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Procurement of Evaluation Systems: A Case Study of the Parametric Factor Evaluation Approach to Source Selection

Arwin S. Libman

July 1980

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Prepared by



Experimental Technology Incentives Program
National Bureau of Standards
Washington, DC 20234

CENTER FOR FIELD METHODS

THE EXPERIMENTAL TECHNOLOGY INCENTIVES PROGRAM

The Experimental Technology Incentives Program (ETIP) of the National Bureau of Standards pursues an understanding of the relationships between government policies and technology-based economic growth. The pursuit of this objective is based on three premises:

- o Technological change is a significant contributor to social and economic development in the United States.
- o Federal, State, and local government policies can influence the rate and direction of technological change.
- o Current understanding of this influence and its impact on social and economic factors is incomplete.

ETIP seeks to improve public policy and the policy research process in order to facilitate technological change in the private sector. The program does not pursue technological change per se. Rather, its mission is to examine and experiment with government policies and practices in order to identify and assist in the removal of government-related barriers and to correct inherent market imperfections that impede the innovation process.

ETIP assists other government agencies in the design and conduct of policy experiments. Key agency decisionmakers are intimately involved in these experiments to ensure that the results are incorporated in the policymaking process. ETIP provides its agency partners with both analytical assistance and funding for the experiments while it oversees the evaluation function.

Because all government activities potentially can influence the rate and direction of technological change, ETIP works with a wide variety of agencies, including those that have regulatory, procurement, R&D, and subsidy responsibilities. Programs are currently underway with the General Services Administration, Food and Drug Administration, Veterans Administration, Securities and Exchange Commission, Department of Energy, Environmental Protection Agency, Occupational Safety and Health Administration, and other Federal agencies as well as various State and local agencies.

Director
Center for Field Methods
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**PROCUREMENT OF EVALUATION
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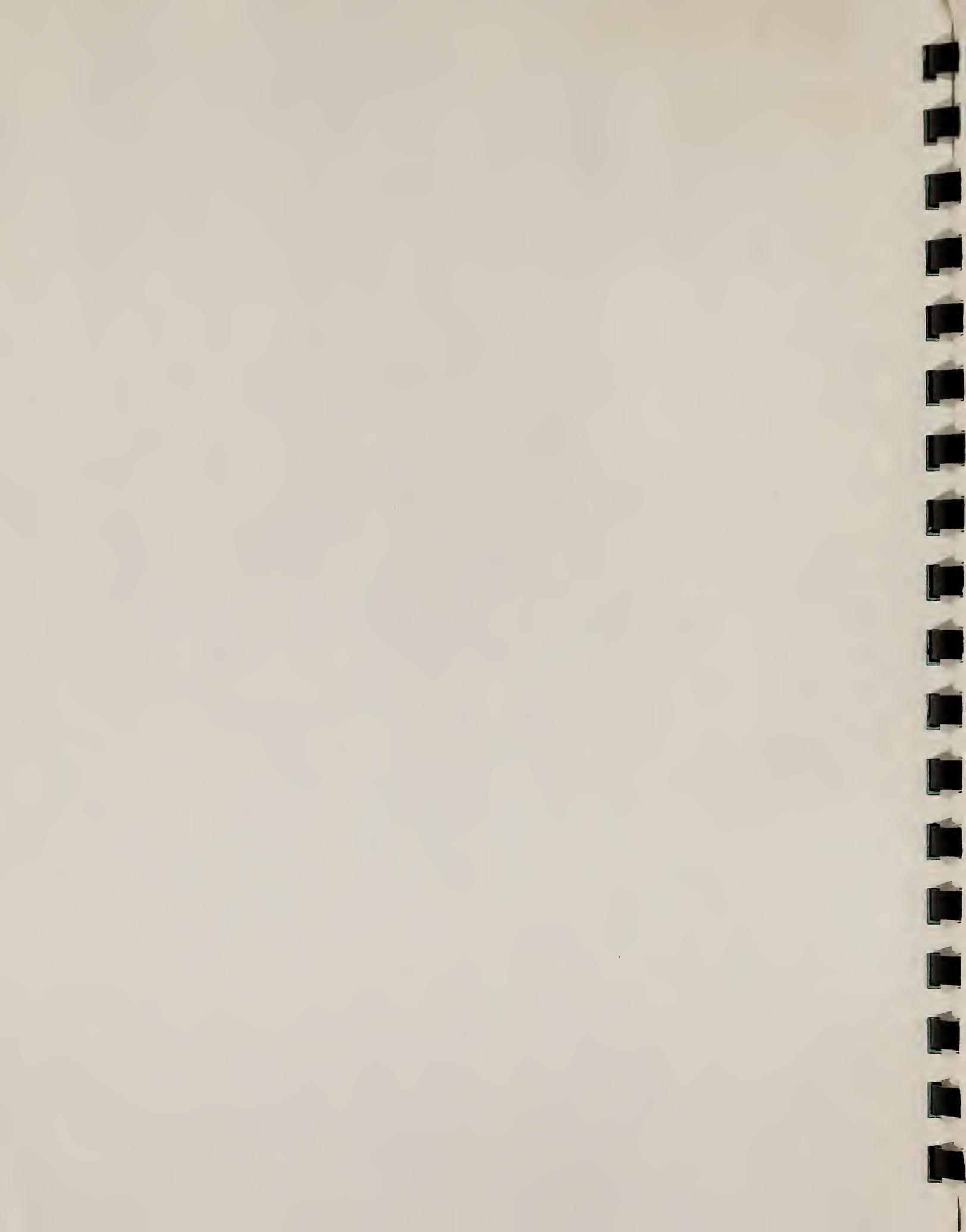
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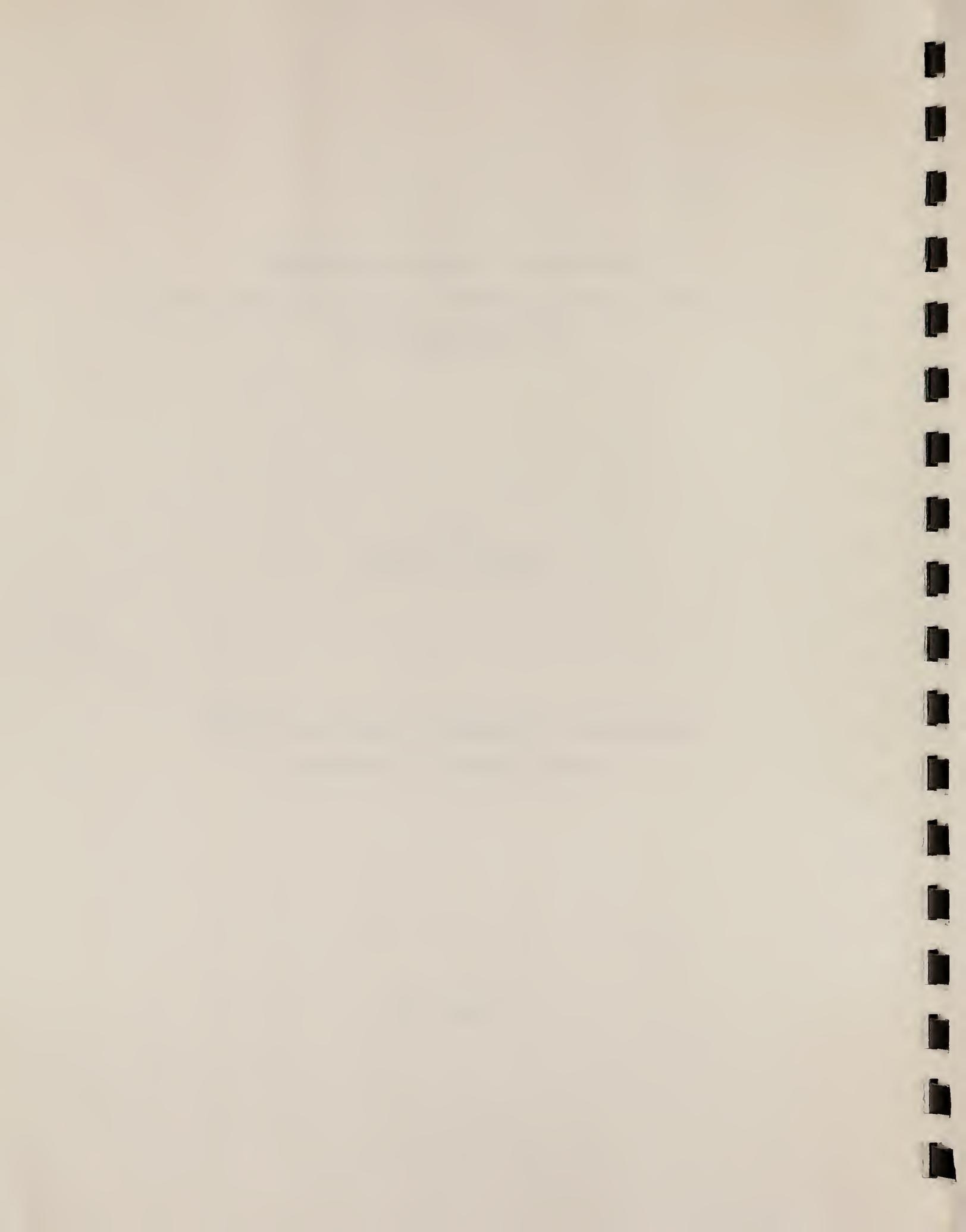


PROCUREMENT OF EVALUATION SYSTEMS:
A CASE STUDY OF THE PARAMETRIC FACTOR EVALUATION APPROACH
TO SOURCE SELECTION

By
ARDWIN S. LIBMAN

EXPERIMENTAL TECHNOLOGY INCENTIVES PROGRAM
NATIONAL BUREAU OF STANDARDS

June 1980



ABSTRACT

This document is a report of a case study of the use of a system contractor source selection process by a federal program. It is intended to be of both research and administrative value. Its primary research value is as a benchmark for future case studies on source selection techniques in general and for future research on the specific source selection process reported on here. Its primary administrative value is to those responsible for procuring systems (and other complex and uncertain products, e.g., large evaluations) as an evaluation of the outcome of the use of the specific technique in terms of the issues critical to effective source selection.

