, PMRC, PMC for Final Review

STEP 35: Final Corrections for PMRC, PMC, PM / to dist.

S2 SOLE SOURCE BUY $ 10,000 to $ 100,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer
- Sole Source Justification
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of Corrections

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 6: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO

Set-up Negotiation schedule with Engineer and Offeror

STEP 9: Negotiations (telephone)

Resolve technical issues
Negotiate a reasonable price

STEP 10: Write-up Award

Write Contract

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO, Clerk, Contractor

STEP 15: Back from Contractor

Review / to PCO for Award

S3 SOLE SOURCE BUY $ 100,000 to $ 250,000. Buver's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer
- Review Sole Source Justification
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of Corrections

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 6: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO

Set-up Negotiation schedule with Engineer and Offeror

STEP 9: Negotiations (telephone)

Resolve technical issues
Negotiate a reasonable price

STEP 10: Write-up Award

Write Contract

Write ROCA and file items

---

to clerk

STEP 11: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take Contract to JAG

STEP 16: Make JAG required corrections

---

to clerk

STEP 17: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 18: Back from Contractor

Review / to PCO for Award

S4 SOLE SOURCE BUY $ 250,000 to $ 500,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review Sole Source Justification

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of type Corrections (JAG's)

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 9: <u>Receive Proposal</u>

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 10: <u>Receive Technical Evaluation</u>

Review Tech Eval/ resolve problems with Engineer

STEP 11: <u>Price Proposals</u>

Review Exceptions to Terms and Conditions/ discuss

with PCO/JAG
Review Historical files/ call. DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offeror

STEP 12: Negotiations (telephone)

Resolve technical issues
Discuss AF Objective and negotiate agreement

STEP 13: Write-up Award

Write Contract

Write ROCA and file items

---

to Clerk

STEP 14: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 15: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 16: Make PCO required Corrections

---

to clerk

STEP 17: Review typed corrections (PCO's)

---

to PCO

STEP 18: Take Contract to JAG

STEP 19: Make JAG required corrections

---

to clerk

STEP 20: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 21: Back from Contractor

Review / to PCO for Award

S5 SOLE SOURCE BUY $ 500,000 to $ 750,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review Sole Source Justification

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 9: Make PMRC required Corrections

---

to clerk

STEP 10: Review of type corrections (PMRC's)

---

to PCO, Clerk, Repro, Clerk, and offerors

STEP 11: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

to Technical Evaluation

STEP 12: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 13: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offeror

STEP 14: Negotiations (telephone)

Resolve technical issues
Discuss AF Objective and negotiate price

STEP 15: Write-up Award

Request Small Business Subcontracting Plan

Write Contract

Write ROCA and file items

to Clerk

STEP 16: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 17: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 18: Make PCO required Corrections

---

to clerk

STEP 19: Review typed corrections (PCO's)

---

to PCO

STEP 20: Take Contract to JAG

STEP 21: Make JAG required corrections to Award

---

to clerk

STEP 22: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 23: Make PMRC required corrections to Award

---

to clerk

STEP 24: Review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 25: Back from Contractor

Review / to PCO for Award

S6 SOLE SOURCE BUY $ 750,000 to $ 1,000,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review Sole Source Justification

Review PR
- Review SOW
- Review Contract Data Requirements (DD1423)
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 9: Make PMRC required Corrections

---

to clerk

STEP 10: Review of type corrections (PMRC's)

---

to PCO, Clerk, Repro, Clerk, and offerors

STEP 11: <u>Receive Proposal</u>

Review of Proposal

Ask Engineer to pick-up

to Technical Evaluation

STEP 12: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 13: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Division Chief

Set-up Negotiation schedule with Engineer and Offeror

STEP 14: Negotiations (telephone)

Resolve technical issues
Discuss AF Objective and negotiate price

STEP 15: Write-up Award

Request Small Business Subcontracting Plan

Write Contract

Write ROCA and file items

to Clerk

STEP 16: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 17: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 18: Make PCO required Corrections

---

to clerk

STEP 19: Review typed corrections (PCO's)

---

to PCO

STEP 20: Take Contract to JAG

STEP 21: Make JAG required corrections to Award

---

to clerk

STEP 22: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 23: Make PMRC required corrections to Award

---

to clerk

STEP 24: Review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 25: Back from Contractor

Review / to PCO for Award

S7 SOLE SOURCE BUY $ 1,000,000 to $ 3,500,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review Sole Source Justification

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer
- Compare SOW with TPP

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO

STEP 6: Take RFP to JAG

STEP 7: Make JAG required Corrections

---

to clerk

STEP 8: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 9: Make PMRC required Corrections

---

to clerk

STEP 10: Review of type corrections (PMRC's)

---

to PCO, Clerk, Repro, Clerk, and offerors

STEP 11: RFP Amendment

Evaluate offeror's request/ discuss with engineer/ PCO
Get changes from engineer/ Write up amendment

---

to clerk

STEP 12: Review amendment

---

to PCO , clerk, offerors

STEP 13: Receive Proposal

Review of Proposal

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 14: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Request PMRP perform Pricing

STEP 15: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG

(PMRP performs pricing)

Set-up Negotiation schedule with Engineer and Offeror

Draft documents for pre-negotiation meeting

---

clerk types pre-neg documents

STEP 16: Conduct Pre-negotiation Presentation for Director

STEP 17: Negotiations (telephone or face-to-face)

Resolve technical iss
Negotiate and reach agreement

STEP 18: Write-up Award

Request Small Business Subcontracting Plan

Write Contract

Write ROCA (Pricing is writing the PNM) and file items (including DD1499)

Request EEO clearance

---

to Clerk

STEP 19: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 20: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 21: Make PCO required Corrections

---

to clerk

STEP 22: Review typed corrections (PCO's)

---

to PCO

STEP 23: Take Contract to JAG

STEP 24: Make JAG required corrections to Award

---

to clerk

STEP 25: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 26: Make PMRC required corrections to Award

---

to clerk

STEP 27: Review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 28: Back from Contractor

Review / to PCO and PMRC for Final Review

STEP 29: Final Corrections for PMRC or Director/ to dist.

S8 SOLE SOURCE BUY $ 3,500,000 to $10,000,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review Sole Source Justification

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Draft D&F

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Prepare for BSP with Director / draft minutes

---

to clerk

STEP 2: Conduct BSP with Director

STEP 3: Write Solicitation

Rewrite BSP Minutes

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 4: RFP back from Clerk

Review BSP Minutes

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 5: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

STEP 6: Make PCO required Corrections

---

to Clerk

STEP 7: Review of typed Corrections (PCO's)

---

to PCO

STEP 8: Take RFP to JAG

STEP 9: Make JAG required Corrections

---

to clerk

STEP 10: Review of typed Corrections (JAG's)
(include time to carry to Committee)

---

to PCO, Committee

STEP 11: Make PMRC required Corrections

---

to clerk

STEP 12: Review of typed Corrections (PMRC's)

---

to PCO, ASD/PMC

STEP 13: Make ASD/PMC required Corrections

---

to clerk

STEP 14: Review of typed Corrections (ASD/PMC)

---

to PCO, Clerk, Repro, Clerk, and offerors

STEP 15: RFP Amendment

Evaluate offeror's request/ discuss with engineer/ PCO
Get changes from engineer/ Write up amendment

---

to clerk

STEP 16: Review amendment

---

to PCO , clerk, offeror

STEP 17: Receive Proposal

Review of Proposal

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 18: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Request PMRP perform Pricing

---

wait for audit

STEP 19: Price Proposal

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG

(PMRP performs pricing)

Set-up Negotiation schedule with Engineer and Offerors

Draft documents for pre-negotiation meeting

---

clerk types pre-neg documents

STEP 20: Conduct Pre-negotiation Presentation for Director and ASD/PM

STEP 21: Negotiations (telephone or face-to-face)

Negotiate a Fair and Reasonable Price

STEP 22: Write-up Award

Request Small Business Subcontracting Plan

Write Contract

Write ROCA (Pricing is writing the PNM) and file items (including DD1499)

Request EEO clearance

---

to Clerk

STEP 23: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 24: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

to PCO

STEP 25: Make PCO required Corrections

---

to clerk

STEP 26: Review typed corrections (PCO's)

---

to PCO

STEP 27: Take Contract to JAG

STEP 28: Make JAG required corrections to Award

---

to clerk

STEP 29: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 30: Make PMRC required corrections to Award

---

to clerk

STEP 31: Review of typed corrections (PMRC's)

---

to PCO, ASD/PMC

STEP 32: Make ASD/PMC required Corrections to Award

Prepare 3 day hold TWX

---

to clerk

STEP 33: Review of typed corrections (ASD/PMC)

to PCO, clerk, out-for-signature

STEP 34: Back from Contractor

Review / to PCO, PMRC, PMC for Final Review

STEP 35: Final Corrections for PMRC, PMC, PM / to dist.

M2 CONTRACT MOD $ 10,000 to $ 100,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer
- Mod Justification

Discuss PR problems with Engineer

Accept in Data-Cen

Write RFP

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of Corrections

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 6: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO

Set-up Negotiation schedule with Engineer and Offeror

STEP 9: Negotiations (telephone)

Resolve technical issues
Negotiate a reasonable price

STEP 10: Write-up Award

Write Contract Modification

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO, Clerk, Contractor

STEP 15: Back from Contractor

Review / to PCO for Award

M3 CONTRACT MOD $ 100,000 to $ 250,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer

Discuss PR problems with Engineer

Accept in Data-Cen

Write RFP letter

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: Review corrections

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of Corrections / Mail

---

to PCO and Contractor

STEP 6: Receive Proposal

Ask Engineer to pick-up

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offerors

STEP 9: Negotiations (telephone)

Resolve technical issues
Negotiate modification

STEP 10: Write-up Award

Write modification

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review modification

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take modification to JAG

STEP 16: Make JAG required corrections

---

to clerk

STEP 17: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 18: Back from Contractor

Review / to PCO for Award

M4 MODIFICATION $ 250,000 to $ 500,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review Sole Source Justification

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer

Discuss PR problems with Engineer

Accept in Data-Cen

Write RFP letter

---

to Clerk

STEP 2: Letter back from Clerk

Review letter to contractor with changes

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: Corrections back from Clerk

Review corrections

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's) / Mail

---

to PCO and Contractor

STEP 6: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offeror

STEP 9: Negotiations (telephone)

Resolve technical issues
Discuss AF Objective and negotiate agreement

STEP 10: Write-up Award

Write Modification

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review Modification

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take Contract to JAG

STEP 16: Make JAG required corrections

---

to clerk

STEP 17: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 18: Back from Contractor

Review / to PCO for Award

M5 MODIFICATION $ 500,000 to $ 750,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer

Discuss PR problems with Engineer

Accept in Data-Cen

Write RFP letter

---

to Clerk

STEP 2: Letter back from Clerk

Review RFP letter

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: Letter Corrections back from Clerk

Review corrections

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO and offeror

STEP 6: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposal

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offeror

STEP 9: Negotiations (telephone)

Resolve technical issues
Discuss AF Objective and negotiate price

STEP 10: Write-up Award

Request Small Business Subcontracting Plan

Write Modification

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review Modification

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take Contract to JAG

STEP 16: Make JAG required corrections to Award

---

to clerk

STEP 17: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 18: Make PMRC required corrections to Award

---

to clerk

STEP 19: Review of typed corrections (PMRC's)

to PCO, clerk, out-for-signature

STEP 20: Back from Contractor

Review / to PCO for Award

M6 MODIFICATION $ 750,000 to $ 1,000,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
Review SOW
Review Contract Data Requirements (DD1423)
Review Notes to Buyer

Discuss PR problems with Engineer

Accept in Data-Cen

Write RFP letter

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP letter

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)/Mail

---

to PCO and contractor

STEP 6: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Division Chief

Set-up Negotiation schedule with Engineer and Offeror

STEP 9: Negotiations (telephone)

Resolve technical issues
Discuss AF Objective and negotiate price

STEP 10: Write-up Award

Request Small Business Subcontracting Plan

Write Modification

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review Modification

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13 Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take Contract to JAG

STEP 16: Make JAG required corrections to Award

---

to clerk

STEP 17: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 18: Make PMRC required corrections to Award

---

to clerk

STEP 19: Review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 20: Back from Contractor
Review / to PCO for Award

M7 MODIFICATION $ 1,000,000 to $ 3,500,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
Review SOW
Review Contract Data Requirements List (DD1423)
Review Notes to Buyer

Discuss PR problems with Engineer

Accept in Data-Cen

Write RFP letter

---

to Clerk

STEP 2: RFP letter back from Clerk

Review RFP letter

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: Corrections back from Clerk

Review corrections

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Review of typed Corrections (PCO's)

---

to PCO and contractor

STEP 6: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Request PMRP perform Pricing

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG

(PMRP performs pricing)

Set-up Negotiation schedule with Engineer and Offeror

Draft documents for pre-negotiation meeting

---

clerk types pre-neg documents

STEP 9: Conduct Pre-negotiation Presentation for Director

STEP 10: Negotiations (telephone or face-to-face)

Resolve technical issues
Negotiate and reach agreement

STEP 11: Write-up Award

Request Small Business Subcontracting Plan

Write Modification

Write ROCA (Pricing is writing the PNM) and file items (including DD1499)

---

to Clerk

STEP 12: Review typed Award

Review Modification

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 13: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 14: Make PCO required Corrections

---

to clerk

STEP 15: Review typed corrections (PCO's)

---

to PCO

STEP 16: Take Contract to JAG

STEP 17: Make JAG required corrections to Award

---

to clerk

STEP 18: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 19: Make PMRC required corrections to Award

---

to clerk

STEP 20: Review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 21: Back from Contractor

Review / to PCO and PMRC for Final Review

STEP 22: Final Corrections for PMRC or Director/ to dist.

M8 MODIFICATION $ 3,500,000 to $10,000,000. Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
Review SOW
Review Contract Data Requirements List (DD1423)

Discuss PR problems with Engineer

Accept in Data-Cen

Prepare for BSP with Director / draft minutes

---

to clerk

STEP 2: Conduct BSP with Director

STEP 3: Write Solicitation

Rewrite BSP Minutes

Write RFP letter

---

to Clerk

STEP 4: RFP back from Clerk

Review BSP Minutes

Review RFP

Write Correction Instructions to Clerk

---

to Clerk

STEP 5: RFP Corrections back from Clerk

Review corrections

Sign BSP Minutes

STEP 6: Make PCO required Corrections

to Clerk

STEP 7: Review of typed Corrections (PCO's)

---

to PCO, Committee (BSP Minutes)

STEP 8: Make PMRC required Corrections to BSP Minutes

---

to clerk

STEP 9: Review of typed Corrections (PMRC's)

---

to PCO, ASD/PMC (BSP Minutes)

---

to PCO and offerors

STEP 10: Receive Proposal

Review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 11: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Request PMRP perform Pricing

---

wait for audit

STEP 12: Price Proposal

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG

(PMRP performs pricing)

Set-up Negotiation schedule with Engineer and Offerors

Draft documents for pre-negotiation meeting

clerk types pre-neg documents

STEP 13: Conduct Pre-negotiation Presentation for Director and ASD/PM

STEP 14: Negotiations (telephone or face-to-face)

Negotiate a Fair and Reasonable Price

STEP 15: Write-up Award

Request Small Business Subcontracting Plan

Write Contract Modification

Write ROCA (Pricing is writing the PNM) and file items (including DD1499)

to Clerk

STEP 16: Review typed Award

Review contract modification

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

to Clerk

STEP 17: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

to PCO

STEP 18: Make PCO required Corrections

to clerk

STEP 19: Review typed corrections (PCO's)

---

to PCO

STEP 20: Take Contract to JAG

STEP 21: Make JAG required corrections to Award

---

to clerk

STEP 22: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 23: Make PMRC required corrections to Award

---

to clerk

STEP 24: Review of typed corrections (PMRC's)

---

to PCO, ASD/PMC

STEP 25: Make ASD/PMC required Corrections to Award

---

to clerk

STEP 26: Review of typed corrections (ASD/PMC)

---

to PCO, clerk, out-for-signature

STEP 27: Back from Contractor

Review / to PCO, PMRC, PMC for Final Review

STEP 28: Final Corrections for PMRC, PMC, PM / to dist.

STEP 1: Write-up Award

Review BAFO's / discuss with Engineer/ discuss with price analyst/ Source Select with PCO

Request Small Business Subcontracting Plan

Write Contract

Write ROCA (Pricing is writing the PNM) and file items (including DD1499)

Request EEO clearance

---

to Clerk

STEP 2: Review typed Award

Review contract

Review file

Evaluate contractor's Subcontracting Plan, prepare documentation

Write correction instructions to Clerk

---

to Clerk

STEP 3: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 4: Make PCO required Corrections

---

to clerk

STEP 5: Review typed corrections (PCO's)

---

to PCO

STEP 6: Take Contract to JAG

STEP 7: Make JAG required corrections to Award

---

to clerk

STEP 8: Review typed corrections (JAG's)
(include time to carry to PMRC)

---

to PCO, PMRC

STEP 9: Make PMRC required corrections to Award

---

to clerk

STEP 10: Quick review of typed corrections (PMRC's)

---

to PCO, clerk, out-for-signature

STEP 11: Back from Contractor

Quick review / to PCO and PMRC for Final Review

STEP 12: Final Corrections for PMRC or Director/ to dist.

F2 COMPETITIVE BUY FAST TRACK Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Evaluation Criteria
- Review Notes to Buyer

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

to Clerk

STEP 5: Quick Review of Corrections

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 6: Receive Proposals

Quick review of Proposals

Write Request for Technical Evaluation/ ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

Write letter(s) to unacceptable(s) (if any)

Write letter to PMR if only one acceptable/ discuss/ resolve

STEP 8: Price Proposals

For Each Proposal in the Competitive Range
- Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
- Review Historical files/ call DCAA for rates
- Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offerors

Draft BAFO's

STEP 9: Negotiations (telephone)

For Each Proposal in the Competitive Range
- Resolve technical issues
- Discuss AF Objective

Mail BAFO's

STEP 10: Write-up Award

Review BAFO's / discuss with Engineer/ Source Select with PCO

Write Contract

Write ROCA and file items

to Clerk

STEP 11: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

to PCO

STEP 13: Make PCO required Corrections

to clerk

STEP 14: Review typed corrections (PCO's)

to PCO

STEP 15: Take Contract to JAG

STEP 16: Make JAG required corrections

---

to clerk

STEP 17: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 18: Back from Contractor

Quick review / to PCO for Award

F3 SOLE SOURCE BUY FAST TRACK Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
- Review SOW
- Review Contract Data Requirements List (DD1423)
- Review Notes to Buyer
- Review Sole Source Justification

Discuss PR problems with Engineer

Check Sources Sought Synopsis / DD254

Accept in Data-Cen, get RFP number

Write Small Business Coordination form

Informal BSP with PCO / Division Chief

Write RFP

Write Acquisition Plan

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Review File

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: RFP Corrections back from Clerk

Review corrections

Sign Acquisition Plan

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Quick Review of Corrections

---

to PCO, Clerk, Repro, Clerk, and Contractor

STEP 6: Receive Proposal

Quick review of Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offeror

STEP 9: Negotiations (telephone)

Resolve technical issues
Discuss AF Objective and negotiate price

STEP 10: Write-up Award

Write Contract

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review contract

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

---

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take Contract to JAG

STEP 16: Make JAG required corrections

---

to clerk

STEP 17: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 18: Back from Contractor

Quick review / to PCO for Award

F4 CONTRACT MOD FAST TRACK Buyer's Steps

STEP 1: Review PR and Write-up RFP

Review PR
Review SOW
Review Contract Data Requirements List (DD1423)
Review Notes to Buyer

Discuss PR problems with Engineer

Accept in Data-Cen

Write RFP letter

---

to Clerk

STEP 2: RFP back from Clerk

Review RFP

Write Correction Instructions to Clerk

---

to Clerk

STEP 3: Review corrections

---

to PCO

STEP 4: Make PCO required Corrections

---

to Clerk

STEP 5: Quick Review of Corrections / Mail

---

to PCO and Contractor

STEP 6: Receive Proposal

Ask Engineer to pick-up

---

to Technical Evaluation

STEP 7: Receive Technical Evaluation

Review Tech Eval/ resolve problems with Engineer

STEP 8: Price Proposals

Review Exceptions to Terms and Conditions/ discuss with PCO/JAG
Review Historical files/ call DCAA for rates
Compute AF Cost Objective and Profit Objective

Pre-negotiation with PCO / Branch Chief

Set-up Negotiation schedule with Engineer and Offerors

STEP 9: Negotiations (telephone)

Resolve technical issues
Negotiate modification

STEP 10: Write-up Award

Write modification

Write ROCA and file items

---

to Clerk

STEP 11: Review typed Award

Review modification

Review file

Write correction instructions to Clerk

---

to Clerk

STEP 12: Review Corrections (buyer's)

Review corrections

Sign ROCA and other file items

to PCO

STEP 13: Make PCO required Corrections

---

to clerk

STEP 14: Review typed corrections (PCO's)

---

to PCO

STEP 15: Take modification to JAG

STEP 16: Make JAG required corrections

---

to clerk

STEP 17: Review typed corrections (JAG's)

---

to PCO, clerk, out-for-signature

STEP 18: Back from Contractor

Quick review / to PCO for Award

F1 FUNDING Buyer's Steps

STEP 1: Ask Contractor for letter. Accept in Data-Cen

to clerk

STEP 2: Review Fundings and send back for corrections

to clerk

STEP 3: Review corrections. Sign FI 53.

to PCO, PMRC, clerk

STEP 4: Review corrections (PMRC). To PCO for award.

MO NO COST SUPPLEMENTAL AGREEMENT BUYER's STEPS

Receive letter from contractor

STEP 1: Write letter to Lab

---

clerk types

STEP 2: Review and sign letter to Lab

Lab sends back recommendation

STEP 3: Negotiate change with contractor.

Write Modification

Write Justification

---

clerk types

STEP 4: Review change, sign file

PCO reviews, out to contractor

STEP 5: Quick review / give to PCO

A1 Administrative Change Buyer's Steps

STEP 1: Write up change

Receive request for correction or change.

Write up change.

Input DATA-CEN

---

to typing

STEP 2: Review change

---

to PCO, award

OTHER DUTIES AS ASSIGNED

Security Check

Administer contracts

Write letters on awarded contracts

Go to Meetings

Go to training classes/ PMR meetings/ Security meetings

Branch or Division meetings

Terminate contracts

Participate in reviews (C/SSR, technical, etc.)

Delinquent Contract Reports

Management Reviews / reports

Answer Freedom of Information requests

Keep-up on new regulations, policy letters, etc.

Update Data-Cen

Fill-out travel vouchers / TDY forms for trips

Draft RFPs

APPENDIX I

ANALYSIS OF BUYER ESTIMATES

Buyers' STEPS
NETWORK C2

Step 1	Normal	Optimistic	Pessimistic
Mean	10.9	7.44	18.88
Std. Dev.	6.7	4.44	12.96
Median	10	6	16
Percent	45	19	36
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	2	1.32	3.57
Std. Dev.	1.8	1.37	3.56
Median	1	.5	2
Percent	52	16	32
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	1.07	.589	1.78
Std. Dev.	1.02	.644	1.37
Median	.5	.3	1.5
Percent	50	20	30
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.38	.657	2.42
Std. Dev.	1.14	.655	1.7
Median	1	.5	1.5
Percent	54	20	26
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	.94	.51	1.44
Std. Dev.	.97	.64	1.19
Median	.5	.3	1
Percent	55	18	27
Number in Sample	9		

Solicitation Period	Normal	Optimistic	Pessimistic
Mean	182.6	144	271.5
Std. Dev.	18.66	37.4	34
Median	176	140	264
Percent	57	15	28
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	2.5	1.52	5.3
Std. Dev.	1.22	.9	4.4
Median	3	2	4
Percent	51	22	27
Number in Sample	9		

Technical Eval.	Normal	Optimistic	Pessimistic
Mean	164.5	116	247.7
Std. Dev.	47.5	37.8	68
Median	176	100	240
Percent	54	18	28
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	4.94	3.05	8.55
Std. Dev.	4.3	2.8	8.95
Median	4	2	6
Percent	52	22	26
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	12.4	8.55	17.9
Std. Dev.	18.4	12.3	24
Median	6	4	12
Percent	52	21	27
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	3.25	1.83	5.67
Std. Dev.	1.86	1.12	3.7
Median	3	2	4
Percent	52	21	27
Number in Sample			

Out BAFO	Normal	Optimistic	Pessimistic
Mean	87.5	60	125
Std. Dev.	31.95	18.5	50
Median	80	60	120
Percent	53	19	28
Number in Sample	8		

Step 10	Normal	Optimistic	Pessimistic
Mean	11.67	6.67	19
Std. Dev.	9.56	4.27	15.95
Median	10	8	18
Percent	48	20	32
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	2.1	1.3	4.1
Std. Dev.	1.9	1.4	3.6
Median	1	.5	3
Percent	60	18	22
Number in Sample	9		

Step 12	Normal	Optimistic	Pessimistic
Mean	.86	.46	1.7
Std. Dev.	.62	.4	1.2
Median	1	.5	1.5
Percent	46	17	27
Number in Sample	9		

Step 13	Normal	Optimistic	Pessimistic
Mean	1	.57	1.97
Std. Dev.	.9	.63	1.32
Median	1	.5	2
Percent	54	19	27
Number in Sample	9		

Step 14	Normal	Optimistic	Pessimistic
Mean	.72	.57	1.97
Std. Dev.	.65	.4	.91
Median	.5	.25	1
Percent	55	17	28
Number in Sample	9		

Contractor Sign	Normal	Optimistic	Pessimistic
Mean	75	42.5	122
Std. Dev.	9.25	8.3	33.6
Median	80	40	120
Percent	50	20	30
Number in Sample	8		

Step 15	Normal	Optimistic	Pessimistic
Mean	1.1	.4	2
Std. Dev.	.9	.3	1.9
Median	1	.5	1.5
Percent	55	21	24
Number in Sample	9		

NETWORK C3

Step 1	Normal	Optimistic	Pessimistic
Mean	14.7	9.4	22.4
Std. Dev.	11.8	7.6	20.3
Median	10	6	16
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.9	1.2	3.4
Std. Dev.	1.9	1.4	3.6
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	13.5	9.1	21
Std. Dev.	18.2	12.3	24.3
Median	8	4	16
Percent	-	-	-
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	3.5	1.8	6.5
Std. Dev.	2.6	1.5	5.6
Median	3	1	4
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	12.1	7	18.9
Std. Dev.	9.8	4.9	15.1
Median	1	.5	3
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	2	1.2	4
Std. Dev.	1.8	1.4	3.5
Median	1	.5	3
Percent	-	-	-
Number in Sample	9		

Step 15	Normal	Optimistic	Pessimistic
Mean	.7	.5	1
Std. Dev.	.2	.2	.4
Median	.5	.5	1
Percent	46	27	27
Number in Sample	9		

JAG Review	Normal	Optimistic	Pessimistic
Mean	28	14	49.5
Std. Dev.	8.6	5.7	12.8
Median	24	16	48
Percent	47	19	34
Number in Sample	8		

Step 16	Normal	Optimistic	Pessimistic
Mean	1.4	.6	3.4
Std. Dev.	.9	.4	2.4
Median	1	.5	3.5
Percent	52	24	24
Number in Sample	9		

Step 17	Normal	Optimistic	Pessimistic
Mean	.8	.4	1.6
Std. Dev.	.6	.3	1.4
Median	.8	.5	1
Percent	49	24	27
Number in Sample	9		

NETWORK C4

Step 1	Normal	Optimistic	Pessimistic
Mean	15	10.6	23
Std. Dev.	11.6	8	20.5
Median	12	8	16
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	2	1.2	3.2
Std. Dev.	1.3	.9	2.5
Median	2	1	3
Percent	-	-	-
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.7	.5	.9
Std. Dev.	.3	.2	.4
Median	.5	.5	.8
Percent	50	24	26
Number in Sample	9		

JAG RFP Review	Normal	Optimistic	Pessimistic
Mean	31	15	49.5
Std. Dev.	13.3	5.1	14.2
Median	24	16	44
Percent	47	18	35
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	1.5	.5	3.4
Std. Dev.	1.2	.4	2.4
Median	1	.5	3.5
Percent	51	21	28
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	.7	.3	1.4
Std. Dev.	.6	.3	1.1
Median	.5	.3	1
Percent	51	22	27
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	11.7	7.3	19.7
Std. Dev.	11.7	7.2	23.8
Median	10	4	15
Percent	-	-	-
Number in Sample	9		

Step 12	Normal	Optimistic	Pessimistic
Mean	4	2.1	7.4
Std. Dev.	3.1	1.7	6.3
Median	4	2	5
Percent	-	-	-
Number in Sample	9		

Step 13	Normal	Optimistic	Pessimistic
Mean	15.4	9.6	26.2
Std. Dev.	12.5	6.3	25.6
Median	10	8	14
Percent	-	-	-
Number in Sample	9		

Step 14	Normal	Optimistic	Pessimistic
Mean	1.9	1.2	3.3
Std. Dev.	1.3	.9	2.7
Median	2	1	3
Percent	-	-	-
Number in Sample	9		

NETWORK C5

Step 1	Normal	Optimistic	Pessimistic
Mean	16.4	11.5	25
Std. Dev.	12.2	8.8	20.5
Median	16	8	22
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	2.1	1.2	3.4
Std. Dev.	1.3	.85	2.4
Median	2	1	3
Percent	-	-	-
Number in Sample	9		