The specific problem for which the technique was used was the selection of two contractors to develop an ongoing capability to evaluate the results (agency and commercial impacts) of experimental modifications in procurement procedures by selected federal, state, and local government agencies. These evaluation systems were to be implemented by organizations outside of the developing organization (The Experimental Technology Incentives Program of the National Bureau of Standards).

The primary administrative finding is that the federal program was able to adapt successfully the technique, which was developed and used to procure "hardware" systems, to meet its requirements to select contractors to develop these "software" systems. The successes and failures in dealing with numerous critical issues are detailed in Chapter V. Section V.4 provides a summary of these results with cross-references to the related discussions in the text.

The primary research contribution is the offering of an evaluation structure and an example of its use for future case studies of source selection techniques. This work also provides a departure point for further research on the specific technique evaluated here. The prior literature is void of detailed case material. This document provides a structure for comparative evaluation and much of the data which was used for this one.

The method followed is to: 1) provide background in terms of the problems of the specific procurement (section I.2) and related procurements (section II.2, II.3) and background on the source selection process evaluated here (section II.5); 2) review the related issues of source selection raised in prior literature (section II.4); 3) supply a detailed chronology of the use source selection process (Chapter IV); and 4) evaluate the results of using the process with a structure built around the critical issues raised

by participants (drawn from the Chronology) and by the prior literature (Chapter II).

Implications of this study for future use of the process and for future related research are presented in Chapter VI. A background document on the source selection process, documents from the RFP and the actual ratings from the use of the process which is evaluated here are provided in the Appendix.

The author is an employee of the federal program which used this process. He has been involved in two subsequent source selections using the technique. The report of this research is the author's doctoral dissertation. His committee chairman is the developer of the technique being evaluated. A self-report of the author's biases appears in section III.5.

ACKNOWLEDGEMENTS

Various people have contributed to this work since its inception. These contributions have been wide ranging and varied. I am thankful to the many people who were involved in the completion of this research. Several of these people merit separate mention here.

I wish to acknowledge my dissertation chairman, Charles Thompson, for stimulating my interest in this topic and for his occasional guidance and sustained encouragement. I thank my other committee members, Victor Berlin, Gustave Rath, and Joseph Schofer for their various contributions to the final form of this research.

Several friends/colleagues provided reviews of parts of this work. Thanks go to Warren Frederick, Stephen Garrity, and Roland Weiss for their comments on sections of the text and for the discussions on the research which helped me to remain focused on my objective.

Special thanks go to Darlene Carver who typed several drafts of the manuscript and enabled me to meet deadlines.

The research reported on here was performed as a project of the Experimental Technology Incentives Program of the National Bureau of Standards. I wish to acknowledge

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Finally, I am thankful to Elise Blumenthal for both understanding and encouragement.

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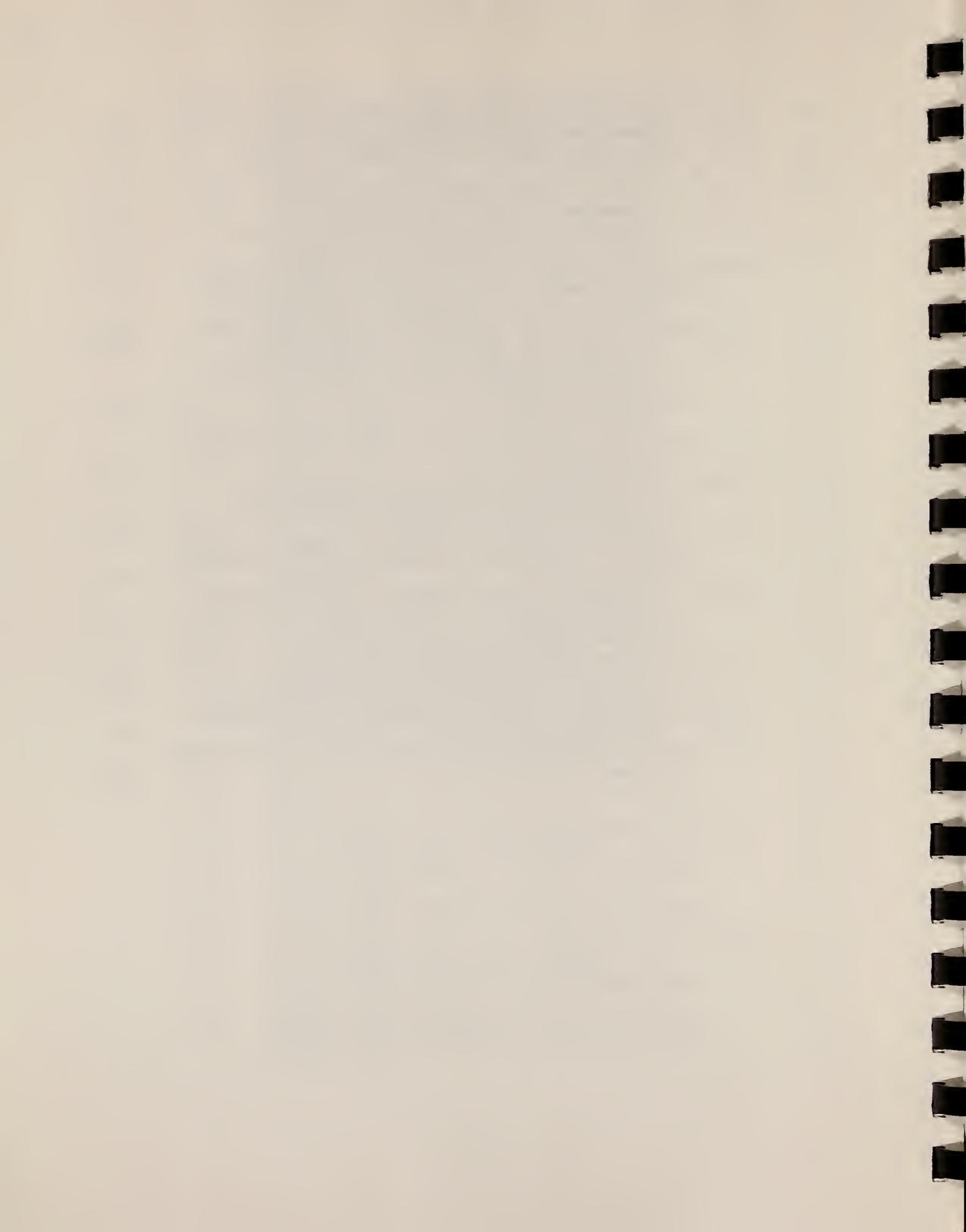
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CHAPTER I

INTRODUCTION

I.1 The General Problem of Acquiring Evaluation Systems

In recent years the level of resources devoted by government to program evaluation has grown to a significant level. This activity is expected to continue to expand with increasing congressional interest in program oversight. Because of requirements for evaluation, some programs have become interested in developing capabilities to evaluate their programs on an on-going basis. Some of these desired capabilities have been labeled as evaluation systems.

Much of the federal government's evaluation work is done under contracts. The track record of such evaluation has not been good. The products of this work have been criticized as being of faulty design, poor timing, and irrelevance for use in decision making.

There has been a growing recognition of the importance of the selection of the contractor as a determinant of satisfaction with the outcome of the evaluation. Professionals in the evaluation community have begun to focus on the role of the source selection process in evaluation.

I.2 The Specific Problem which ETIP Faced

I.2.1 ETIP

ETIP (the Experimental Technology Incentives Program), at the National Bureau of Standards (NBS), was established by Presidential decree in 1972 to find methods which the government could use to stimulate technological innovation. As the program developed it pursued this mandate by working with government agencies to experiment with modifications in policies and procedures which were hypothesized to have an inhibiting effect on innovation. The idea was to work with those people in government who have the responsibility for various programs in order to design, implement, and evaluate the results of these "policy experiments."

I.2.2 ETIP's System Procurement Problem

In 1975 ETIP decided that it wanted to develop some kind of ongoing capability to evaluate the results (agency and commercial impacts) of the experiments in procurement practice which it was conducting with various federal, state, and local government agencies. This capability was to be developed using outside contractors. The responsibility for this fell on the newly hired head of evaluation for ETIP.

He faced several problems in trying to decide how to contract for this evaluation capability. These included that:

- o This project was only one of his responsibilities and at the time he had no staff working

for him. This created a resource problem if he were to meet the deadline he was given of awarding the contract by the end of the fiscal year.

- o He had no directly related prior experience with either the source selection process or with systems management.
- o He was not yet trusted by other members of the ETIP staff.
- o There was a great deal of uncertainty over what the requirements for the evaluation capability would be, including who would own it, what specific types of experiments it would be required to evaluate, and how many experiments would be evaluated during the development of the systems.
- o The evaluation industry had a poor track record for getting its work used in decision-making. It had no track record at developing evaluation systems.
- o ETIP had little visibility in the evaluation community. Its prior attempt at contracting for evaluation services resulted in cancellation of the RFP after the proposals had been evaluated.
- o ETIP had a high profile with the administration of NBS and parts of the Department of Commerce. The source selection would be subject to close internal scrutiny.

The manager of evaluation decided to ask Charles W. N. Thompson, a special employee of the program, for help. Thompson chose to use a source selection process which he had developed and used to procure "hardware" subsystems for the Air Force. Use of the method, called Parametric Factor Evaluation (PFE), represented a significant departure from the way evaluations were being purchased by the government.

There was a great deal of skepticism in ETIP over whether the source selection would be effective. People were concerned with whether:

- o the process was legal;
- o any firms would respond;
- o the proposals which were received could be evaluated; and
- o the selection would stand.

I.3 The Topic of this Research

This research is a case study of ETIP's use of the Parametric Factor Evaluation Process to select two contractors to develop the evaluation systems which it desired.

The case study is constructed by the author from:

- o background on the PFE process from both historical documents and personal communications with its primary developer;
- o participation in the process at ETIP and access to records of the source selection; and
- o interview and questionnaire information from other participants in the source selection.

The format followed in presenting the case is to provide the reader with background on both the source selection process and the PFE process, to present a specific detailed chronology of ETIP's use of the PFE process, and to evaluate ETIP's experience against the set of relevant issues. Fi-

nally, some broader implications suggested by this research are presented.

I.4 Value of this Research

This research is intended to be of value both for researchers and for people responsible for acquiring evaluation systems (or other types of systems). Its value for researchers is as a bench mark, in terms of method and results, for those interested in further research on PFE or comparative research on other source selection techniques. It is also offered as an example of a credible method for doing exploratory research. Its value for people responsible for acquiring systems is as a description of the PFE process which answers some of the questions which someone considering using the process may have. It provides a detailed level of information on how the process works, what problems it will and will not solve, and how those who are involved may feel about it.

I.5 The Organization of this Document

This document is organized to progress from the general to the specific and back to the general. Chapter II contains general background and information on relevant prior states-of-the-art in both program evaluation and systems procurement. The size of the problems, the people working in the topic areas, the prior research, and the

issues which are raised by other authors are identified. Chapter II also contains background on the Parametric Factor Evaluation process. History of the process, claims for where it will be useful, and a description of its characteristics are provided. Chapter III describes the central purposes of the research. It contains a description of both what the author set out to accomplish and the approach which was taken. A discussion of the proposed value of the research and a disclosure of the biases of the author are also given. Chapter IV is a chronology of ETIP's use of the PFE process for its source selection. It reports what occurred, including what issues were raised by participants in the process. Chapter V presents the evaluation of the outcome of ETIP's use of PFE against a set of issues either raised by participants or contained in related literature. Section V.4 presents a summary of the results in terms of successes, failures, and remaining uncertainties. It contains cross-references back to the discussion of each issue in the preceding text. Chapter VI reviews the implications of this research which go beyond the specific case study. In it the author comments on the methodology used for the research, draws lessons from comparison of the results of this use of PFE with other prior and subsequent uses, mentions other problems for which parts of the PFE process may present a useful solution, and indicates possible topics for additional research on PFE.

Two terms which are used quite often in later chapters are "bidder" and "panel." The term "bidder" is used to refer to a firm responding to a request for proposals. Technically, the term "offeror" refers to a firm responding to a negotiated procurement. However, since the use of the term "bidder" is common in the literature and in practice (including use in ETIP's RFP), the author chose to use it throughout this document. The term "panel" is used to refer to the group of people who meet to perform the review and scoring of the technical proposals.

CHAPTER II

BACKGROUND

II.1 Introduction

This chapter reviews background to provide perspective for the case study which follows. Information is presented on the related states-of-the-art in terms of issues raised by researchers and practitioners of evaluation and systems procurement. A description of the Parametric Factor Evaluation approach to source selection is also presented. The review of the literature is not intended to be comprehensive. It represents a modest selective sampling of much larger literatures in both evaluation and systems procurement. The intention is to give the reader an understanding of the larger contexts within which ETIP's procurement problem resided. The description of PFE is included to provide a context for the case study in terms of the history and characteristics of the process which ETIP used.

II.2 Evaluation Systems

II.2.1 Concept of Evaluation Systems

Evaluation and evaluation systems have no agreed upon conceptual framework (Tien, 1979). There are, however, many government programs doing evaluation work (Comptroller General, 1976). This work varies in scope and method.

Some of it is classified as developing evaluation systems (Comptroller General, 1978, 1979). Other works, which are large program evaluations, share many of the same characteristics and problems as that which is directed toward developing evaluation systems. It is not the purpose here to analyze these similarities and differences but merely to indicate some of the problems which have been claimed to exist.

Evaluation systems may be useful to programs which are expected to have a continuing requirement for information related to impacts, where at least some of it is of a stable and predictable nature. They are primarily software systems rather than hardware. They may often be large and complex and take a long time to acquire (Thompson, 1976a). In development they can require a large number of people of diverse skills and interests to work together over a long period of time. As such they exhibit problems of cooperation and communication and turnover in people who support or oppose the systems (Patton, 1977; Thompson, 1976a). For comparison, they are probably most closely related to management information systems and logistics systems.

The definition of evaluation system used by ETIP was:

EVALUATION SYSTEM - Refers to the set of policies and procedures which provides the basis for evaluating the (agency and/or commercial) impacts of a set of specific procurement or related experiments. The form, detail and completeness of the system will progressively change. In Phase One, it may begin as a preliminary outline within which detailed "single thread" designs are developed

for the early evaluation of specific procurement experiments; later, the results of the preliminary systems analysis and the "pilot test" will provide the basis for a preliminary evaluation systems design. In Phase Two, progressive refinement should result in a relatively complete evaluation system which can be tested as a prototype, in part, through the evaluation of specific experiments. In Phase Three, the evaluation system should be in the form of a stable and complete system (Thompson, 1976, p. 5).

II.2.2 The Level of Evaluation in the Federal Government

The level of resources devoted to government program evaluation has increased significantly in recent years and it appears that this trend will continue. It has been estimated that the federal government alone spent \$243 million on executive branch program evaluation in fiscal year 1977 (Granquist, 1977). This may be compared to an estimate of \$20 million spent in fiscal year 1969 (Knezo, 1974).¹

In the last several years Congress has demonstrated increased interest in expanding and exercising its oversight authority (Comptroller General, 1977; Havens, 1977). On October 11, 1978, the Senate passed an oversight reform proposal, S. 2, The Sunset Act of 1978. This legislation, which has facetiously been referred to as the Evaluators Full Employment Act, would require periodic review and re-

¹Though the methods used in counting probably differed, these figures do give an indication of magnitude and trend. It should also be noted that the \$243 million does not include Congressional evaluation.

authorization of nearly all federal programs. Though the House of Representatives did not pass a similar bill during the 95th Congress, there is some probability that similar legislation will exist in the near future. The result will be an even greater demand for program evaluations.

II.2.3 The Evaluation Community

A community of professional evaluators has grown up in response to the government's demand for their services. These people reside both within and outside of the government. Within the government most executive branch agencies have high-level organizational units specifically devoted to evaluation and many have evaluation functions built into the lower levels. The people who work in these units either perform in-house evaluations or manage contracts and grants which support their evaluation programs. Congressional arms of the government such as the General Accounting Office, the Congressional Budget Office, and the Office of Technology Assessment also have sizable in-house evaluation functions. Outside of government, professional evaluators exist in both universities and in contract research organizations. These people do evaluations for government programs on contracts or grants and also do research on methods for improved evaluation. In a sense they form a research industry (Biderman & Sharp, 1972).