PMRC RFP Review	Normal	Optimistic	Pessimistic
Mean	26	13.5	46.5
Std. Dev.	10.3	7	14.5
Median	24	10	48
Percent	49	19	32
Number in Sample	8		

Step 9	Normal	Optimistic	Pessimistic
Mean	2.7	1.3	4.9
Std. Dev.	1.8	1.2	3.8
Median	3	1	5
Percent	47	19	34
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	.9	.4	1.5
Std. Dev.	.5	.3	.8
Median	1	.5	1.5
Percent	53	19	28
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	2.6	1.3	4.9
Std. Dev.	1.2	.6	3.2
Median	3	1	4.5
Percent	52	22	26
Number in Sample	8		

Step 12	Normal	Optimistic	Pessimistic
Mean	.5	.3	.7
Std. Dev.	.3	.3	.3
Median	.4	.2	.6
Percent	55	23	22
Number in Sample	8		

Step 15	Normal	Optimistic	Pessimistic
Mean	9.4	6.1	17.3
Std. Dev.	7.2	5.3	17.6
Median	6	3	16
Percent	-	-	-
Number in Sample	9		

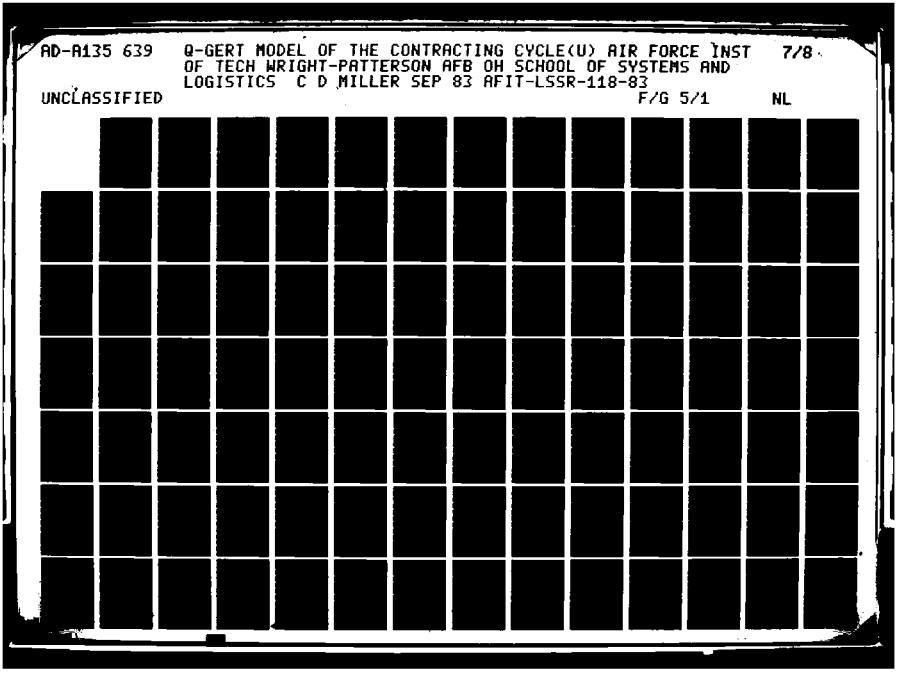
Step 16	Normal	Optimistic	Pessimistic
Mean	4.4	2.6	7.8
Std. Dev.	3.8	2.6	7.3
Median	3	1.5	5
Percent	-	-	-
Number in Sample	9		

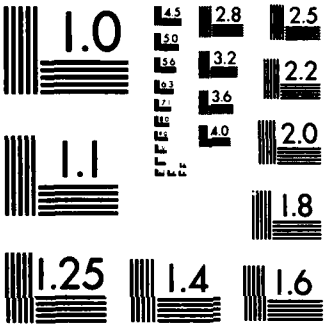
Step 17	Normal	Optimistic	Pessimistic
Mean	14.75	9.75	21.2
Std. Dev.	12.7	7.75	19.2
Median	12.5	8	16.5
Percent	-	-	-
Number in Sample	8		

Step 18	Normal	Optimistic	Pessimistic
Mean	3	1.8	5.1
Std. Dev.	2.4	1.2	3.9
Median	3	2	6
Percent	-	-	-
Number in Sample	9		

PMRC Contract	Normal	Optimistic	Pessimistic
Mean	27	14	47.5
Std. Dev.	9.5	7.[illegible]	13.6
Median	24	12	48
Percent	50	19	31
Number in Sample	8		

Step 25	Normal	Optimistic	Pessimistic
Mean	3.4	1.8	6.8
Std. Dev.	2.5	1.9	5.5
Median	3	1	5
Percent	46	20	34
Number in Sample	9		


AD-A135 639 Q-GERT MODEL OF THE CONTRACTING CYCLE(U) AIR FORCE INST 7/8
OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND
LOGISTICS C D MILLER SEP 83 AFIT-LSSR-118-83
UNCLASSIFIED F/G 5/1 NL



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

Buyers' STEPS

Step 26	Normal	Optimistic	Pessimistic
Mean	1.1	.6	1.8
Std. Dev.	.6	.3	1.1
Median	1	.7	2
Percent	48	23	29
Number in Sample	9		

NETWORK C6

Step 1	Normal	Optimistic	Pessimistic
Mean	14.6	7.8	25.4
Std. Dev.	8.1	4.4	13.9
Median	14.5	7	24
Percent	51	17	32
Number in Sample	8		

Step 2	Normal	Optimistic	Pessimistic
Mean	2.1	.8	3.6
Std. Dev.	1.8	.5	2.1
Median	1.5	.8	3
Percent	58	18	24
Number in Sample	8		

Audit	Normal	Optimistic	Pessimistic
Mean	317.7	216	535.7
Std. Dev.	60.7	80.3	245.2
Median	352	176	528
Percent	60	20	20
Number in Sample	8		
$ Level	Competitive 2M Sole Source 1.75M Modification 500K		

Step 15	Normal	Optimistic	Pessimistic
Mean	11.6	7.8	25.1
Std. Dev.	10.2	7.7	26
Median	10	5.5	17
Percent	56	18	26
Number in Sample	8		

Step 16	Normal	Optimistic	Pessimistic
Mean	13.8	8.2	21.4
Std. Dev.	27.3	16.4	40.1
Median	2	1	4.5
Percent	61	18	21
Number in Sample	8		

Step 17	Normal	Optimistic	Pessimistic
Mean	13.1	6.9	20.5
Std. Dev.	12.3	5.0	19.0
Median	11	6.5	18
Percent	60	19	21
Number in Sample	8		

Out BAFO	Normal	Optimistic	Pessimistic
Mean	61.6	38.8	103
Std. Dev.	18.4	12.6	21.1
Median	64	40	108
Percent	58	22	20
Number in Sample	8		

Step 27	Normal	Optimistic	Pessimistic
Mean	1.3	.5	4.4
Std. Dev.	1.3	.4	5.4
Median	.5	.3	3
Percent	62	19	19
Number in Sample	7		

NETWORK C7

Step 1	Normal	Optimistic	Pessimistic
Mean	17.9	10.3	34.9
Std. Dev.	10	7.2	23.1
Median	17	7.5	27
Percent	-	-	-
Number in Sample	8		

Step 2	Normal	Optimistic	Pessimistic
Mean	4.4	2.0	8.9
Std. Dev.	5.1	2.5	12.8
Median	3	1.5	5
Percent	-	-	-
Number in Sample	8		

Step 15	Normal	Optimistic	Pessimistic
Mean	12.9	8.4	28.7
Std. Dev.	15.3	10.3	36.9
Median	7	4.8	11.5
Percent	-	-	-
Number in Sample	8		

Step 16	Normal	Optimistic	Pessimistic
Mean	1.1	.5	2.9
Std. Dev.	.4	.3	1.2
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Step 17	Normal	Optimistic	Pessimistic
Mean	8.2	4.0	17.9
Std. Dev.	11.8	5.9	24.5
Median	2	1	4
Percent	-	-	-
Number in Sample	7		

Step 18	Normal	Optimistic	Pessimistic
Mean	10.4	6.8	18.4
Std. Dev.	9.8	6.5	18.2
Median	6	5	12
Percent	-	-	-
Number in Sample	7		

Step 19	Normal	Optimistic	Pessimistic
Mean	3.6	2.5	6.5
Std. Dev.	3.4	2.6	5.6
Median	2	1	4.5
Percent	-	-	-
Number in Sample	7		

Buyers' STEPS

Step 28	Normal	Optimistic	Pessimistic
Mean	3.1	2	5.3
Std. Dev.	4.2	2.8	5.3
Median	1	.8	4
Percent	-	-	-
Number in Sample	7		

Step 29	Normal	Optimistic	Pessimistic
Mean	1.7	.6	3.2
Std. Dev.	1.4	.8	2.4
Median	1	.3	2.0
Percent	-	-	-
Number in Sample	7		

NETWORK C8

Step 1	Normal	Optimistic	Pessimistic
Mean	20.1	12.4	33
Std. Dev.	11.7	8.1	13.9
Median	24	8	32
Percent	48	20	32
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.8	.9	3.4
Std. Dev.	.7	.6	1.2
Median	2.0	1.0	4
Percent	56	19	25
Number in Sample	7		

Step 3	Normal	Optimistic	Pessimistic
Mean	13.1	9.1	21.7
Std. Dev.	9.9	8.3	16
Median	12	8	20
Percent	-	-	-
Number in Sample	7		

Step 4	Normal	Optimistic	Pessimistic
Mean	3.4	2.2	5.2
Std. Dev.	2.4	1.8	3
Median	3	2	5
Percent	-	-	-
Number in Sample	7		

ASD/PMC RFP Review	Normal	Optimistic	Pessimistic
Mean	29.1	13.7	58.3
Std. Dev.	9.4	6	22.5
Median	32	16	56
Percent	51	15	34
Number in Sample	7		

Step 13	Normal	Optimistic	Pessimistic
Mean	2.3	1.4	4.3
Std. Dev.	2.6	2.1	3.8
Median	2	1	3
Percent	65	19	16
Number in Sample	7		

Step 14	Normal	Optimistic	Pessimistic
Mean	.8	.4	2.3
Std. Dev.	.6	.3	2.6
Median	.8	.4	1.4
Percent	-	-	-
Number in Sample	8		

Step 19	Normal	Optimistic	Pessimistic
Mean	13.2	5.4	22
Std. Dev.	11.2	3.6	17.7
Median	15	7	20
Percent	-	-	-
Number in Sample	7		

Step 20	Normal	Optimistic	Pessimistic
Mean	2.1	.9	4
Std. Dev.	1.4	.5	2.8
Median	2	1	3
Percent	-	-	-
Number in Sample	7		

Step 21	Normal	Optimistic	Pessimistic
Mean	11.8	6.4	23.4
Std. Dev.	16.8	9.6	33.6
Median	3	2	4
Percent	-	-	-
Number in Sample	7		

Step 22	Normal	Optimistic	Pessimistic
Mean	9	5.6	15.1
Std. Dev.	5.9	4	11
Median	10	5	15
Percent	-	-	-
Number in Sample	7		

ASD/PMC K Review	Normal	Optimistic	Pessimistic
Mean	24.9	13.9	51.4
Std. Dev.	10.6	8.6	21.6
Median	24	16	40
Percent	57	11	32
Number in Sample	7		

Step 32	Normal	Optimistic	Pessimistic
Mean	2.5	1.4	4.6
Std. Dev.	2	1.3	2.2
Median	2	1	5
Percent	65	19	16
Number in Sample	7		

Step 33	Normal	Optimistic	Pessimistic
Mean	1.3	.5	2.2
Std. Dev.	1.1	.5	1.7
Median	.5	.3	1
Percent	60	22	18
Number in Sample	7		

Step 34	Normal	Optimistic	Pessimistic
Mean	4.2	1.9	7.1
Std. Dev.	5.5	2.8	8.1
Median	2	1	3
Percent	-	-	-
Number in Sample	7		

Step 35	Normal	Optimistic	Pessimistic
Mean	8.1	3.8	13.9
Std. Dev.	11	6.1	16.7
Median	1	.5	7
Percent	-	-	-
Number in Sample	7		

NETWORK S2

Step 1	Normal	Optimistic	Pessimistic
Mean	11.9	8.2	21.3
Std. Dev.	10.2	7.3	18.8
Median	8	6	12
Percent	48	18	34
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.4	.8	2.3
Std. Dev.	1.2	.9	2
Median	.8	.5	1
Percent	57	19	24
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	.9	.4	1.4
Std. Dev.	.7	.4	1.3
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.1	.6	1.9
Std. Dev.	.8	.4	1.3
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.1
Std. Dev.	.6	.3	1
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Solicitation Time	Normal	Optimistic	Pessimistic
Mean	160.8	105	253.3
Std. Dev.	32	41.8	34
Median	176	104	264
Percent	52	21	27
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.4	.4	1.1
Std. Dev.	.6	.3	1
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Technical Eval.	Normal	Optimistic	Pessimistic
Mean	117	82	185.5
Std. Dev.	53.4	43.3	78.1
Median	104	70	208
Percent	45	22	33
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	2.8	1.7	5.2
Std. Dev.	1.7	1.1	3.6
Median	2	1	3.5
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	5.2	3.7	13.3
Std. Dev.	4.1	3.4	16.5
Median	5	4	8
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	6.9	4.7	10.6
Std. Dev.	4.9	3.6	7.4
Median	8	4	10
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.6	1	2.6
Std. Dev.	1.2	.9	2.1
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

Step 12	Normal	Optimistic	Pessimistic
Mean	.8	.4	1.4
Std. Dev.	.6	.4	.9
Median	.5	.3	2
Percent	-	-	-
Number in Sample	9		

Step 13	Normal	Optimistic	Pessimistic
Mean	.76	.41	1.54
Std. Dev.	.65	.4	.9
Median	.5	.17	1
Percent	-	-	-
Number in Sample	9		

Contractor Sign	Normal	Optimistic	Pessimistic
Mean	71.5	38	120
Std. Dev.	11.8	10.3	21.4
Median	80	40	120
Percent	-	-	-
Number in Sample	8		

Step 15	Normal	Optimistic	Pessimistic
Mean	1	.45	1.8
Std. Dev.	.64	.26	1.4
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

NETWORK S3

Step 1	Normal	Optimistic	Pessimistic
Mean	10.3	7.5	19.8
Std. Dev.	7.3	5.3	17.6
Median	8.5	6.5	16
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.7	1	2.5
Std. Dev.	1.2	.9	1.8
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	6.1	4.2	12.8
Std. Dev.	5.2	3.7	13.6
Median	5	4	8
Percent	-	-	-
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	3.5	2.3	8.2
Std. Dev.	3.6	2.7	9.7
Median	2	1	4
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	7	4.7	10.6
Std. Dev.	4.8	3.6	7.6
Median	6	4	10
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.8	1.1	3
Std. Dev.	1.2	.9	2.2
Median	1.5	1	2
Percent	-	-	-
Number in Sample	9		