Communication networks have evolved to serve the needs of this professional community. They have their own professional organization (e.g., The Evaluation Research Society; The Council for Applied Social Research) and journals (e.g., Evaluation Quarterly; Evaluation), and contribute to discussions in the media of other related organizations (e.g., The Institute of Management Sciences; The American Psychological Association). University programs have developed to research topics related to evaluation and to teach students how to do this work.

II.2.4 The Pains of Adolescence

The proliferation of evaluation in the government has brought with it a debate among practitioners and intended users as to the quality of the resultant products. This debate takes place in the media and at the conferences of evaluators and program administrators and at Congressional hearings. It often centers on the fact that the results of many evaluations are not used in decision-making about the programs which they review (Agarwala-Rogers, 1977; Berlin, 1977; Chelimsky, 1977, Vol. II, pp. 33-44; Cohen & Garet, 1975; Weiss, 1972, pp. 10-11; Wholey, Scanlon, Duffy, Fukumato & Vogt, 1970; Williams & Evans, 1969).

Those who critique evaluations raise questions of the relevance, methodological appropriateness, and political astuteness of evaluators. Many of the claims of problems

with evaluators center on the irrelevance of their work to the management of the program being evaluated. It is claimed that evaluators often have little understanding of the program processes or the systems in which the programs operate (Horst, Nay, Scanlon, Wholey, 1974). They frequently put a great deal of emphasis on peripheral issues which are of little interest to program managers (Chelimsky, 1977, Vol II, p. 43; Granquist, 1977; Guttentag, 1973; Havens, 1977). Aspects of programs being evaluated are not put into a context in which they address specific policy issues (Cook, 1978; Lynch, 1976). Evaluations are also criticized for being submitted too late to be of use in decision-making (Evans, 1977; Havens, 1977; Wholey et al., 1970).

In the area of methodology it is claimed that faulty or simplistic designs are used which lead to false or misleading or suspect conclusions (Horst, et al., 1974). The relevance of measurement schemes to the program being evaluated (Horst, et al., 1974), the adequacy of data (Havens, 1977), and the quality of analysis are all questioned (Havens, 1977). Attacks of methodology are frequently used to undermine confidence in the results of evaluations (Evans, 1977).

Evaluators are criticized for their lack of political astuteness (Patton et al, 1977). There has been a tendency on the part of some evaluators to work in isolation from the managers of the programs they are evaluating and

to favor surprise findings (Brands, 1977; Patton, et al., 1977). Related to this is the mis-direction of evaluation reports to higher levels in the organization or to the press rather than on-going presentation of results to those with direct control of the programs (Patton, et al, 1977). Evaluation reports have also been criticized for their large volume, pretentiousness, and frequent use of jargon (Cook, 1978; Lynch, 1976).

Evaluators and program managers may work toward differing purposes, evaluators being concerned with technical excellence of research designs and conclusiveness of attribution of effect and program people being concerned with relevance, timeliness, breadth of analysis and responsiveness (Chelimsky, 1977, Vol. II, p. 31).

II.2.5 Contract Evaluation

In looking for causes of the disappointing outcomes of evaluations, some authors have turned attention toward the procurement process (Bernstein & Freeman, 1975; Biderman & Sharp, 1972, 1972a, 1974, 1974a; Mitchell, 1973; OMB, 1975). There seems to be a growing recognition of the importance of finding ways for basing the selection of contractors upon criteria which have a stronger relationship to expected performance. Articles on how to write better RFPs (Weidman, 1977) and critiques of issued RFPs (Evans & Anderson, 1978; Hess, Floden, Sproull, & Conry, 1978)

have appeared in journals. A recent meeting of the Evaluation Research Society (November 1978) held a session on the RFP Award Process. Another professional organization began sponsorship of an annual award for the best evaluation RFP (Council for Applied Social Research, Note 1).

Some of the problems which are raised with the procurement process include the high cost to firms of submitting proposals, the lack of guidance for self selection, the vagueness of RFPs, and the suspicion that the government has a preferred source in mind in advance of receiving proposals (Biderman & Sharp, 1972a). Another problem is that the evaluation which is undertaken often has little relationship to the evaluation which was described in the RFP (Biderman & Sharp, 1972a). Some authors question the competence of federal employees to develop RFPs and evaluate proposals. They suggest more input into the process by the academic community, (Bernstein & Freeman, 1975), including issuing RFPs for contracts to write RFPs (Hess, et. al, 1978).

II.2.6 Relationship to Systems Procurement

Comparisons can be drawn between the problems of acquiring evaluation systems and the problems of acquiring weapons systems (Thompson, 1978a; Yarmolinsky, 1976). However, the literature on source selection for weapons systems is rich by comparison to that of evaluation systems. It is a more mature area of study to which the government and

research community have devoted considerably more attention. Therefore, it is useful to examine the literature on systems procurement to better understand the procurement process and to identify the issues which may also be important for evaluation systems procurement. That is the purpose of section II.3.

II.2.7 Summary of Evaluation Systems Background

This section has reviewed some of the literature related to evaluation systems. Emphasis was placed on identifying the scope of federal evaluation, some of the problems identified with its use, and especially those identified with the procurement process. The next section reviews literature on systems procurement.

II.3 Systems Procurement

II.3.1 The Concept of Systems

The word "system" has been used to refer to many different things (Ackoff, 1971). For purposes of this research, a brief indication of system characteristics is probably more useful than using any one definition. Rudelius (1969), indicates aspects of large systems which make them unique by summarizing the first three chapters of Peck and Scherer (1962, pp. 3-64). He lists these as being the presence of:

- o a single buyer,
- o a single seller,
- o high technological and political uncertainty,
- o high cost,
- o high complexity,
- o high lead time,
- o limited production, and
- o contract awards made before development of a precise system definition (Rudelius, 1969, p. 23).

Thompson (1978) describes some dimensions which may be used to differentiate among various systems. These are:

- o Hardware \longleftrightarrow Software
(the degree to which the system can be described in terms of specific physical items),
- o Many \longleftrightarrow Few
(the degree to which the system will be produced in quantity),
- o Incremental \longleftrightarrow Novel
(the degree to which the system represents a change from the "system" it replaces), and
- o Inhouse \longleftrightarrow Isolated
(the degree to which the developer of the system is responsive to the direction and control of the user).

II.3.2 Size of System Procurement

Systems procurements represent a significant element of federal government expenditures. The Office of Management and Budget Circular Number A-109 states that:

the acquisition of major systems by the Federal Government constitutes one of the most crucial and expensive activities performed to meet national needs. Its impact is on technology, on the

Nation's economic and fiscal policies, and on the accomplishment of Government agency missions in such fields as defense, space, energy and transportation (Office of Management Budget, 1976, p. 1).

Several years ago Hall (1975, p. 88) estimated that the Department of Defense had over 150 major and minor systems acquisition programs. He placed the cost of these programs at over \$200 billion for development plus an amount equal for follow-on.

Much systems work is done by private firms under contract to the government. Livingston (1959), in an early article on the system concept, indicates that

The philosophy underlying the weapon system concept holds that authority for the design, development, and production of an entire weapon or support system...should be assigned to a single [original in italics] management organization (p. 83).

The primary reason for this is the great complexity of developing and integrating all of the system components. Since the military services found that they did not possess sufficient in-house capability to manage the development of their programs they began contracting for systems management (Livingston, 1959).

II.3.3 Research Related to Systems Procurements

Research on procurement has been sponsored by both government and industry. Spagnola (1978, p. 397) traces the Department of Defense's formal interest in procurement research to the Defense Procurement Pricing Conference held in Hershey, Pennsylvania in November, 1977. Since then

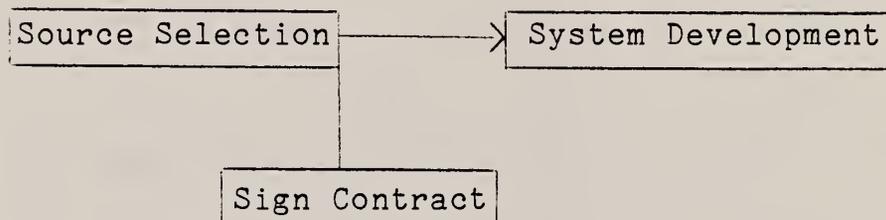
the various services have set up offices to conduct procurement research. The Army established its Procurement Research Office (APRO) in 1969; the Air Force established the Business Management Research Center (AFBMRC) in 1973; and the Navy began its research program in 1977 (Spagnola, 1978, p. 397). There has been the addition of a graduate procurement curriculum to the Air Force Institute of Technology and a Systems Acquisition Management curriculum to the Naval Postgraduate School (Martin, Heuer, Kingston, & Williams, 1978, p 422). The Defense Systems Management College has also initiated a program of acquisition research (Spagnola, 1978, p. 397). In 1976 the Office of Management and Budget established the Federal Procurement Institute (now the Federal Acquisition Institute) to serve as a government-wide focal point for procurement research. Industry research has been sponsored by groups such as the Aerospace Industries Association (e.g., Aerospace Industries Association, 1969).

The research in this area is reported in professional journals (e.g., Esposito, 1973; Goldberg, 1977; Skolnick, 1969), conference proceedings (e.g., Cochran & Rowe, 1977; Martin, et.al, 1977), theses and dissertations (e.g., Bailey, 1964; Logan, 1966), books (e.g., Fox, 1974; Peck & Scherer, 1962; Scherer, 1964), and reports (e.g., Commission on Government Procurement, 1972). It is conducted both by practi-

tioners (e.g., Carnes, 1976) and academics (e.g., Hynes, 1977; Roberts, 1964).

II.3.4 Characteristics of Systems Procurements

For purposes of discussion, the procurement of systems is divided here into two phases. This division is illustrated in Figure II.1. The first phase, labeled source selection, is that part of the procurement process which terminates with the signing of a contract between the government and a contractor. The second phase, labeled the system



• FIGURE II.1 TWO PHASES OF THE PROCUREMENT OF SYSTEMS

development, is that part of the procurement process which follows the signing of the contract and results in work toward implementing an in-place system. Though this research is primarily concerned with the source selection process, it is important to look at the development process to the extent that the characteristics of this process interact with source selection. That is, it is useful to look at some of the characteristics of the development process which make the source selection process difficult and in turn some of the characteristics of the source selection process which may affect the development process. O'Connor (1972)

has pointed out that early misunderstandings may lead to expensive mistakes downstream in the program. It is therefore desirable to use a source selection process which will be able to predict and in some manner favorably affect the development process.

The characteristics of complexity and uncertainty lead to problems. System developments have both technical and organizational components. Technical complexity results from the large number of technical problems present, the interrelationship among these problems, and reliability requirements of the individual components (Peck & Scherer 1962, p. 42). Organizational complexity results from the large number of objectives which different people have for any system, the changes which occur in objectives, and the need to resolve conflicts among them (Peck & Scherer, 1962, p. 80). Included here are differences between the objectives of the government and those of the systems contractor. Interface between technical problems and organizational problems is important.

Uncertainty in systems development results from the complexities of the problem and the required long development time (Ruth, 1978; Thompson, 1978). Complexity leads to technical difficulties which were not foreseen in the early stages of the program (Fox, 1974, p. 372; Peck & Scherer, 1962, p. 24). Some of these problems may have no fea-

sible solution (Eyring, 1966, p. 170) and must result in modifications in the system's performance characteristics. The long development time may result in required changes due to advances in the technical state-of-the-art (Peck & Scherer, 1962, p. 46; Srull, 1972, p. 4), modifications to strategic requirements (Esposito, 1973, p. 9; Fox, 1974, p. 369; Peck & Scherer, 1962, p. 48), or new government policies (Peck & Scherer 1962, p. 50). The demand for a system may also vary over time, particularly as competing systems become available and with turnover in government personnel who support or oppose them (Thompson, 1978). There will also be turnover of personnel by the system contractor which may affect approaches used (Ruth, 1978).

The literature which discusses problems with the development of systems emphasizes the large numbers of changes which occur. These changes are in cost, schedule, and performance characteristics. Cost is often discussed in terms of overruns, schedule in terms of slippages, and performance in terms of both increased and decreased capabilities. Cost, schedule, and performance characteristics are all closely interrelated and subject to similar influences (Anderson, 1969, p. 163; Rudelius, 1969). For example a technical problem in meeting performance capability may lead to increased cost and longer time until delivery. An attempt to cut costs may lead to reduced capabilities and longer time until delivery. An attempt to speed delivery may lead

to greater cost and reduced performance. Because of this interrelatedness, the causes of schedule slippage and performance modifications will be covered here within the discussion of cost overruns which follows.

The literature on the causes of overruns can be grouped into six categories. These are:

- o having to lie about the cost--buying in,
- o spending time on things which are unimportant,
- o having to do something different from what was originally planned,
- o doing a poor job of estimating costs,
- o making mistakes requiring re-work, and
- o catastrophic external events (Cochran & Rowe, 1977; Thompson, Note 2).

Buying-in can be attributed to circumstances which require that both the government and the bidder lie about the initial estimated cost of development. The government program manager may use an unrealistically optimistic cost estimate in order to obtain approval for his system (Fox, 1974, p. 159; Peck & Scherer, 1962, pp. 412-413). Thus the program is initially inadequately funded (Patterson, 1977, p. 61). Bidders are forced by the government to underestimate their own costs if they wish to obtain contracts (Peck & Scherer, 1962, p. 412-413). Bidders often believe that there is little chance of obtaining future contracts without initial contracts (Babione, 1978; Patterson, 1977, p. 60). They may also be more concerned with obtaining

revenue to cover fixed costs than with longer term cost issues (Patterson, 1977, p. 60). Firms realize that price may be the primary consideration in making an award (Packard, 1972), since the government must defend a selection of any-one other than the lowest bidder (Fox, 1974, p. 277), and the technical evaluation may result in an inability to discriminate among bidders (Carnes, 1976, p. 2). When under contract it becomes clear that the award price will not result in the desired performance characteristics, the successful bidder requests contract modifications (Anderson, 1969, p. 163) and the government program manager requests a supplemental budget (Peck & Scherer, 1962, pp. 412-413). In procurements which are characterized by high uncertainty, the initial price may have little relationship to the cost to perform (Thompson, 1978a).

Spending time on things which are unimportant may be related to differences in objectives between the government and its contractor, management inefficiencies, or the desire by the government or its contractor to justify future costs. Objectives of the contractor which are not held by the government may lead to the addition to systems of non-essential performance characteristics ("goldplating") (Fox, 1974, p. 369). Contractors may make their decisions on allocation of effort (and on doing work in-house vs. contracting out) based on factors such as desire to:

- o enhance their competitive position (e.g., maintain competence, public image, and market share) (Fox, 1974, p. 441; Peck & Scherer, 1962, p. 458)
- o cover overhead (e.g., increased direct cost results in increased charges to overhead and indirect cost)(Fox 1974, pp. 232, 299), and
- o maintain stability of employment (e.g., during delays while waiting for approval (Fox, 1974, pp. 165, 419; Peck & Scherer, 1962, p. 458)).

Management inefficiencies may be the result of lack of responsibility for managing costs (Fox, 1974, p. 434), or the tendency for work to be authorized within functional organizations without coordination with upper level management (Fox, 1974, p. 419). The government project manager may encourage "goldplating" in order to justify future year budget requests (Fox, 1974, p. 482). By increasing costs the contractor may also try to justify higher future estimates (Fox, 1974, p. 232).

Being required to do something different from what was originally planned results from the need to respond to the customer's evolving concept of uses of the system (Cochran & Rowe, 1977, p. 540). Changes in the state-of-the-art can lead to required new features which were not originally anticipated (Cochran & Rowe, 1977; Fox, 1974, p. 165). In many instances the government requires bidders to specify approaches in their proposals in areas of high uncertainty (Drake, 1970, p. 124). This can lead to early

decisions which lock the program into a single solution and require considerable additional expense to undertake other options (Hall, 1975, p. 97; Keeling, 1975, p. 130).

Poor cost estimates are attributed to not dealing adequately with uncertainties. Bidders are required to cost out systems with little or no historical data upon which to base many of their estimates. This is particularly true where the system is required to push the state-of-the-art (Fox, 1974, p. 165; Keeling, 1974, p. 130; Martin, Glover & Lenz, 1977; Srull, 1972, p. 3). The estimates which result do not reflect differences in uncertainty over the costs of various parts of the system (Anderson, 1969; Drake, 1970; Thompson, 1978a).

Mistakes requiring re-work may be caused by setting overly ambitious requirements or by poor workmanship. If the original requirements call for significant increases in the state-of-the-art for various parts of the system, it is possible that one or more of these advances will prove too ambitious and require re-design (Comptroller General, 1973, p. 26). Instances of poor workmanship may also require re-work (Fox, 1974, p. 165).

Catastrophic external events may lead to significant, uncontrollable overruns. Included here are events such as natural disasters, civil disorder, major strikes, and fire (Cochran & Rowe, 1977, p. 536). Severe unanticipated inflation might also be included in this category.

Some of the factors which lead to contract changes may be anticipated before or during source selection. In some cases the source selection process may be a cause of the problem. In others the ability to be able to better evaluate the technical and management capabilities of a bidder may prevent problems from occurring. Some feel that the selection of the contractor may be the most important aspect of an acquisition program (Helman & Taylor, 1976, p. 88).

II.3.5 The Role of Source Selection

The primary roles of the source selection process are to select a contractor, allocate risk between the government and the contractor, and to provide for review and management by the government once a contract is signed (Lenk, 1977). The procurement process has its roots in the purchase of food, soap and other necessities for George Washington's Army (Report of the Commission on Government Procurement, 1972, Appendix G).² Various contractual mechanisms have evolved to try to meet most effectively the government's requirements for obtaining specific types of goods and services.³ Waks (1960) traces the use of the system source

²Appendix G of the Report of the Commission on Government Procurement (1972) provides an informative history of the evolution of the procurement process.