Step 16	Normal	Optimistic	Pessimistic
Mean	1.3	.6	3.2
Std. Dev.	.7	.4	2.3
Median	1.5	.5	3
Percent	-	-	-
Number in Sample	9		

JAG Review	Normal	Optimistic	Pessimistic
Mean	28	14	5
Std. Dev.	6	5.7	.4
Median	24	16	
Percent	-	-	
Number in Sample	8		

Step 17	Normal	Optimistic	Pessimistic
Mean	1	.5	1.7
Std. Dev.	.7	.4	1.2
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

Step 18	Normal	Optimistic	Pessimistic
Mean	1	.5	1.8
Std. Dev.	.5	.3	1.2
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

NETWORK S4

Step 1	Normal	Optimistic	Pessimistic
Mean	11.4	8.3	18.9
Std. Dev.	8	6.2	14.8
Median	9.5	7	16
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.7	1.1	2.6
Std. Dev.	1.2	.9	1.8
Median	1	.8	2
Percent	-	-	-
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.7	.5	.9
Std. Dev.	.3	.3	.4
Median	.5	.5	1
Percent	-	-	-
Number in Sample	9		

JAG RFP Review	Normal	Optimistic	Pessimistic
Mean	26	14	46
Std. Dev.	7.1	5.7	10.9
Median	24	16	40
Percent	-	-	-
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	1.2	.5	2.2
Std. Dev.	.6	.4	1.1
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.2
Std. Dev.	.6	.3	.9
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	5	3.3	8.7
Std. Dev.	2.5	2	6.6
Median	5	3	8
Percent	-	-	-
Number in Sample	9		

Step 12	Normal	Optimistic	Pessimistic
Mean	2.8	1.6	6.1
Std. Dev.	1.7	.9	5.6
Median	2.5	1	5
Percent	-	-	-
Number in Sample	9		

Buyers' STEPS

Step 13	Normal	Optimistic	Pessimistic
Mean	8	5.1	14.1
Std. Dev.	6.8	4.7	13.9
Median	6	4	12
Percent	-	-	-
Number in Sample	9		

Step 14	Normal	Optimistic	Pessimistic
Mean	1.7	1.1	2.9
Std. Dev.	1.2	.9	2.4
Median	1.5	1	2
Percent	-	-	-
Number in Sample	9		

Step 21	Normal	Optimistic	Pessimistic
Mean	1	.6	1.9
Std. Dev.	.6	.3	1.8
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

NETWORK S5

Step 1	Normal	Optimistic	Pessimistic
Mean	12.8	9.4	20.7
Std. Dev.	9.6	7	17.3
Median	10	7.5	18
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	2	1.2	3
Std. Dev.	1.3	.9	1.8
Median	2	1	4
Percent	-	-	-
Number in Sample	9		

PMRC RFP Review	Normal	Optimistic	Pessimistic
Mean	27	14.5	43
Std. Dev.	9.5	6.7	13.3
Median	24	14	44
Percent	-	-	-
Number in Sample	8		

Step 9	Normal	Optimistic	Pessimistic
Mean	2.6	1.3	5.1
Std. Dev.	1.8	1.2	3.8
Median	2	1	5
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	.8	.3	1.6
Std. Dev.	.5	.3	.9
Median	.8	.3	1.5
Percent	-	-	-
Number in Sample	9		

Step 13	Normal	Optimistic	Pessimistic
Mean	5.6	3.6	8.2
Std. Dev.	3.6	2.3	5.1
Median	5	4	8
Percent	-	-	-
Number in Sample	9		

Step 14	Normal	Optimistic	Pessimistic
Mean	3	1.8	6.3
Std. Dev.	1.8	1.1	5.6
Median	3	1	5
Percent	-	-	-
Number in Sample	9		

Step 15	Normal	Optimistic	Pessimistic
Mean	7.9	5.6	11.6
Std. Dev.	5.1	4.4	8.3
Median	8	4	12
Percent	-	-	-
Number in Sample	9		

Step 16	Normal	Optimistic	Pessimistic
Mean	2.1	1.3	3.4
Std. Dev.	1.5	1.1	2.5
Median	2	1	3
Percent	-	-	-
Number in Sample	9		

PMRC K Review	Normal	Optimistic	Pessimistic
Mean	29	15	46.5
Std. Dev.	10.4	6.7	17.4
Median	24	16	44
Percent	-	-	-
Number in Sample	8		

Step 23	Normal	Optimistic	Pessimistic
Mean	2.8	1.3	5.6
Std. Dev.	2.3	1.2	4.8
Median	2	1	5
Percent	-	-	-
Number in Sample	9		

Step 24	Normal	Optimistic	Pessimistic
Mean	1	.5	1.5
Std. Dev.	.6	.3	1.2
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

Step 25	Normal	Optimistic	Pessimistic
Mean	1	.5	1.6
Std. Dev.	.6	.3	1.2
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

NETWORK S6

Step 1	Normal	Optimistic	Pessimistic
Mean	15	9.3	25.4
Std. Dev.	15.4	10.6	25.1
Median	12	5	20
Percent	-	-	-
Number in Sample	7		

Buyers' STEPS

Step 2	Normal	Optimistic	Pessimistic
Mean	5	2.5	10.1
Std. Dev.	8.6	4.3	17.1
Median	1	.5	3
Percent	-	-	-
Number in Sample	7		

Solicitation Time	Normal	Optimistic	Pessimistic
Mean	154.3	104	264
Std. Dev.	38.9	41.8	71.9
Median	176	112	264
Percent	-	-	-
Number in Sample	7		

Step 13	Normal	Optimistic	Pessimistic
Mean	7.6	5.1	15
Std. Dev.	4.9	4.2	12.5
Median	6	4	12
Percent	-	-	-
Number in Sample	7		

Step 14	Normal	Optimistic	Pessimistic
Mean	8.3	5.6	13
Std. Dev.	6.3	5	10.5
Median	6	4	9
Percent	-	-	-
Number in Sample	7		

Step 15	Normal	Optimistic	Pessimistic
Mean	8.3	5.6	13
Std. Dev.	6.3	5	10.5
Median	6	4	9
Percent	-	-	-
Number in Sample	7		

Step 16	Normal	Optimistic	Pessimistic
Mean	3.3	1.9	6.1
Std. Dev.	3.9	2.7	7.9
Median	2	1	3.5
Percent	-	-	-
Number in Sample	7		

Out for KR Sign	Normal	Optimistic	Pessimistic
Mean	86.7	41.3	165.3
Std. Dev.	12.8	7.9	44.6
Median	80	40	168
Percent	-	-	-
Number in Sample	7		

Step 25	Normal	Optimistic	Pessimistic
Mean	1.5	.6	2.9
Std. Dev.	1	.4	1.6
Median	1.5	.5	3
Percent	-	-	-
Number in Sample	7		

NETWORK S7

Step 1	Normal	Optimistic	Pessimistic
Mean	16.6	11.4	27.4
Std. Dev.	15.5	10.9	25.2
Median	12	8	20
Percent	-	-	-
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	5.9	3	10.9
Std. Dev.	8.2	4.1	16.6
Median	3	2	5
Percent	-	-	-
Number in Sample	7		

Step 11	Normal	Optimistic	Pessimistic
Mean	8.8	4.4	16.7
Std. Dev.	8.1	4	16
Median	5	2	8
Percent	-	-	-
Number in Sample	7		

Step 12	Normal	Optimistic	Pessimistic
Mean	.9	.4	1.7
Std. Dev.	.6	.3	1.1
Median	1	.3	1.5
Percent	-	-	-
Number in Sample	7		

Step 15	Normal	Optimistic	Pessimistic
Mean	7.9	3.8	11.8
Std. Dev.	5.9	2.5	8.2
Median	8	4	12
Percent	-	-	-
Number in Sample	7		

Step 16	Normal	Optimistic	Pessimistic
Mean	1.2	.6	2.3
Std. Dev.	.4	.3	.9
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Step 17	Normal	Optimistic	Pessimistic
Mean	8.8	5.5	17
Std. Dev.	17.4	11.7	28.2
Median	2	1	8
Percent	-	-	-
Number in Sample	7		

Step 18	Normal	Optimistic	Pessimistic
Mean	7.5	5.1	12.1
Std. Dev.	4.9	4.1	7.7
Median	8	6	12
Percent	-	-	-
Number in Sample	7		

Step 19	Normal	Optimistic	Pessimistic
Mean	2	1.2	3.9
Std. Dev.	1.2	1	2.3
Median	2	1	4
Percent	-	-	-
Number in Sample	7		

Step 28	Normal	Optimistic	Pessimistic
Mean	3.2	1.6	5.2
Std. Dev.	5.7	2.9	8.4
Median	1	.3	2
Percent	-	-	-
Number in Sample	7		

Step 29	Normal	Optimistic	Pessimistic
Mean	2.1	1	3.8
Std. Dev.	2.7	1.4	3.8
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

NETWORK S8

Step 1	Normal	Optimistic	Pessimistic
Mean	18.9	12.1	31.3
Std. Dev.	15.3	10.4	24.3
Median	15	8	25
Percent	-	-	-
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.6	.9	2.7
Std. Dev.	.7	.6	1
Median	1.5	1	2
Percent	-	-	-
Number in Sample	7		

Step 3	Normal	Optimistic	Pessimistic
Mean	15.1	10	26.7
Std. Dev.	12	6.9	24.7
Median	12	8	24
Percent	-	-	-
Number in Sample	7		

Step 4	Normal	Optimistic	Pessimistic
Mean	2.6	1.5	5.2
Std. Dev.	1.9	1.3	5
Median	2	1	4
Percent	-	-	-
Number in Sample	7		

Step 13	Normal	Optimistic	Pessimistic
Mean	1.8	.9	3.9
Std. Dev.	1.3	.8	2.5
Median	1.5	.5	3
Percent	-	-	-
Number in Sample	7		

ASD/PMC RFP Review	Normal	Optimistic	Pessimistic
Mean	27.4	14.3	58.3
Std. Dev.	10.2	5.6	21.5
Median	24	16	56
Percent	-	-	-
Number in Sample	7		

Step 14	Normal	Optimistic	Pessimistic
Mean	1.6	.9	2.8
Std. Dev.	1.6	1	2.3
Median	1	.5	3
Percent	-	-	-
Number in Sample	7		

Step 15	Normal	Optimistic	Pessimistic
Mean	5.2	2.9	11.1
Std. Dev.	3.6	2.5	10.2
Median	4.0	2	8
Percent	-	-	-
Number in Sample	7		

Step 16	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.9
Std. Dev.	.5	.3	1.2
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	7		

Step 19	Normal	Optimistic	Pessimistic
Mean	7.6	4.3	11.7
Std. Dev.	4.9	2.8	7
Median	8	5	12
Percent	-	-	-
Number in Sample	7		

Step 20	Normal	Optimistic	Pessimistic
Mean	1.9	1.1	3.3
Std. Dev.	1.4	.9	1.8
Median	1.5	1	3
Percent	-	-	-
Number in Sample	7		

Buyers' STEPS

Step 21	Normal	Optimistic	Pessimistic
Mean	9.1	4	18.4
Std. Dev.	8.8	3.4	16.7
Median	8	4	15
Percent	-	-	-
Number in Sample	7		

Step 22	Normal	Optimistic	Pessimistic
Mean	9.9	6.3	15.2
Std. Dev.	6.7	5.1	9.9
Median	9	6	16
Percent	-	-	-
Number in Sample	7		

Step 23	Normal	Optimistic	Pessimistic
Mean	3.1	1.5	5.3
Std. Dev.	2.8	1.4	5.2
Median	2	1	3
Percent	-	-	-
Number in Sample	7		

ASD/PMC K Review	Normal	Optimistic	Pessimistic
Mean	29.7	14.3	59.4
Std. Dev.	8.9	7.3	20
Median	32	12	56
Percent	46	16	38
Number in Sample	7		

Step 32	Normal	Optimistic	Pessimistic
Mean	3.1	1.8	5.6
Std. Dev.	3.4	2.3	5.9
Median	1.5	.8	3
Percent	54	23	23
Number in Sample	7		

Step 33	Normal	Optimistic	Pessimistic
Mean	1.1	.5	2
Std. Dev.	.9	.5	1.6
Median	.5	.3	1
Percent	54	18	28
Number in Sample	7		

Buyers' STEPS

Step 34	Normal	Optimistic	Pessimistic
Mean	3.3	1.6	5.4
Std. Dev.	5.7	2.9	8.4
Median	.7	.5	2
Percent	-	-	-
Number in Sample	7		

Step 35	Normal	Optimistic	Pessimistic
Mean	3.1	1.4	5.7
Std. Dev.	2.8	1.6	5.5
Median	3	.5	4
Percent	-	-	-
Number in Sample	7		

NETWORK M2

Step 1	Normal	Optimistic	Pessimistic
Mean	6.3	3.6	10.8
Std. Dev.	5.7	3.9	10.3
Median	4	2	8
Percent	55	19	26
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.2	.7	1.8
Std. Dev.	1.1	.6	1.6
Median	1	.5	1
Percent	54	22	24
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	4.5	3	9.1
Std. Dev.	4.2	3.5	11.7
Median	3	2	6
Percent	49	19	32
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	2.7	1.7	5.9
Std. Dev.	3.5	2.4	7
Median	1.5	1	4
Percent	51	20	29
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	4.1	2.9	6.8
Std. Dev.	3	2.5	5.7
Median	3	2	5
Percent	51	21	28
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2.1
Std. Dev.	.9	.6	1.2
Median	1	.5	2
Percent	56	21	23
Number in Sample	9		

Step 15	Normal	Optimistic	Pessimistic
Mean	.9	.4	1.3
Std. Dev.	.5	.3	.9
Median	1	.5	1.3
Percent	54	22	24
Number in Sample	9		

NETWORK M3

Step 1	Normal	Optimistic	Pessimistic
Mean	7.6	4.5	12
Std. Dev.	7.5	4.9	12.3
Median	6	3	8
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.4	.8	2
Std. Dev.	1.1	.5	1.7
Median	1	.5	1
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	5.5	3.2	10.1
Std. Dev.	7	4.8	14.3
Median	3	2	6
Percent	-	-	-
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	3.5	2.3	7.4
Std. Dev.	5.5	3.7	10.9
Median	2	1	4
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	4.4	3.3	7.2
Std. Dev.	3.5	3	7
Median	3	2	5
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.4	.8	2.6
Std. Dev.	.8	.5	1.7
Median	1.3	.8	3
Percent	-	-	-
Number in Sample	9		

Step 15	Normal	Optimistic	Pessimistic
Mean	.7	.5	1
Std. Dev.	.3	.2	.5
Median	.8	.5	1
Percent	-	-	-
Number in Sample	9		

JAG Award Review	Normal	Optimistic	Pessimistic
Mean	27	13.5	43.5
Std. Dev.	9.5	7.1	18.1
Median	24	10	40
Percent	-	-	-
Number in Sample	8		

Buyers' STEPS

Step 16	Normal	Optimistic	Pessimistic
Mean	1.2	.6	2.5
Std. Dev.	.6	.4	2.2
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

Step 17	Normal	Optimistic	Pessimistic
Mean	1	.4	1.6
Std. Dev.	.7	.4	1.3
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

Step 18	Normal	Optimistic	Pessimistic
Mean	.9	.4	1.6
Std. Dev.	.5	.3	1.2
Median	1	.5	1.3
Percent	-	-	-
Number in Sample	9		

NETWORK M4

Step 1	Normal	Optimistic	Pessimistic
Mean	9.1	6.3	13.8
Std. Dev.	9.1	6.3	13.4
Median	4	3	8
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.1	.6	1.7
Std. Dev.	.6	.3	.9
Median	1	.5	1.3
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	7.3	5.2	10.9
Std. Dev.	9.5	7.2	14.1
Median	4	2.5	6
Percent	-	-	-
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	3.2	2.1	7
Std. Dev.	3.4	2.3	9.6
Median	2	1	3.5
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	5.2	3.8	8
Std. Dev.	3.6	3.2	6.7
Median	5	4	6
Percent	-	-	-
Number in Sample	0		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.8	1.1	2.8
Std. Dev.	1.3	.9	1.9
Median	1.5	.8	3
Percent	-	-	-
Number in Sample	9		

Step 18	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.6
Std. Dev.	.5	.3	1.2
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

NETWORK M5

Step 1	Normal	Optimistic	Pessimistic
Mean	10.7	7.8	15.7
Std. Dev.	10.7	7	14.8
Median	7	6	8
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.4	.8	2.1
Std. Dev.	.6	.4	1
Median	1.5	.8	3
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	6.9	4.7	10.4
Std. Dev.	5.5	3	8.4
Median	5	4	6
Percent	-	-	-
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	4.8	2.5	7.9
Std. Dev.	7.3	3.6	12.2
Median	2.5	1	3.5
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	5.8	3.9	8.9
Std. Dev.	4	2.9	6.9
Median	5	4	6
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.9	1	3.2
Std. Dev.	1.2	.7	2
Median	2	1	3
Percent	-	-	-
Number in Sample	9		

Step 18	Normal	Optimistic	Pessimistic
Mean	2.3	1.1	4.5
Std. Dev.	2.3	1.3	4.9
Median	2	0.5	3
Percent	-	-	-
Number in Sample	9		

Buyers' STEPS

Step 19	Normal	Optimistic	Pessimistic
Mean	1	.5	1.8
Std. Dev.	.7	.4	1.7
Median	1	.5	1
Percent	-	-	-
Number in Sample	9		

Step 20	Normal	Optimistic	Pessimistic
Mean	.7	.5	1.4
Std. Dev.	.3	.3	1.1
Median	.8	.5	1
Percent	-	-	-
Number in Sample	9		

NETWORK M6

Step 1	Normal	Optimistic	Pessimistic
Mean	4.1	2.7	10.3
Std. Dev.	2.2	1.9	7.8
Median	4	2.5	8
Percent	-	-	-
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.8	1.1	3.4
Std. Dev.	2.8	2.2	5.6
Median	.8	.3	1
Percent	-	-	-
Number in Sample	7		

Step 8	Normal	Optimistic	Pessimistic
Mean	6.3	4.1	13.1
Std. Dev.	5.2	4.1	13
Median	6	2.5	12
Percent	-	-	-
Number in Sample	7		

Step 9	Normal	Optimistic	Pessimistic
Mean	6.1	3	11.8
Std. Dev.	11.5	5.7	19.7
Median	2	1	4
Percent	-	-	-
Number in Sample	7		

Step 10	Normal	Optimistic	Pessimistic
Mean	6.3	4.3	10.8
Std. Dev.	4.2	3.1	8
Median	6	4	10
Percent	-	-	-
Number in Sample	7		

Step 11	Normal	Optimistic	Pessimistic
Mean	2.7	1.4	5.3
Std. Dev.	2.5	1.2	5
Median	2	1	4
Percent	-	-	-
Number in Sample	7		

Step 20	Normal	Optimistic	Pessimistic
Mean	.9	.5	2.1
Std. Dev.	.6	.3	1.2
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

NETWORK M7

Step 1	Normal	Optimistic	Pessimistic
Mean	5	3.1	13.1
Std. Dev.	2.2	1.9	12.8
Median	5	3	8
Percent	-	-	-
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.7	1.1	3.2
Std. Dev.	2.8	2.2	5.7
Median	.5	.3	1
Percent	-	-	-
Number in Sample	7		

Step 8	Normal	Optimistic	Pessimistic
Mean	7.5	3.4	12.9
Std. Dev.	7.8	2	13.2
Median	6	4	8
Percent	-	-	-
Number in Sample	7		

Step 9	Normal	Optimistic	Pessimistic
Mean	1.1	.6	2.2
Std. Dev.	.4	.2	.8
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Step 10	Normal	Optimistic	Pessimistic
Mean	6.7	3.2	12
Std. Dev.	8.3	3	13.9
Median	4	3	6
Percent	-	-	-
Number in Sample	7		

Step 11	Normal	Optimistic	Pessimistic
Mean	5.9	3.3	8.9
Std. Dev.	5.1	2.7	7.5
Median	6	4	8
Percent	-	-	-
Number in Sample	7		

Step 12	Normal	Optimistic	Pessimistic
Mean	1.9	1.2	3.7
Std. Dev.	1.1	.9	2.3
Median	2	1	4
Percent	-	-	-
Number in Sample	7		

Step 21	Normal	Optimistic	Pessimistic
Mean	2.6	1.7	4.8
Std. Dev.	2.9	2.1	5.4
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Buyers' STEPS

Step 22	Normal	Optimistic	Pessimistic
Mean	3.2	1.5	5.3
Std. Dev.	5.7	2.9	8.4
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

NETWORK M8

Step 1	Normal	Optimistic	Pessimistic
Mean	9	4.3	16.6
Std. Dev.	5.4	2.4	12.2
Median	8	4	14
Percent	-	-	-
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.2	.6	2.3
Std. Dev.	.4	.2	.8
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Step 3	Normal	Optimistic	Pessimistic
Mean	3.3	2	5.6
Std. Dev.	2.7	2.1	5
Median	2	1	4
Percent	-	-	-
Number in Sample	7		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2.6
Std. Dev.	.6	.4	1.3
Median	1	.7	3
Percent	-	-	-
Number in Sample	7		

Step 12	Normal	Optimistic	Pessimistic
Mean	6.4	4	9.9
Std. Dev.	5.1	3.8	7.5
Median	5	3	6
Percent	-	-	-
Number in Sample	7		

Step 13	Normal	Optimistic	Pessimistic
Mean	1.3	.6	2.4
Std. Dev.	.5	.2	.8
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Step 14	Normal	Optimistic	Pessimistic
Mean	7.4	3.7	14.4
Std. Dev.	8.1	3.1	13.9
Median	8	4	12
Percent	-	-	-
Number in Sample	7		

Step 15	Normal	Optimistic	Pessimistic
Mean	7.3	4.8	12.5
Std. Dev.	4.5	3.4	7.8
Median	8	6	14
Percent	-	-	-
Number in Sample	7		

Step 16	Normal	Optimistic	Pessimistic
Mean	2.5	1.4	4.4
Std. Dev.	1.1	.6	2.3
Median	3	1.5	4
Percent	-	-	-
Number in Sample	7		

ASD/PMC K Review	Normal	Optimistic	Pessimistic
Mean	28.6	14.9	61.7
Std. Dev.	9.1	5.5	23.4
Median	24	16	56
Percent	-	-	-
Number in Sample	7		

Step 25	Normal	Optimistic	Pessimistic
Mean	2.1	1.4	3.7
Std. Dev.	2.7	2.1	3.3
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Step 26	Normal	Optimistic	Pessimistic
Mean	1	.4	2
Std. Dev.	.8	.4	1.6
Median	.5	.3	1
Percent	-	-	-
Number in Sample	7		

Step 27	Normal	Optimistic	Pessimistic
Mean	3	1.7	5.5
Std. Dev.	3.1	2.1	5.5
Median	2	1	3
Percent	-	-	-
Number in Sample	7		

Step 28	Normal	Optimistic	Pessimistic
Mean	2.4	1.4	4.9
Std. Dev.	2.9	2.1	5.8
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

NETWORK C9

Step 1	Normal	Optimistic	Pessimistic
Mean	12	7	18.4
Std. Dev.	7.4	5.3	12.3
Median	12	5	20
Percent	55	20	25
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	4	2.5	7.2
Std. Dev.	3.8	2.7	7.7
Median	2	1	5
Percent	58	15	27
Number in Sample	7		

NETWORK F1

Step 1	Normal	Optimistic	Pessimistic
Mean	.6	.3	1.4
Std. Dev.	.3	.1	.9
Median	.5	.3	1
Percent	60	23	17
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	.5	.2	.9
Std. Dev.	.3	.1	.6
Median	.5	.3	1
Percent	53	22	25
Number in Sample	7		

Step 3	Normal	Optimistic	Pessimistic
Mean	1	.4	1.9
Std. Dev.	1.8	.7	2.8
Median	.25	.25	1
Percent	57	14	29
Number in Sample	7		

PMRC Review	Normal	Optimistic	Pessimistic
Mean	13.4	6	29
Std. Dev.	4.7	2.8	14.6
Median	16	8	40
Percent	54	16	30
Number in Sample	7		

Step 4	Normal	Optimistic	Pessimistic
Mean	.6	.3	1.3
Std. Dev.	.6	.3	1.2
Median	.5	.3	1
Percent	55	23	22
Number in Sample			

NETWORK F2

Step 1	Normal	Optimistic	Pessimistic
Mean	9.8	7.2	13.1
Std. Dev.	10.5	7.9	12.9
Median	6	4.5	8
Percent	50	21	29
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.5	1	2.1
Std. Dev.	1.2	.9	1.5
Median	1	.5	2
Percent	53	29	18
Number in Sample	7		

Solicitation	Normal	Optimistic	Pessimistic
Mean	180	148	237.3
Std. Dev.	9.8	27.6	35.7
Median	176	152	252
Percent	50	27	23
Number in Sample	7		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.6	1	2.5
Std. Dev.	1.2	.9	1.6
Median	1	.5	2
Percent	53	24	23
Number in Sample	7		

Tech. Eval.	Normal	Optimistic	Pessimistic
Mean	137.7	94	227.7
Std. Dev.	83.6	47.6	89.4
Median	100	80	195
Percent	50	18	32
Number in Sample	6		

Step 7	Normal	Optimistic	Pessimistic
Mean	3.9	2.4	5.7
Std. Dev.	1.8	1.3	2.4
Median	4	2	6
Percent	50	25	25
Number in Sample	7		

Step 8	Normal	Optimistic	Pessimistic
Mean	6.9	4.6	11
Std. Dev.	5	3.6	9.1
Median	6	4	8
Percent	49	28	23
Number in Sample	7		

Step 9	Normal	Optimistic	Pessimistic
Mean	2.9	1.5	4.9
Std. Dev.	2.5	1	5.1
Median	2	1	3
Percent	54	19	27
Number in Sample	7		

BAFO Time	Normal	Optimistic	Pessimistic
Mean	66.7	50	96
Std. Dev.	10.6	16.7	19.6
Median	62	40	88
Percent	48	18	34
Number in Sample	7		

Step 10	Normal	Optimistic	Pessimistic
Mean	11.5	5.9	15
Std. Dev.	11.9	5.2	15
Median	7	6	8
Percent	47	19	34
Number in Sample	7		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.5	.9	2.4
Std. Dev.	1	.6	1.2
Median	2	1	3
Percent	54	20	26
Number in Sample	7		

JAG K Review	Normal	Optimistic	Pessimistic
Mean	20.5	9.3	38.7
Std. Dev.	10.4	3.3	21.1
Median	16	8	32
Percent	52	17	31
Number in Sample	7		

Buyers' STEPS

Contractor Sign	Normal	Optimistic	Pessimistic
Mean	58	28	102.7
Std. Dev.	18.5	14.1	39.3
Median	54	32	80
Percent	59	13	28
Number in Sample	6		

Step 18	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.1
Std. Dev.	.3	.2	.5
Median	.8	.5	1
Percent	48	28	24
Number in Sample	7		

NETWORK F3

Step 1	Normal	Optimistic	Pessimistic
Mean	9.7	6.9	13.8
Std. Dev.	10.4	7.9	12.6
Median	6	4	12
Percent	-	-	-
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.4	.9	2
Std. Dev.	1.2	.9	1.5
Median	1	.5	2
Percent	-	-	-
Number in Sample	7		

Solicitation Time	Normal	Optimistic	Pessimistic
Mean	162.7	105.3	216
Std. Dev.	12	19.9	27.2
Median	160	116	220
Percent	-	-	-
Number in Sample	6		

Tech. Eval.	Normal	Optimistic	Pessimistic
Mean	108.7	73.3	172
Std. Dev.	40.4	35.6	49.3
Median	108	72	168
Percent	-	-	-
Number in Sample	6		

Step 7	Normal	Optimistic	Pessimistic
Mean	2.1	1.3	3.3
Std. Dev.	.7	.6	1.3
Median	2	1	3
Percent	-	-	-
Number in Sample	7		

Step 8	Normal	Optimistic	Pessimistic
Mean	4.5	3.1	6.1
Std. Dev.	2.3	2.1	3
Median	4	3	6
Percent	-	-	-
Number in Sample	7		

Step 9	Normal	Optimistic	Pessimistic
Mean	2.3	1.4	5.4
Std. Dev.	1.2	.8	5.2
Median	2	1	3
Percent	-	-	-
Number in Sample	7		

Step 10	Normal	Optimistic	Pessimistic
Mean	7.9	5.1	10.1
Std. Dev.	7.7	5.1	10.4
Median	8	4	8
Percent	-	-	-
Number in Sample	7		

Step 11	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2
Std. Dev.	.1	.6	1.4
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	7		

NETWORK F4

Step 1	Normal	Optimistic	Pessimistic
Mean	6.2	4.1	9.3
Std. Dev.	8.8	5.9	11.5
Median	3.3	2	4.5
Percent	-	-	-
Number in Sample	6		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.3	.8	1.8
Std. Dev.	1.4	1.1	1.6
Median	.8	.5	1
Percent	-	-	-
Number in Sample	6		

Solicitation	Normal	Optimistic	Pessimistic
Mean	136	81.6	204.8
Std. Dev.	37.5	28.5	46.9
Median	144	80	200
Percent	-	-	-
Number in Sample	5		

Tech. Eval.	Normal	Optimistic	Pessimistic
Mean	103.2	75.2	182.4
Std. Dev.	46.2	30.4	47.1
Median	80	80	176
Percent	-	-	-
Number in Sample	5		