³Lenk (1977) provides a good overview of the various contractual mechanisms used by the government.

selection concept to the spring of 1955 when it was first used by the Air Force. He explains that source selection shifts the emphasis from making a technical analysis of the relative merits of specific design proposals, to making an overall analysis of the relative ability of a select group of sources to accept a particular design assignment.⁴

The literature on source selection suggests that there is dissatisfaction with both the process of source selection and the results of the process (Esposito, 1973, p. 9; Hynes, 1977). This dissatisfaction occurs both among government and industry personnel (Keeling, 1975, pp. 129-130). The significant resources required have not paid off in the achievement of the outputs desired (Blue Ribbon Defense Panel, 1970; Esposito, 1973, p. 9).

II.3.6 Issues Related to Source Selection

In reviewing the issues raised about the source selection process, it is useful to divide the process into four stages. A somewhat simplistic division is represented in Figure II.2. The first stage incorporates selecting the type of contractual mechanism to be used, writing and distributing the RFP and briefing the prospective bidders.

⁴The term System Source Selection was adopted by the Air Force for a set of guidelines for accomplishing this type of solicitation and selection.

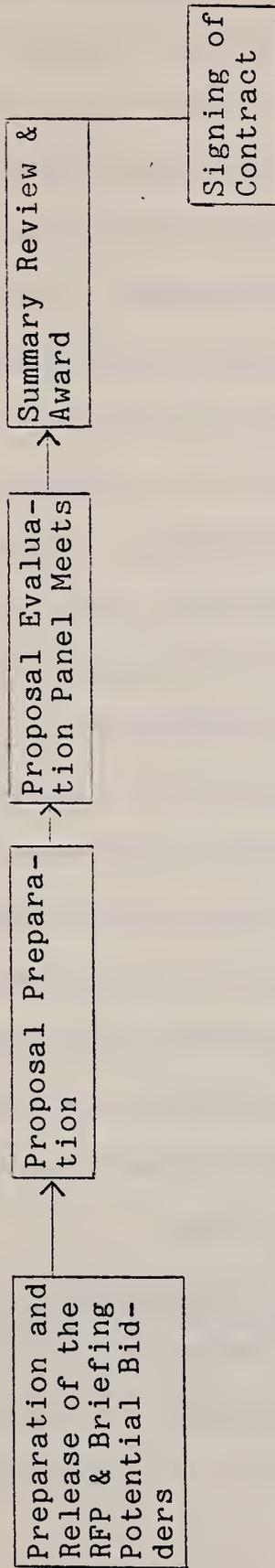


FIGURE II.2 FOUR PHASES OF THE SOURCE SELECTION PROCESS

The second stage of proposal preparation includes the decisions by firms on whether and how to bid and the actual writing of proposals. The third stage includes the recruiting and briefing of the proposal evaluation panel and conducting the technical evaluation of proposals which are received. Summary, review, and award is that part of the process which includes summarizing the results of the panel meetings, determining the competitive range, reviewing cost proposals, obtaining clarifications, negotiation, signing the contract, and debriefing unsuccessful bidders. Though these stages are, for the most part sequential, they do overlap somewhat in time (e.g., selection of the panel generally occurs before proposal writing is completed).

It is generally desirable that each stage be conducted both effectively and efficiently. It is also desirable that each stage support what comes later (e.g., the format required for proposals may affect the ability of the panel to accomplish its evaluation). The remainder of this subsection will use these four phases to highlight what the literature raises as issues relating to the effectiveness and efficiency of the source selection process.

II.3.6.1 Preparation and release of the RFP and briefing potential bidders. The RFP has been described as being primarily a business action (Esposito, 1973, p. 9); its purpose being to provide accurate information and guidance

in a competitive marketplace (Esposito, 1973, p. 11; Morris, 1973, p. 19). The information provided and the form for the responses should allow prospective bidders to determine effectively whether to bid and enable them to convey their capabilities to the government (Fox, 1974, p 301; Keeling, 1975). Hynes (1977), in reporting on a survey of defense contractors, indicates that there is a great deal of dissatisfaction with the RFP as a communication instrument.

One of the first tasks when preparing an RFP is to select an appropriate contract type. Gordon (1980) argues strongly for realistically matching the contract terms to the expectations for the system and the inherent technical and financial risks. Systems procurements currently tend to make use of cost reimbursement contracts rather than fixed price contracts (Lenk, 1977).⁵ It is intended that this mechanism be used where there is uncertainty as to what the final product is, its form, how much it will cost and the quantity to be produced (Fox, 1974, pp. 230-231; Skolnick, 1969). Contractors are reimbursed for allowable direct and indirect costs, overhead and often a fee based

⁵Anderson (1969) describes how problems occurred when Secretary McNamara required the Department of Defense to procure systems using fixed price contracts. The most publicized case is the use of Total Package Procurement for the C-5A program.

upon a percentage of the negotiated contract price.⁶ Systems procurements also tend to make use of negotiated rather than advertised procurements (Fox, 1974, p. 252; Schnitzer, 1973). In negotiated procurements both price and other factors (technical management) are to be evaluated in determining who wins.

A number of important issues relate to the writing of the RFP. One of the first to arise is to determine who should be involved in writing it. Esposito (1973, p. 10) and Skolnick (1969, p. 74) argue for writing of the RFP and retention of the source selection process by the staff people who are most closely concerned with the specific aspects of the program and its management.

The basis for competition among bidders must be determined. Peck and Scherer (1962, pp. 343-355) discuss design competition and the management competition as two ends of a scale for the technical evaluation. In design competition bidders are evaluated on the basis of the specific designs which they propose for the system. In management competition the evaluation is based upon the approach the bidder intends to use in dealing with various tasks to be accomplished in developing the system and the capability of the proposed

⁶Lenk (1977) reviews some of the variations on these two basic types of contracts, such as those utilizing various incentive schemes.

team (Peck & Scherer, 1962, pp. 343, 354, 362, 367). Helman and Taylor (1976, p. 88) indicate that often bidder's management capability is not adequately covered during proposal evaluation.

The level of detail of advance system design work provided in the RFP must also be determined. If the government has the time and resources, it may wish to develop a detailed design in advance of issuing an RFP and require bids on developing the system based upon this design. If time and resources do not allow this, the government may require bids against a set of performance specifications (Hall, 1975, p. 98). Esposito (1973, p. 12) indicates that a key problem in providing information on requirements is to reflect and deal effectively with the varying levels of uncertainty. He argues for separating the knowns from the unknowns by doing a good job of defining the knowns and by identifying the unknowns and a management approach for dealing with them.

A format for the bidders' responses must be determined. Decisions are required on both the outline and the allowable length for proposals. Frequently the outline is arranged in a manner which does not mesh with the other elements of the RFP (i.e., the statement of work, the evaluation criteria, the work breakdown). The result is wasted time and poor proposals (Morris, 1973, p. 23). Morris (1973,

p. 24) advocates using an outline which would allow proposals to be so uniform that they could be evaluated almost on a paragraph-by-paragraph basis. Many people also advocate limiting the allowable length of proposals. Claims in favor of this are that proposals can be evaluated using fewer government resources (Fox, 1974, p. 266; Skolnick, 1969, p. 82), and that bidders are forced to concentrate on the most important issues (Fox, 1974, p. 266). Logan (1962, p. 32) mentions the problem of brochuremanship or "gold plating" of proposals, where contractors hope to make up for weakness through volume and fancy art work. He indicates that this tends to prejudice the evaluator who has to "sift through the chaff in order to find the wheat" (Logan, 1966, p. 32). An alternate view of this problem is that bidders resort to brochuremanship or "gold plating" because they cannot tell from the RFP what information the government will use in its evaluation. In order to be safe they try to provide information on every issue they think might arise during the evaluation panel's deliberations (Thompson, 1978a).

Another issue which is closely related to this is to decide what information to place in the RFP about the proposal evaluation process. An argument for complete information on the process is that bidders will submit more responsive proposals which will take less time to evaluate (Hostler,

1973, p 13; Keeling, 1975, p. 125; Morris, 1973, pp. 21-22). A counter argument which the author has heard, but has not noticed in the literature, is that telling the bidders the criteria for evaluation will enable them to tell you only what they think you want to hear, thereby not giving you a basis for discriminating among them.

A final issue on RFP preparation is to determine how much information to furnish to prospective bidders. Steward (1973) argues for limiting the size of RFPs. His claim is that it forces better writing, creates fewer errors of inconsistency, can be read and understood at the corporate officer level, and that it limits the amount of information submitted in response (Stewart, 1973, p. 14). Another approach is to try to furnish anything which may help to minimize misunderstandings (Thompson, 1978). This includes presentations and question and answer sessions at bidders briefings.

II.3.6.2 Proposal preparation. During the proposal preparation phase a prospective bidder must determine whether to bid and if they decide to bid, they must determine what approach to take in writing their proposal (Goldberg, 1977, p. 257). Since the government assumes the cost of evaluation of proposals and most of the cost of preparation of proposals (through reimbursable overhead on other contracts), it may be interested in a process which allows firms to

self select effectively on bidding (Bailey, 1964, p. 16; Roberts, 1964, p. 76).