Step 7	Normal	Optimistic	Pessimistic
Mean	1.4	.7	2.5
Std. Dev.	.5	.2	.8
Median	1.3	.6	3
Percent	-	-	-
Number in Sample	6		

Step 8	Normal	Optimistic	Pessimistic
Mean	2.8	1.8	4.5
Std. Dev.	1.3	1	2.1
Median	3	1.5	4.5
Percent	-	-	-
Number in Sample	6		

Buyers' STEPS

Step 9	Normal	Optimistic	Pessimistic
Mean	1.8	1.1	3.8
Std. Dev.	1.1	.9	2.5
Median	1.5	.9	3
Percent	-	-	-
Number in Sample	6		

Step 10	Normal	Optimistic	Pessimistic
Mean	3.3	2.2	4.8
Std. Dev.	2.5	2	3.9
Median	2.3	1.3	3.5
Percent	-	-	-
Number in Sample	6		

Step 11	Normal	Optimistic	Pessimistic
Mean	.8	.4	1.2
Std. Dev.	.2	.2	.5
Median	.8	.4	1.3
Percent	-	-	-
Number in Sample	6		

NETWORK M0

Step 1	Normal	Optimistic	Pessimistic
Mean	.9	.4	1.8
Std. Dev.	.6	.3	1.1
Median	1	.5	2
Percent	58	14	28
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	.4	.2	1
Std. Dev.	.3	.2	1.3
Median	.3	.1	.5
Percent	58	16	26
Number in Sample	7		

Lab Review	Normal	Optimistic	Pessimistic
Mean	50	24	109.3
Std. Dev.	28.8	18.2	52.3
Median	48	28	100
Percent	54	13	33
Number in Sample	6		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.7	.7	2.9
Std. Dev.	2	.9	3.2
Median	.5	.3	1
Percent	58	16	26
Number in Sample	7		

Contractor Sign	Normal	Optimistic	Pessimistic
Mean	80	43.3	138.7
Std. Dev.	0	8.2	28.9
Median	80	40	120
Percent	59	15	26
Number in Sample	6		

Step 5	Normal	Optimistic	Pessimistic
Mean	.6	.3	1.3
Std. Dev.	.4	.2	.8
Median	.5	.3	1
Percent	60	20	20
Number in Sample	7		

NETWORK A1

Step 1	Normal	Optimistic	Pessimistic
Mean	1.3	.8	2.6
Std. Dev.	.9	.6	1.5
Median	1	.5	2.5
Percent	62	22	16
Number in Sample	7		

Buyers' STEPS

Step 2	Normal	Optimistic	Pessimistic
Mean	.5	.2	1.3
Std. Dev.	.4	.2	1.3
Median	.3	.1	1.0
Percent	63	19	18
Number in Sample	7		

OTHER DUTIES AS ASSIGNED = 32% or 2.55 hours/day

APPENDIX J

PCO QUESTIONNAIRE

C2 COMPETITIVE BUY $ 10,000 to $ 100,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections and sign RFP

---

to clerk,repro, contractor, buyer

STEP 4: Pre-negotiation review

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise

Sign BAFO request letters

---

buyer negotiates, writes award, clerk types

STEP 5: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 6: Review corrections, sign file

---

to contractor, buyer, clerk

STEP 7: Sign Contract

Sign Contract

Sign Sorry letters

Sign form letters (12,13,87)

C3 COMPETITIVE BUY $ 100,000 to $ 250,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections and sign RFP

---

to clerk,repro, contractor, buyer

STEP 4: Pre-negotiation review

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise

Sign BAFO request letters

---

buyer negotiates, writes award, clerk types

STEP 5: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 6: Review corrections, sign file

---

to JAG

STEP 7: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 8: Sign Contract

Sign Contract

Sign Sorry letters

Sign form letters (12,13,87)

C4 COMPETITIVE BUY $ 250,000 to $ 500,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign JAG sheet

---

to JAG

STEP 4: Review corrections (JAG) and sign RFP

---

to clerk,repro, contractor, buyer

STEP 5: Pre-negotiation review

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise

Sign BAFO request letters

---

buyer negotiates, writes award, clerk types

STEP 6: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 7: Review corrections, sign file

---

to JAG

STEP 8: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 9: Sign Contract

Sign Contract

Sign Sorry letters

Sign form letters (12,13,87)

C5 COMPETITIVE BUY $ 500,000 to $ 750,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign RFP

---

to clerk,repro, offerors ask for RFP Amd.

STEP 6: Sign RFP Amendment

---

to offerors, buver, lab, buyer

STEP 7: Pre-negotiation review

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise

Sign BAFO request letters

---

buyer negotiates, writes award, clerk types

STEP 8: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 9: Review corrections, sign file

---

to JAG

STEP 10: Review JAG corrections, sign file

---

to PMRC

STEP 11: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 12: Sign Contract

Sign Contract

Sign Sorry letters

Sign form letters (12,13,87)

C6 COMPETITIVE BUY $ 750,000 to $ 1,000,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP with Div. Chief)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign RFP

---

to clerk,repro, offerors ask for RFP Amd.

STEP 6: Sign RFP Amendment

---

to offerors, buyer, lab, buyer

STEP 7: <u>Pre-negotiation review</u>

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise

Sign BAFO request letters

---

buyer negotiates, writes award, clerk types

STEP 8: <u>Review Contract</u>

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 9: Review corrections, sign file

---

to JAG

STEP 10: Review JAG corrections, sign file

---

to PMRC

STEP 11: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 12: Sign Contract

Sign Contract

Sign Sorry letters

Sign form letters (12,13,87)

C7 COMPETITIVE BUY $ 1,000,000 to $ 3,500,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP with Div. Chief)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign RFP

---

to clerk,repro, offerors ask for RFP Amd.

STEP 6: Sign RFP Amendment

---

to offerors, buver, lab, buyer

STEP 7: Pre-negotiation review

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise /

Sign BAFO request letters

---

buyer negotiates, writes award, clerk types

STEP 8: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 9: Review corrections, sign file

---

to JAG

STEP 10: Review JAG corrections, sign file

---

to PMRC

STEP 11: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 12: Sign Contract

Sign Contract

Help resolve final review problems with PMRC or PMR

Sign Sorry letters

Sign form letters (12,13,87)

C8 COMPETITIVE BUY $ 3,500,000 to $10,000,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign file

---

to ASD/PMC

STEP 6: Review corrections (ASD/PMC), sign RFP

---

to clerk,repro, offerors ask for RFP Amd.

STEP 7: Sign RFP Amendment

---

to offerors, buyer, lab, buyer

STEP 8: Pre-negotiation review

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise /

Sign BAFO request letters

---

buyer holds pre-neg, negotiates, writes award, clerk types

STEP 9: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 10: Review corrections, sign file

---

to JAG

STEP 11: Review JAG corrections, sign file

---

to PMRC

STEP 12: Review PMRC corrections, sign file

---

to ASD/PMC

STEP 13: Review ASD/PMC corrections, send out for signature

---

to contractor, buyer, clerk

STEP 14: Sign Contract

Sign Contract

Help resolve final review problems with PMRC, PMR, PM

Sign Sorry letters

Sign form letters (12,13,87)

S2 SOLE SOURCE BUY $ 10,000 to $ 100,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

Review and sign Sole Source Justification

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections and sign RFP

---

to clerk,repro, contractor, buyer

STEP 4: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 5: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 6: Review corrections, sign file

---

to contractor, buyer, clerk

STEP 7: Sign Contract

Sign Contract

Sign form letters (12,13,87)

S3 SOLE SOURCE BUY $ 100,000 to $ 250,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

Review and sign Sole Source Justification

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections and sign RFP

---

to clerk,repro, contractor, buyer

STEP 4: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 5: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 6: Review corrections, sign file

---

to JAG

STEP 7: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 8: Sign Contract

Sign Contract

Sign form letters (12,13,87)

S4 SOLE SOURCE BUY $ 250,000 to $ 500,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

Review and sign Sole Source Justification

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign JAG sheet

---

to JAG

STEP 4: Review corrections (JAG) and sign RFP

---

to clerk,repro, contractor, buyer

STEP 5: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 6: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 7: Review corrections, sign file

---

to JAG

STEP 8: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 9: Sign Contract

Sign Contract

Sign form letters (12,13,87)

S5 SOLE SOURCE BUY $ 500,000 to $ 750,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

Review and Sign Sole Source Justification

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign RFP

---

to clerk,repro, offerors

STEP 6: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk tvpes

STEP 7: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 8: Review corrections, sign file

---

to JAG

STEP 9: Review JAG corrections, sign file

---

to PMRC

STEP 10: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 11: Sign Contract

Sign Contract

Sign form letters (12,13,87)

S6 SOLE SOURCE BUY $ 750,000 to $ 1,000,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP with Div. Chief)

Review and Sign the Sole Source Justification

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign RFP

---

to clerk,repro, offerors

STEP 6: Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 7: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 8: Review corrections, sign file

---

to JAG

STEP 9: Review JAG corrections, sign file

---

to PMRC

STEP 10: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 11: Sign Contract

Sign Contract

Sign form letters (12,13,87)

S7 SOLE SOURCE BUY $ 1,000,000 to $ 3,500,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP with Div. Chief)

Review and Sign Sole Source Justification

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign RFP

---

to clerk,repro, offeror ask for RFP Amd.

STEP 6: Sign RFP Amendment

---

to offeror, buyer, lab, buyer

STEP 7: Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 8: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 9: Review corrections, sign file

---

to JAG

STEP 10: Review JAG corrections, sign file

---

to PMRC

STEP 11: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 12: Sign Contract

Sign Contract

Help resolve final review problems with PMRC or PMR

Sign form letters (12,13,87)

S8 SOLE SOURCE BUY $ 3,500,000 to $10,000,000 PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer)

Review and Sign Sole Source Justification

---

receive typed RFP for review

STEP 2: *Review RFP*

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections, sign file

---

to JAG

STEP 4: Review corrections (JAG), sign file

---

to PMRC

STEP 5: Review corrections (PMRC), sign file

---

to ASD/PMC

STEP 6: Review corrections (ASD/PMC), sign RFP

---

to clerk,repro, offeror ask for RFP Amd.

STEP 7: Sign RFP Amendment

---

to offeror, buyer, lab, buyer

STEP 8: Review buyer's negotiation position / advise /

buyer holds pre-neg, negotiates, writes award, clerk types

STEP 9: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 10: Review corrections, sign file

to JAG

STEP 11: Review JAG corrections, sign file

to PMRC

STEP 12: Review PMRC corrections, sign file

to ASD/PMC

STEP 13: Review ASD/PMC corrections, send out for signature

to contractor, buyer, clerk

STEP 14: Sign Contract

Sign Contract

Help resolve final review problems with PMRC, PMR, PM

Sign form letters (12,13,87)

M2 CONTRACT MOD $ 10,000 to $ 100,000 PCO Steps

receive letter for review

STEP 1: Review letter to contractor for proposal

Send back for corrections

---

to buyer, clerk, buyer

STEP 2: Review corrections and sign letter

---

to clerk,repro, contractor, buyer

STEP 3: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 4: Review Contract Modification

Review contract modification

Review file

Send back for corrections

Buyer corrects

STEP 5: Review corrections, sign file

---

to contractor, buyer, clerk

STEP 6: Sign Contract

M3 MODIFICATION $ 100,000 to $ 250,000 PCO Steps

---

receive typed letter for review

STEP 1: Review letter to contractor for proposal

Send back for corrections

---

to buyer, clerk, buyer

STEP 2: Review corrections and sign letter

---

to clerk,repro, contractor, buyer

STEP 3: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 4: Review Modification

Review Modification

Review file

Send back for corrections

Buyer corrects

STEP 5: Review corrections, sign file

---

to JAG

STEP 6: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 7: Sign Modification

M4 MODIFICATION $ 250,000 to $ 500,000 PCO Steps

receive typed Letter for review

STEP 1: Review letter to contractor for proposal

Send back for corrections

---

to buyer, clerk, buyer

STEP 2: Review corrections, sign letter

---

to clerk,repro, contractor, buyer

STEP 3: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 4: Review Modification

Review Modification

Review file

Send back for corrections

Buyer corrects

STEP 5: Review corrections, sign file

---

to JAG

STEP 6: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 7: Sign Modification

M5 MODIFICATION $ 500,000 to $ 750,000 PCO Steps

receive typed letter for review

STEP 1: Review letter to contractor for proposal

Send back for corrections

---

to buyer, clerk, buyer

STEP 2: Review corrections, sign letter

---

to contractor

STEP 3: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 4: Review Modification

Review Modification

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 5: Review corrections, sign file

---

to JAG

STEP 6: Review JAG corrections, sign file

---

to PMRC

STEP 7: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 8: Sign Modification

M6 MODIFICATION $ 750,000 to $ 1,000,000 PCO Steps

receive typed letter for review

STEP 1: Review letter to contractor for proposal

Send back for corrections

---

to buyer, clerk, buyer

STEP 2: Review corrections, sign letter

---

to contractor

STEP 3: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 4: Review Modification

Review Modification

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 5: Review corrections, sign file

---

to JAG

STEP 6: Review JAG corrections, sign file

---

to PMRC

STEP 7: Review PMRC corrections, send out-for-signature

---

to contractor, buyer, clerk

STEP 8: Sign Modification

M7 MODIFICATION $ 1,000,000 to $ 3,500,000 PCO Steps

receive typed Letter for review

STEP 1: Review letter to contractor for proposal on changes.

Send back for corrections

---

to buyer, clerk, buyer

STEP 2: Review corrections, sign letter

STEP 3: Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 4: Review Modification

Review Modification

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 5: Review corrections, sign file

---

to JAG

STEP 6: Review JAG corrections, sign file

---

to PMRC

STEP 7: Review PMRC corrections, send out-for-signature

to contractor, buyer, clerk

STEP 8: Sign Modification

Help resolve final review problems with PMRC or PMR

M8 MODIFICATION $ 3,500,000 to $10,000,000 PCO Steps

receive typed RFP letter for review

STEP 1: Review RFP

Review RFP letter

Review BSP Minutes

Send back for corrections

---

to buyer, clerk, buyer

STEP 2: Review corrections, sign file

---

to PMRC

STEP 3: Review corrections (PMRC), sign BSP Minutes

---

to ASD/PMC

STEP 4: Review buyer's negotiation position / advise /

---

buyer holds pre-neg, negotiates, writes award, clerk types

STEP 5: Review Contract Modification

Review contract modification

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 6: Review corrections, sign file

---

to JAG

STEP 7: Review JAG corrections, sign file

---

to PMRC

STEP 8: Review PMRC corrections, sign file

---

to ASD/PMC

STEP 9: Review ASD/PMC corrections, send out for signature

---

to contractor, buyer, clerk

STEP 10: Sign Contract Modification

Sign Contract Modification

Help resolve final review problems with PMRC, PMR, PM

buyer negotiates, writes award, clerk types

STEP 1: Review Contract

Review contract

Review file

Review and sign Subcontracting Plan

Send back for corrections

Buyer corrects

STEP 2: Review corrections, sign file

to JAG

STEP 3: Review JAG corrections, sign file

to PMRC

STEP 4: Review PMRC corrections, send out-for-signature

to contractor, buyer, clerk

STEP 5: Sign Contract

Sign Contract

Help resolve final review problems with PMRC or PMR

Sign Sorry letters

Sign form letters (12,13,87)

F1 FUNDING PCO's STEPS

receive typed funding

STEP 1: Review typed funding, sign FI 66.

to PMRC, clerk,buyer

STEP 2: Sign funding.