Several criteria are discussed as being important for a prospective bidder to consider in determining whether to bid. They relate to market strategy and whether the firm thinks it has a good chance of winning. The firm's decision on bidding may be influenced by desire to develop or maintain a reputation in the line of work required by the RFP and by factors of availability of company resources (Peck & Scherer, 1962). If bidding is consistent with the company's market strategy, they may next assess their chances of winning the contract. They will want to assess their market intelligence to determine whether the contract is "wired" (i.e., whether the government has established a sole source position on the award) (Fox, 1974, p. 296), whether they have a positive image with the program personnel (Fox, 1974, p. 296; Roberts, 1964, p. 75), and whether the actual objectives of these personnel differ from what is said in the RFP (Fox, 1974, p. 296). Bidders may also consider the resources available to them for bidding (i.e., time of specific people and money) and whether they feel that they can successfully demonstrate their capability with the resources that they are able to apply (Goldberg, 1977, p. 257).

If a firm decides to bid, it may decide to choose one of two major strategies. One is to try to submit the lowest bid while being at least satisfactory on all other aspects of the proposal. The other is to try to submit the superior proposal and to have a cost in the competitive range (Fox, 1974, p. 296).

II.3.6.3 Proposal evaluation panel meets. The role of the proposal evaluation panel is to assess the degree to which each proposal is potentially technically acceptable on each of the evaluation criteria. Some of the key issues for this part of the source selection process are recruiting and preparing the panel, dealing with the large amount of information which must be processed in order to assess success, determining a scale for use in evaluating proposals, deciding what information is admissible for evaluation purposes, establishing a process for obtaining a group evaluation, and having a method for dealing with missing information.

When recruiting an evaluation panel, it may be useful to obtain at least one person who is qualified to represent each important aspect of the system. Both technical experts and program participants are important (Bureau of Naval Weapons, 1965, pp. 8-9).⁷ Carnes (1976) and Logan (1966)

⁷Roberts (1964, p. 74) indicates that in some cases, the technical initiator may select the panel with the objective of getting participants who will favor his preferred bidder.

indicate that it is frequently quite difficult to obtain participation of experts on evaluation panels. The time required for preparation and participation may prevent experts from taking part.

Panel members are often responsible for sorting through vast amounts of information which is present in proposals in order to arrive at an estimate of the probability that each bidder will perform effectively. In working with large amounts of information people are constrained by limits on their ability to process it (Miller, 1956; Weaver, 1949). The proposal evaluation process will generally have some method for chunking information and then integrating scores.

A form of rating scale must also be determined. Dycus (1977, pp. 257-258) identifies five general categories of rating scale as numeric, adjective-numeric (e.g., 1-10 scale with qualitative adjective for each score), check off (e.g., acceptable/unacceptable), adjective (e.g., color codes), and relative rank (i.e., ordering from best to poorest). After comparing them for various scale effects, he suggests that "the best approach might be a rating scale that asks the evaluators to consciously make both absolute and relative evaluative judgments" (Dycus, 1977, p. 264).

The issue of admissible evidence is primarily one of how to deal with bias where the members of the panel know

more about some bidders than others. Roberts (1964) points out that the lack of bias in proposal evaluation is impossible and probably undesirable. He indicates that technical "facts" are subject to dispute by experts and that appraisals are based upon judgments, technical prejudices, and other subjective factors (Roberts, 1964, p. 74). The issue of bias is how to recognize it and incorporate it into the evaluation so that it is not used selectively for or against only certain specific bidders. This is an especially difficult problem when it comes to incorporating information about a bidder's past performance into the evaluation. Nassr (1978) indicates that DOD has tended to place insufficient emphasis on doing this. Richardson (1977) quotes an Army General as saying "the concept [use of past performance in evaluation] is unbelievably difficult to implement and there does not appear to be any ready formal solution" (Richardson, 1977, p. 425). Keeling (1975, p. 130) reports that the methods which have been tried for doing this have been based on historical data and an assumption that contractors are monolithic. He argues for analyzing past performance based upon the track records and the proposed extent of involvement of the specific personnel on the company's proposed project team.

The evaluation panel meetings are a group decision-making process and as such require some type of process

for determining how scores are assigned. Voting, reaching consensus, and leaving the decision to the chairman are three possibilities. Since this is a group decision-making process, issues of how the ground rules affect motivation and effectiveness are relevant. Some important issues may include whether:

- o the group members feel confident that the results of their evaluation will be used in the final decisions (Bradford, Stock, & Horwitz, 1953);
- o there is a process for dealing with strong individual disagreements (Bradford, Stock & Horwitz, 1953);
- o lower status individuals who feel that their opinions are better than higher status individuals are able to express themselves and prevail (Torrance, 1957, pp. 314-318);
- o the group is able to resist undue influence by dominant personality types (Dalkey & Helmer, 1963; Roberts, 1964); and
- o implied threat of sanctions from more knowledgeable members is controlled (Dalkey & Helmer, 1963).

A final aspect of the evaluation panel process is determining how to deal with missing information. In some instances the panel will not understand an approach being proposed by a bidder. This may be due to lack of information provided in the proposal (Carnes, 1976, p. 7). If the panel has no way of obtaining this missing information, it may result in the bidder receiving a lower evaluation than is warranted (Fox, 1974, p. 273). Carnes (1976, p.

7) describes how incorrect scoring of initial proposals occurs when the only form of communication is through a deficiency reporting process.

II.3.6.4 Summary, review and award. After the panel has completed its evaluation, the results of the process are summarized in written form and submitted to the contracting office for review, clarification and negotiation. The summary is generally done by the chairman of the evaluation panel (often the Contracting Officer's Technical Representative) who also recommends those bidders who may be technically qualified for the contract after clarification and negotiation. Often the program will have a person or group of people above the level of the panel chairman who review his report and recommendations before they go to the contracting office. The technical evaluation is then reviewed together with an analysis of the cost proposals. Clarifications are obtained from bidders if necessary. The clarification process may result in some bidders being excluded from the remaining competition. The contracting office negotiates with the remaining bidders on technical considerations, price considerations, and provisions for future changes. The contracting officer, after consulting with technical people, makes a determination of the offer which is most favorable and signs a contract. The signing is often fol-

lowed by requests for debriefing and occasionally protests of the award by unsuccessful bidders.

Determination of the competitive range is largely within the discretion of the contracting officer. He is not bound by the recommendations of the evaluation panel (Schnitzer, 1973). The relevant statute (10 U.S.C. 2304(g)) requires that "an offeror is held to be in the competitive range if his proposal can be improved reasonably to the point where it becomes the most acceptable." In practice this is often a difficult determination to make. Scores of competing contractors are often very close. The large number of items evaluated often levels out the overall rating (Blue Ribbon Defense Panel, 1970). In other cases a bidder's overriding superiority in a particular area may saturate the evaluation, even though the bidder is weak in other areas of the proposal (Skolnick, 1969, p. 75). The numerical scores may obscure some of the more important issues (Blue Ribbon Defense Panel, 1970). Schnitzer (1973, p. 17) stresses that competitive range should be decided on the basis of the array of scores received rather than an overall passing grade.

If there is a higher level review committee, it may disagree with the recommendations of the panel. In this case, the panel may be asked to revise their report until the senior group agrees with it (Carnes, 1976, pp. 27-30;

Roberts, 1960, p. 75). The discussions and wisdom of the panel are ignored.

Because of the uncertainty associated with information in the proposals, clarifications will often be required before a confident technical assessment can be completed. Representatives of firms in the competitive range are called in for discussions with technical and contracting office representatives. Technical leveling is a problem which often arises here. The technical people may wish to get all firms to incorporate approaches which they found favor with in the proposals of other firms. When firms are willing to modify their proposals to comply, there is little basis for discriminating among proposals on technical grounds (Babione, 1978; Carnes, 1976, pp. 30-31; Hall, 1975, p. 89; Schnitzer, 1973, p. 27).

If there is no basis for technical discrimination, the result is a price competition (Carnes, 1976, p. 2; Fox, 1974, pp. 251, 277, 470; Keeling, 1975, p. 127; Richardson, 1977, p. 423). In effect this turns a negotiated procurement into an advertised procurement. Award is generally made to the low bidder, since there is a requirement to justify the choice of any other bidder on technical grounds (Fox, 1974, pp. 251, 277). This encourages "buy-ins," pricing the bid low in order to get the contract and then requesting price or performance modifications when it is clear

that the promised system cannot be produced at that price (Keeling, 1975, p. 127; Logan, 1966). The contractor may use various techniques to come up with a lower cost, including overstating his future business base to obtain a lower overhead rate (Keeling, 1975, p. 127) and using less costly personnel than required to do the work.