M0 NO COST SUPPLEMENTAL AGREEMENT PCO's STEPS

STEP 1: Review type change, sign FI 53, sign letter to contractor.

STEP 2: Sign contract Modification

F2 COMPETITIVE BUY FAST TRACK PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections and sign RFP

---

to clerk,repro, contractor, buyer

STEP 4: Pre-negotiation review

Sign technically unacceptable letters (if any)

Review single source determination (if any)

Review buyer's negotiation position / advise

Sign BAFO request letters

---

buyer negotiates, writes award, clerk types

STEP 5: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 6: Review corrections, sign file

---

to JAG

STEP 7: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 8: Sign Contract

Sign Contract

Sign Sorry letters

Sign form letters (12,13,87)

F3 SOLE SOURCE BUY FAST TRACK PCO Steps

STEP 1: Review PR before Buyer receives it (include time for discussions with buyer, informal BSP)

Review and sign Sole Source Justification

---

receive typed RFP for review

STEP 2: Review RFP

Review RFP

Review File and sign

Send back for corrections

---

to buyer, clerk, buyer

STEP 3: Review corrections and sign RFP

---

to clerk,repro, contractor, buyer

STEP 4: Pre-negotiation review

Review buyer's negotiation position / advise

---

buyer negotiates, writes award, clerk types

STEP 5: Review Contract

Review contract

Review file

Send back for corrections

Buyer corrects

STEP 6: Review corrections, sign file

---

to JAG

STEP 7: Review JAG corrections, sign

---

to contractor, buyer, clerk

STEP 8: Sign Contract

Sign Contract

Sign form letters (12,13,87)

F4 MODIFICATION FAST TRACK PCO Steps

receive typed letter for review

STEP 1: Review letter to contractor for proposal

Send back for corrections

to buyer, clerk, buyer

STEP 2: Review corrections and sign letter

to clerk,repro, contractor, buyer

STEP 3: Pre-negotiation review

Review buyer's negotiation position / advise

buyer negotiates, writes award, clerk types

STEP 4: Review Modification

Review Modification

Review file

Send back for corrections

Buyer corrects

STEP 5: Review corrections, sign file

to JAG

STEP 6: Review JAG corrections, sign

to contractor, buyer, clerk

STEP 7: Sign Modification

A1 ADMINISTRATIVE CHANGE PCO'S STEP

Receive typed change from buyer

STEP: Sign Modification

OTHER DUTIES AS ASSIGNED

Write and process D&F's over $ 5M

Train new buyers

Substitute for Branch Chief

Attend meetings for buyers (buyer's negotiation, BSP, Pre-Neg's, meetings with Lab,etc.)

Review draft PRs

Help gather data for management

Sign correspondence for contract administration functions (transfer of GFP, retention of classified, etc.)

Answer telephone calls for absent buyers

APPENDIX K

ANALYSIS OF PCO ESTIMATES

PCO's STEPS
NETWORK C2

Step	Normal	Optimistic	Pessimistic
Mean	.4	.3	1.6
Std. Dev.	.4	.3	2.2
Median	.3	.2	.5
Percent	55	23	22
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.4	.7	2.4
Std. Dev.	1.1	.3	2
Median	1	.5	2
Percent	72	12	16
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	.4	.3	.9
Std. Dev.	.3	.3	.7
Median	.3	.3	.7
Percent	76	11	13
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	2	.7	2.7
Std. Dev.	3	.5	3.6
Median	.8	.5	1
Percent	70	14	16
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.6	.9	2.7
Std. Dev.	1.1	.5	2.2
Median	1.5	1	2
Percent	67	17	16
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.4	.2	.9
Std. Dev.	.3	.3	.7
Median	.3	.1	.8
Percent	74	12	14
Number in Sample	9		

PCO's STEPS

Step 7	Normal	Optimistic	Pessimistic
Mean	.3	.2	.6
Std. Dev.	.3	.3	.6
Median	.3	.2	.3
Percent	77	13	10
Number in Sample	9		

NETWORK C3

Step 1	Normal	Optimistic	Pessimistic
Mean	.5	.4	2
Std. Dev.	.6	.6	2.5
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.4	.7	2.5
Std. Dev.	1.2	.5	2
Median	1	.5	2
Percent	-	-	-
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.7	.7	2.3
Std. Dev.	3.2	.8	3.7
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.6	1	2.9
Std. Dev.	1.2	.6	2.3
Median	1.3	.8	2
Percent	-	-	-
Number in Sample	9		

PCO's STEPS

Step 7	Normal	Optimistic	Pessimistic
Mean	.4	.4	.9
Std. Dev.	.6	.7	1.0
Median	.3	.2	.4
Percent	-	-	-
Number in Sample	8		

Step 8	Normal	Optimistic	Pessimistic
Mean	.3	.2	.6
Std. Dev.	.3	.3	.6
Median	.3	.2	.3
Percent	-	-	-
Number in Sample	9		

Network C4

Step 1	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.8
Std. Dev.	.9	.6	2.3
Median	.3	.3	.7
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.6	.9	2.6
Std. Dev.	1.4	.8	2.1
Median	1	.8	2
Percent	-	-	-
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	.6	.3	1.1
Std. Dev.	.6	.3	.9
Median	.5	.3	.8
Percent	-	-	-
Number in Sample	8		

Step 5	Normal	Optimistic	Pessimistic
Mean	2.1	.8	2.8
Std. Dev.	3.3	.7	3.9
Median	.8	.5	1.3
Percent	-	-	-
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.7	1.0	2.9
Std. Dev.	1.2	.7	2.4
Median	1.4	.9	2.3
Percent	-	-	-
Number in Sample	8		

Step 9	Normal	Optimistic	Pessimistic
Mean	.3	.2	.7
Std. Dev.	.3	.3	.6
Median	.3	.2	.3
Percent	-	-	-
Number in Sample	8		

NETWORK C5

Step 1	Normal	Optimistic	Pessimistic
Mean	.6	.5	1.8
Std. Dev.	.6	.6	2.1
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.6	1	2.8
Std. Dev.	1.2	.6	2
Median	1	.8	2.5
Percent	-	-	-
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	.8	.4	1.7
Std. Dev.	.5	.3	1.2
Median	.5	.3	1.5
Percent	-	-	-
Number in Sample	9		

PCO's STEPS

Step 6	Normal	Optimistic	Pessimistic
Mean	.3	.2	.7
Std. Dev.	.3	.3	.6
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	2.2	.9	3
Std. Dev.	3.1	.7	3.6
Median	1	.8	2
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	1.8	1.1	3.2
Std. Dev.	1.1	.6	2.3
Median	1.5	1.0	3
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.7
Std. Dev.	.9	.6	1.7
Median	.5	.3	.8
Percent	-	-	-
Number in Sample	9		

Step 12	Normal	Optimistic	Pessimistic
Mean	.6	.2	1.[illegible]
Std. Dev.	.7	.3	1
Median	.3	.2	3.0
Percent	-	-	-
Number in Sample	9		

PCO's STEPS

NETWORK C6

Step 1	Normal	Optimistic	Pessimistic
Mean	.8	.5	1.9
Std. Dev.	.8	.6	2.2
Median	.7	.5	1
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.9	1.1	3.1
Std. Dev.	1.2	.6	2
Median	1.3	.8	2.5
Percent	-	-	-
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	2.4	1	3.6
Std. Dev.	3	.7	3.9
Median	1.5	.8	2
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	1.9	1.2	3.3
Std. Dev.	1.2	.6	2.4
Median	1.5	1	2
Percent	-	-	-
Number in Sample	9		

Step 12	Normal	Optimistic	Pessimistic
Mean	.6	.3	1.2
Std. Dev.	.6	.3	1.1
Median	.3	.2	.3
Percent	-	-	-
Number in Sample	9		

PCO' STEPS

NETWORK C7

Step 1	Normal	Optimistic	Pessimistic
Mean	1.6	1	3
Std. Dev.	1.4	.8	3
Median	1	.8	1.5
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	2.6	1.7	4.3
Std. Dev.	1.5	.9	2.6
Median	2	1.5	4
Percent	-	-	-
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	3.2	1.6	4.4
Std. Dev.	3.7	1.2	4.8
Median	1.5	1	2
Percent	-	-	-
Number in Sample	9		

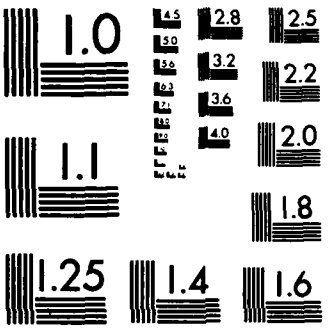
Step 8	Normal	Optimistic	Pessimistic
Mean	2.3	1.5	4
Std. Dev.	1	.5	2.5
Median	2	1.5	4
Percent	-	-	-
Number in Sample	8		

Step 12	Normal	Optimistic	Pessimistic
Mean	1	.6	1.9
Std. Dev.	.9	.6	1.6
Median	.8	.5	2
Percent	-	-	-
Number in Sample	9		

AD-A135 639 Q-GERT MODEL OF THE CONTRACTING CYCLE(U) AIR FORCE INST 8/8
OF TECH WRIGHT-PATTERSON AFB OH SCHOOL OF SYSTEMS AND
LOGISTICS C D MILLER SEP 83 AFIT-LSSR-118-83

UNCLASSIFIED F/G 5/1 NL





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NETWORK C8

Step 1	Normal	Optimistic	Pessimistic
Mean	3.1	1.9	5.7
Std. Dev.	3.6	1.9	7.5
Median	1.5	1	2
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	3.3	2.5	5.1
Std. Dev.	1.7	1.3	2.6
Median	3	2	6
Percent	-	-	-
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.4	.9	2.8
Std. Dev.	.8	.5	2.3
Median	1	.8	2
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	4.1	2.3	6.5
Std. Dev.	5	2.5	8.1
Median	2	1	2.5
Percent	-	-	-
Number in Sample	9		

Step 9	Normal	Optimistic	Pessimistic
Mean	3.1	2.2	5.4
Std. Dev.	1.5	1.1	3.5
Median	3	2	5
Percent	-	-	-
Number in Sample	9		

Step 13	Normal	Optimistic	Pessimistic
Mean	1.3	.8	2.8
Std. Dev.	.9	.6	2.5
Median	.9	.5	1.8
Percent	-	-	-
Number in Sample	8		

Step 14	Normal	Optimistic	Pessimistic
Mean	1.8	1.1	3.1
Std. Dev.	1.2	.7	2.3
Median	2	1	3
Percent	-	-	-
Number in Sample	9		

NETWORK S2

Step 1	Normal	Optimistic	Pessimistic
Mean	.8	.5	1.8
Std. Dev.	.9	.6	2.5
Median	.5	.25	.8
Percent	70	15	15
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.1	.6	1.8
Std. Dev.	.6	.3	1
Median	1	.5	2
Percent	70	14	16
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	.4	.3	.8
Std. Dev.	.2	.3	.5
Median	.3	.3	.7
Percent	71	15	14
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.6
Std. Dev.	.6	.3	1.3
Median	.8	.4	1.3
Percent	70	13	17
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.4	.8	2.3
Std. Dev.	.8	.5	1.6
Median	1	.5	2
Percent	70	15	15
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.4	.3	.8
Std. Dev.	.3	.3	.5
Median	.3	.3	.8
Percent	70	15	15
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	.4	.3	.8
Std. Dev.	.3	.3	.7
Median	.3	.2	.3
Percent	75	16	9
Number in Sample	9		

NETWORK S3

Step 1	Normal	Optimistic	Pessimistic
Mean	1.0	.7	2.1
Std. Dev.	1.0	.8	2.7
Median	.8	.5	1
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.2	.8	2
Std. Dev.	.8	.5	1.1
Median	1	.5	2
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	1	.7	1.6
Std. Dev.	.8	.6	1.5
Median	.5	.3	.7
Percent	-	-	-
Number in Sample	8		

PCO's STEPS

Step 5	Normal	Optimistic	Pessimistic
Mean	1.5	1.0	2.4
Std. Dev.	1.0	0.7	1.8
Median	1.1	0.8	1.8
Percent	-	-	-
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	.5	.4	.9
Std. Dev.	.6	.6	.8
Median	.3	.2	.8
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	.4	.3	.8
Std. Dev.	.3	.3	.6
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	9		

NETWORK S4

Step 1	Normal	Optimistic	Pessimistic
Mean	1.2	.8	2.2
Std. Dev.	1	.6	1.9
Median	.9	.6	1.5
Percent	-	-	-
Number in Sample	8		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.6	.8	2.5
Std. Dev.	1.3	.5	2.1
Median	1	.6	2.1
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	.7	.5	1.5
Std. Dev.	.9	.6	1.5
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2.6
Std. Dev.	.9	.3	2.5
Median	.9	.6	1.5
Percent	-	-	-
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.4	.9	2.6
Std. Dev.	.8	.5	1.7
Median	1.3	.8	2.3
Percent	-	-	-
Number in Sample	8		

Step 9	Normal	Optimistic	Pessimistic
Mean	.3	.2	.7
Std. Dev.	.3	.3	.6
Median	.3	.2	.4
Percent	-	-	-
Number in Sample	8		

NETWORK S5

Step 1	Normal	Optimistic	Pessimistic
Mean	1.1	.7	1.9
Std. Dev.	1	.6	1.7
Median	.8	.5	1
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.8	1.0	2.8
Std. Dev.	1.3	.8	2
Median	1	.8	2.5
Percent	-	-	-
Number in Sample	9		

PCO's STEPS

Step 5	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.6
Std. Dev.	.8	.6	1.4
Median	.8	.3	1.5
Percent	-	-	-
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.3	.8	2
Std. Dev.	1.1	.7	1.9
Median	.8	.5	1
Percent	-	-	-
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	1.7	1.2	2.7
Std. Dev.	1.2	.9	2
Median	1.5	1	2
Percent	-	-	-
Number in Sample	9		

Step 10	Normal	Optimistic	Pessimistic
Mean	.8	.5	1.5
Std. Dev.	.9	.6	1.2
Median	.5	.3	1
Percent	-	-	-
Number in Sample	8		

Step 11	Normal	Optimistic	Pessimistic
Mean	.4	.3	.9
Std. Dev.	.3	.3	.7
Median	.3	.2	.7
Percent	-	-	-
Number in Sample	9		

PCO's STEPS

NETWORK S6

Step 1	Normal	Optimistic	Pessimistic
Mean	1.4	.8	2.1
Std. Dev.	1.1	.6	1.7
Median	.8	.5	1
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.8	1	3
Std. Dev.	1.2	.5	2.1
Median	1.3	.8	2.5
Percent	-	-	-
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.4	.8	2.5
Std. Dev.	1.3	.7	2.4
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	2	1.2	3.3
Std. Dev.	1.1	.5	1.9
Median	1.5	1	3
Percent	-	-	-
Number in Sample	9		

Step 11	Normal	Optimistic	Pessimistic
Mean	.5	.3	1.1
Std. Dev.	.4	.3	.8
Median	.3	.3	1
Percent	-	-	-
Number in Sample	9		

NETWORK S7

Step 1	Normal	Optimistic	Pessimistic
Mean	2.4	1.4	4.3
Std. Dev.	2.4	1.2	4.9
Median	1.5	1	2
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	2.6	1.5	4.5
Std. Dev.	1.6	.8	3.1
Median	2.5	1.5	3.5
Percent	-	-	-
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.5
Std. Dev.	.6	.3	1.3
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	2.7	1.6	4.4
Std. Dev.	2.7	1.6	5
Median	1	.8	2
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	2.8	1.9	4.9
Std. Dev.	2.3	1.4	4.7
Median	2	1.5	2.5
Percent	-	-	-
Number in Sample	9		

Step 12	Normal	Optimistic	Pessimistic
Mean	1.5	.9	2.2
Std. Dev.	1.4	.8	1.9
Median	1.1	.8	1.5
Percent	-	-	-
Number in Sample	8		

NETWORK S8

Step 1	Normal	Optimistic	Pessimistic
Mean	4	2.2	5.8
Std. Dev.	5.3	2.6	7.9
Median	1.3	.9	1.8
Percent	-	-	-
Number in Sample	8		

Step 2	Normal	Optimistic	Pessimistic
Mean	3.1	2.1	5.3
Std. Dev.	2.2	1.6	4.8
Median	2.5	1.8	3.3
Percent	-	-	-
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2.7
Std. Dev.	1.0	.5	2.3
Median	.9	.5	1.3
Percent	-	-	-
Number in Sample	8		

Step 8	Normal	Optimistic	Pessimistic
Mean	3	1.5	5.4
Std. Dev.	2.8	1.2	5.7
Median	2	1.4	3
Percent	-	-	-
Number in Sample	8		

Step 9	Normal	Optimistic	Pessimistic
Mean	3.5	2.1	5.6
Std. Dev.	2.5	1.1	5.1
Median	2.5	1.8	3.3
Percent	-	-	-
Number in Sample	8		

Step 13	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2.3
Std. Dev.	1.1	.5	1.8
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	8		

Step 14	Normal	Optimistic	Pessimistic
Mean	2	.8	3.7
Std. Dev.	2.6	.8	5.2
Median	1	.5	1.8
Percent	-	-	-
Number in Sample	8		

NETWORK M2

Step 1	Normal	Optimistic	Pessimistic
Mean	.6	.4	1.3
Std. Dev.	.4	.3	1.3
Median	.5	.3	.7
Percent	68	15	17
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	.4	.3	.9
Std. Dev.	.3	.3	.8
Median	.3	.2	.5
Percent	74	14	12
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	1	.6	1.4
Std. Dev.	.7	.4	1.1
Median	.5	.3	.8
Percent	74	12	14
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.3	.8	1.9
Std. Dev.	.9	.5	1.2
Median	1	.8	2
Percent	70	15	15
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	.5	.3	.9
Std. Dev.	.5	.3	.6
Median	.5	.3	1
Percent	70	13	17
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.3	.2	.9
Std. Dev.	.3	.3	1.0
Median	.3	.2	.3
Percent	76	14	10
Number in Sample	9		

NETWORK M3

Step 1	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.4
Std. Dev.	.6	.3	1
Median	.4	.3	.
Percent	-	-	-
Number in Sample	8		

Step 3	Normal	Optimistic	Pe istic
Mean	.8	.4	1.3
Std. Dev.	.8	.4	1.2
Median	.5	.3	.7
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.1	.7	1.7
Std. Dev.	.6	.3	1.0
Median	1	.6	1.6
Percent	-	-	-
Number in Sample	8		

Step 6	Normal	Optimistic	Pessimistic
Mean	.6	.3	1.2
Std. Dev.	.6	.3	.9
Median	.4	.2	.9
Percent	-	-	-
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	.3	.2	.8
Std. Dev.	.3	.3	.8
Median	.3	.2	.3
Percent	-	-	-
Number in Sample	8		

PCO's STEPS

NETWORK M4

Step 1	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.5
Std. Dev.	.6	.3	1.4
Median	.5	.3	.7
Percent	-	-	-
Number in Sample	8		

Step 3	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.4
Std. Dev.	.7	.3	1.1
Median	.5	.3	.8
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.3	.8	1.9
Std. Dev.	.9	.6	1.3
Median	1	.6	1.6
Percent	-	-	-
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	.3	.2	.8
Std. Dev.	.3	.3	.8
Median	.3	.2	.4
Percent	-	-	-
Number in Sample	8		

NETWORK M5

Step 1	Normal	Optimistic	Pessimistic
Mean	1.0	.5	1.8
Std. Dev.	1.0	.6	2.0
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	1.2	.7	1.9
Std. Dev.	1	.5	1.6
Median	.5	.3	.8
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.5	.9	2.5
Std. Dev.	.8	.5	1.4
Median	1.3	.9	2.5
Percent	-	-	-
Number in Sample	8		

Step 7	Normal	Optimistic	Pessimistic
Mean	.8	.6	1.5
Std. Dev.	.9	.6	1.3
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	.4	.3	.9
Std. Dev.	.3	.3	.7
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	9		

NETWORK M6

Step 1	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2.2
Std. Dev.	1.0	.6	2.0
Median	.8	.5	1.5
Percent	-	-	-
Number in Sample	8		

Step 3	Normal	Optimistic	Pessimistic
Mean	1.4	.7	1.9
Std. Dev.	1.1	.6	1.5
Median	.8	.5	1.3
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.4	.9	2.6
Std. Dev.	.8	.5	1.6
Median	1	.8	2.1
Percent	-	-	-
Number in Sample	8		

Step 8	Normal	Optimistic	Pessimistic
Mean	.4	.3	1.1
Std. Dev.	.3	.3	.8
Median	.3	.2	.8
Percent	-	-	-
Number in Sample	8		

NETWORK M7

Step 1	Normal	Optimistic	Pessimistic
Mean	1.5	1.0	2.7
Std. Dev.	1.0	.6	2.0
Median	1.0	.8	2
Percent	-	-	-
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	1.5	.9	2.4
Std. Dev.	1.0	.5	1.4
Median	1	.8	2
Percent	-	-	-
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.7	1.1	3.1
Std. Dev.	1.0	.8	2.4
Median	1.0	0.8	2.0
Percent	-	-	-
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	1.1	.6	2.4
Std. Dev.	1.0	.6	2.6
Median	.8	.5	1.5
Percent	-	-	-
Number in Sample	9		

NETWORK M8

Step 1	Normal	Optimistic	Pessimistic
Mean	2.1	1.3	3.3
Std. Dev.	1.4	.9	2.6
Median	1.8	1.1	2.5
Percent	-	-	-
Number in Sample	8		

Step 3	Normal	Optimistic	Pessimistic
Mean	1.1	.6	2
Std. Dev.	.9	.6	1.5
Median	.8	.5	1.3
Percent	-	-	-
Number in Sample	8		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.8	1.1	3.1
Std. Dev.	1.2	.6	2.4
Median	1.5	1	2
Percent	-	-	-
Number in Sample	8		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.8	1.3	2.9
Std. Dev.	1.0	.7	1.6
Median	1.8	1	2.5
Percent	-	-	-
Number in Sample	8		

Step 9	Normal	Optimistic	Pessimistic
Mean	1	.7	1.9
Std. Dev.	.8	.6	1.4
Median	1	.5	1.5
Percent	-	-	-
Number in Sample	8		

Step 10	Normal	Optimistic	Pessimistic
Mean	1.1	.6	2.2
Std. Dev.	1.0	.4	2.6
Median	.8	.5	1.1
Percent	-	-	-
Number in Sample	8		

NETWORK C9

Step 1	Normal	Optimistic	Pessimistic
Mean	2.5	1.4	4.2
Std. Dev.	1.2	.8	2.3
Median	3	1	4
Percent	-	-	-
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.4	.7	3.0
Std. Dev.	1.2	.6	2.7
Median	1.0	.8	2.5
Percent	-	-	-
Number in Sample	9		

NETWORK F1

Step 1	Normal	Optimistic	Pessimistic
Mean	.4	.3	.8
Std. Dev.	.2	.3	.9
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	.3	.3	.5
Std. Dev.	.3	.3	.6
Median	.2	.1	.3
Percent	-	-	-
Number in Sample	9		

NETWORK M0

Step 1	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.5
Std. Dev.	.5	.3	1.7
Median	.5	.3	1.0
Percent	-	-	-
Number in Sample	9		

PCO's STEPS

Step 2	Normal	Optimistic	Pessimistic
Mean	.3	.2	.7
Std. Dev.	.3	.3	.7
Median	.3	.1	.3
Percent	70	15	15
Number in Sample	9		

NETWORK F2

Step 1	Normal	Optimistic	Pessimistic
Mean	.6	.4	1.2
Std. Dev.	.4	.3	.8
Median	.5	.3	1
Percent	74	11	15
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1.2	.7	2
Std. Dev.	.6	.3	1.3
Median	1	.8	2
Percent	72	13	15
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	.5	.4	1
Std. Dev.	.3	.3	.7
Median	.5	.3	.7
Percent	77	11	12
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	1.3	.7	2.1
Std. Dev.	1.1	.5	1.6
Median	1	.5	1.5
Percent	72	12	16
Number in Sample	9		

PCO's STEPS

Step 5	Normal	Optimistic	Pessimistic
Mean	1.4	.7	2.1
Std. Dev.	.8	.3	1.3
Median	1	.8	1.5
Percent	73	12	15
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.5	.3	1.1
Std. Dev.	.3	.3	.7
Median	.5	.3	.8
Percent	77	10	13
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	.5	.3	.9
Std. Dev.	.3	.3	.7
Median	.3	.3	.7
Percent	73	13	14
Number in Sample	9		

Step 8	Normal	Optimistic	Pessimistic
Mean	.4	.3	.7
Std. Dev.	.3	.3	.5
Median	.3	.2	.5
Percent	76	13	11
Number in Sample	9		

NETWORK F3

Step 1	Normal	Optimistic	Pessimistic
Mean	.7	.4	1.5
Std. Dev.	.6	.4	1.2
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 2	Normal	Optimistic	Pessimistic
Mean	1	.6	1.7
Std. Dev.	.6	.3	1.3
Median	1	.6	1.4
Percent	-	-	-
Number in Sample	9		

Step 3	Normal	Optimistic	Pessimistic
Mean	.5	.5	1.4
Std. Dev.	.3	.3	.7
Median	.3	.3	.7
Percent	-	-	-
Number in Sample	9		

Step 4	Normal	Optimistic	Pessimistic
Mean	.8	.5	1.4
Std. Dev.	.5	.5	1.1
Median	.5	.3	1
Percent	-	-	-
Number in Sample	9		

Step 5	Normal	Optimistic	Pessimistic
Mean	1.2	.7	1.9
Std. Dev.	.6	.3	1.1
Median	1	.8	1.5
Percent	-	-	-
Number in Sample	9		

Step 6	Normal	Optimistic	Pessimistic
Mean	.5	.3	1
Std. Dev.	.3	.3	.8
Median	.5	.3	.8
Percent	-	-	-
Number in Sample	9		

Step 7	Normal	Optimistic	Pessimistic
Mean	.4	.3	.9
Std. Dev.	.3	.3	.7
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	9		

PCO's STEPS

Step 8	Normal	Optimistic	Pessimistic
Mean	.4	.3	.7
Std. Dev.	.3	.3	.6
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	9		

NETWORK F4

Step 1	Normal	Optimistic	Pessimistic
Mean	.6	.3	1.3
Std. Dev.	.3	.1	1.2
Median	.5	.3	.8
Percent	-	-	-
Number in Sample	7		

Step 2	Normal	Optimistic	Pessimistic
Mean	.3	.2	.7
Std. Dev.	.2	.1	.3
Median	.3	.2	.8
Percent	-	-	-
Number in Sample	7		

Step 3	Normal	Optimistic	Pessimistic
Mean	.9	.5	1.3
Std. Dev.	.8	.3	1.1
Median	.5	.3	.8
Percent	-	-	-
Number in Sample	7		

Step 4	Normal	Optimistic	Pessimistic
Mean	1	.6	1.5
Std. Dev.	.5	.2	.8
Median	1	.5	1.3
Percent	-	-	-
Number in Sample	7		

Step 5	Normal	Optimistic	Pessimistic
Mean	.4	.2	.6
Std. Dev.	.1	.1	.3
Median	.3	.3	.5
Percent	-	-	-
Number in Sample	7		

Step 6	Normal	Optimistic	Pessimistic
Mean	.3	.2	.6
Std. Dev.	.1	.1	.3
Median	.3	.3	.5
Percent	-	-	-
Number in Sample	7		

Step 7	Normal	Optimistic	Pessimistic
Mean	.3	.2	.7
Std. Dev.	.1	.1	.6
Median	.3	.2	.5
Percent	-	-	-
Number in Sample	7		

NETWORK A1

	Normal	Optimistic	Pessimistic
Mean	.3	.3	.3
Std. Dev.	0	0	0
Median	.3	.3	.3
Percent	-	-	-
Number in Sample	9		

Other Duties as Assigned: 42% Sample = 7

APPENDIX L

LIST OF EXPERTS

LIST OF EXPERTS

The following people in the R&D Contracting Directorate helped to define the major activities which compose the steps in the contracting process:

Lawrence Kopa	PCO/Buyer	PMRSA
Lynn A Warner	PCO/Buyer	PMRSA
Judith Lindsey	PCO/Buyer	PMRNA
Rick Benge	PCO/Buyer	PMREB
Michael Szczepanek	PCO/Buyer	PMREA
Todd Eisenhut	PCO/Buyer	PMREC
Mary Ann Sharits	Buyer	PMREA
Cindy Larck	Clerk	PMRNB
Janice George	Clerk	PMREA
Annette Atha	Clerk	PMRRA
James McBride	Division Chief	PMRO
Daniel Schaetzle	Buyer	PMREA
Michael Weaver	PCO/Buyer	PMRNA
Phyllis Jones	Clerk	PMREA
Marion Wood	Clerk	PMRRB

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