Often after the contract is signed unsuccessful bidders will request debriefings to discover where they were considered weak. Buying agencies sometimes have trouble explaining the basis for their evaluation (Peck & Scherer, 1962, p. 372). If bidders feel that they were evaluated unfairly, they may file a protest of the award with the General Accounting Office. A successful protest may result if the government did not follow its stated evaluation procedure, i.e., it based the award on criteria other than what were listed in the RFP or if systematic bias entered into the evaluation process. Even if a formal protest is not filed, a bidder who feels that he was treated unfairly may be reluctant to bid on future work by the government agency.

II.3.7 Summary of Systems Procurement Background

This section has reviewed the concept of system and some of the literature related to the acquisition of systems. Emphasis has been placed on describing the issues related to system source selection which are raised in the literature. The next section describes the history and

characteristics of the Parametric Factor Evaluation source selection process.

II.4 Parametric Factor Evaluation⁸

II.4.1 History

The Parametric Factor Evaluation (PFE) process for source selection was developed in the mid-1950s during the early days of the weapons system management concept (Livingston, 1959; Thompson, 1976a, pp. 169-170). It was used by the Electronic Reconnaissance Section, Aerial Reconnaissance Laboratory, at Wright Field in the procurement of two electronic reconnaissance subsystems and one weather reconnaissance subsystem (Thompson, 1976a, p. 170). The process was developed by Charles Thompson to meet several specific problems in trying to procure these subsystems.

First, the requirements (or specifications) were constantly changing because of the need to respond to new developments in radar (and other emitters). Second, few laboratory personnel had any significant prior experience in designing or procuring systems. And, finally, equipment suppliers had little relevant experience (except, in some cases, as subcontractors to systems contractors)(Thompson, 1976a, p. 170).

⁸The reader who is interested in a more detailed description of the Parametric Factor Evaluation process will wish to read Thompson's (1976a) description which is reproduced in the appendix. The article was drawn upon for this section.

The existing published information on the process is contained in three documents (Thompson, 1976, 1976a; U. S. Air Force, 1964).

II.4.2 Claims

Thompson has made claims for the circumstances under which PFE will and will not be useful and for what it will accomplish. He has indicated that the process is applicable to large and complex systems (hardware or software) where the following criteria are met:

- a) that there is a degree of uncertainty or complexity in the item to be procured which makes it difficult to describe the item to bidders and to identify a suitable basis for evaluating bidders' proposals, using available procurement methods;
- b) that there are limits on time, money, or personnel which preclude considering other alternatives; and
- c) that there is some basis in prior experience for believing that it is critical to both the procuring agency and the (successful) bidder to develop a reasonably sound initial mutual understanding in order to ensure a progressive and successful mutual accomplishment of the object of the procurement (Thompson, 1976a, p. 179).

He has indicated that the process would probably be inapplicable to

procurements in which there is a single (or small number of) critical basis(es) for evaluation, e.g., procurements for well-defined products or services where the basis is price, and research procurements where the basis is a particular technical approach or capability (p. 178).

He claims that in general

there would appear to be no need for this procurement process where the prior experience of the procuring agency (and the set of prospective suppliers) has provided a basis for successful procurement and especially where there are comparable previous procurements (p. 178).

In addition he lists other procurement situations in which alternative methods are being used. These include:

- a) where the procuring agency has the time and resources to carry out the preliminary design phase (or even further stages) and prepare detailed specifications;
- b) where the procuring agency has the money (and time) to let parallel (competitive) contracts for the preliminary design (or concept) phase;
- c) where the procuring agency has the time (and money) to let a "sole source" contract for the preliminary design phase, with the flexibility to drop the program or to start over if the first effort was unsuccessful;
- d) where one or more prospective suppliers are willing and able to carry out the preliminary design phase (or even further phases) prior to action by the procuring agency;
- e) where the item to be procured can be "decomposed" from technical and scheduling interfaces through the use of standards, and the like, or where there are acceptable alternatives available (Thompson, 1976a, p. 178).

II.4.3 Characteristics

This sub-section describes, in summary form, the activities required to use PFE and the characteristics which

make it similar or dissimilar to other source selection processes.

The activities required to use PFE are listed below. They are approximately in the order in which they occur in time.

- 1) Assess whether PFE is appropriate for the proposed procurement. Is it appropriate in terms of the characteristics of the thing to be procured, the procuring agency, and the set of potential bidders?
- 2) Review what is known about the procurement to identify the conditions which help to define what it is you are going to procure.
- 3) Refine this information into a series of statements describing the characteristics of a prospective bidder/contractor which you believe critical to the program's success. This should result in 20-70 individual statements, called sub-factors, written to minimize gaps and overlaps. Additional specific illustrative questions can be added for clarity.
- 4) Group the sub-factors into 5-15 major areas of concern called factors. These are administrative groupings selected to reflect related problems and related interests and skills of people who will serve on the evaluation panel.
- 5) Prepare the "Statement of Work" and "Schedule" specifying the output of the project according to the format provided by the factor structure.
- 6) Prepare the "Scope of Effort" document following the same format to provide a framework for the bidder to present his estimate of how he will allocate manpower and dollars to various parts of the program.

- 7) Gather copies of supporting documents to provide bidders with any information which might be helpful in preparing proposals. This step can occur at other stages, as long as this material is available to bidders when the RFP is released.
- 8) Prepare the "Proposal Preparation Procedure" to explain the reason for using the PFE process, the format for response, and how the proposals will be evaluated.
- 9) Combine all of the documents with the formal parts of the RFP to assemble the entire package.
- 10) Brief the bidders by making presentations on the purposes of the project and use of the PFE technique. Encourage questions from those present. If PFE is a departure from past practice, it is desirable to hold two briefings. One to allow bidders to decide whether or not to bid. The second primarily to answer questions.
- 11) Prepare the "Proposal Evaluation Procedure" to provide detailed guidelines for members of the evaluation panel.
- 12) Select members of the evaluation panel from those concerned directly with the success of the program and from individuals whose background and skills are necessary for the evaluation of particular factors. It is desirable for as many panel members as possible to participate in developing the list of sub-factors. Early selection is recommended.
- 13) Panel members prepare for the evaluation by familiarizing themselves with the entire RFP including the supporting documentation. Panel members are invited to participate in briefing the prospective bidders.
- 14) Proposals are received and reviewed by panel members for preparation of initial ratings of bidders on the specific sub-factors to which they are assigned.

- 15) Bidders make a presentation on their proposals to the panel. Panel members are encouraged to question bidders.⁹
- 16) Factor teams meet to arrive at a single aggregate rating of each bidder. Teams arrive at ratings for each sub-factor based upon criteria of bidder's comprehension or understanding of the problem presented, approach described, and present or potential capability to perform. Panel members turn in signed rating forms before the discussion begins. The panel arrives at agreement in any manner it chooses, excluding voting. The panel rating forms are signed by all team members, with strong individual disagreements and specific comments for the negotiation process recorded on the form. All meetings are tape recorded.
- 17) Prepare a summary of all factor ratings for use in final review and negotiation.

Thompson (1976a) indicates the set of general and specific characteristics which when combined make the PFE process unique. The overall characteristics are:

- 1) The process is not applicable everywhere. It is designed to meet a particular kind of procurement problem.
- 2) The process is pragmatic in proposing that uncertainty be faced and not avoided. Bidders are told the degree of uncertainty in the program personnel's knowledge.
- 3) The process is open, explicit, and cooperative in exchanging information and preserving records.

⁹ETIP has substituted a written question and response mechanism for the oral presentation. Panel members who require clarifications prior to their individual ratings submit questions to the bidder through the contracting office.

The specific characteristics are:

- 1) The process neither assumes nor requires any formal structure for the object of the procurement. The sub-factors are treated as separate "probes," obtaining measures along a set of dimensions which describe the program.
- 2) The process uses a single framework for all of its documents, i.e., the factor structure.
- 3) No limitation is placed on length.
- 4) The evaluation team is formed from among those who have a prior interest in the subject of the procurement or who have special competence to evaluate particular sub-factors. Participation may be limited to individual sub-factors.
- 5) There are not restrictions on information which the evaluation panel may use.
- 6) Members of the evaluation team must rate each bidder affirmatively, i.e., have a basis for both low and high ratings. It cannot assign a "zero" but must obtain required information through a specific question.
- 7) The process of aggregating ratings is sequential with a summary hard-copy record retained at each stage. Ratings are aggregated from individual team member ratings of sub-factor to team ratings of sub-factors and from team ratings of sub-factors to team ratings of factors. The panel may use any process for doing this, excluding voting. Factor scores are then aggregated to an overall score using weighted sums.

The sub-factor rating approach is contrasted with other approaches. One approach is that which is used in the case where there may be a comparably high degree of uncertainty on the part of the procuring agency, but it may be able

to limit the evaluation to a "single" or small set of technical problems, together with an evaluation of the capability of the individuals who work on the project. This may often be the case in the procurement of research (Thompson, 1976a). The other extreme is where uncertainty is low and the evaluation may be based upon a single question. An example of this situation is production procurements to detailed specifications which are evaluated on the question of price, together with proof of the existence of the required production facilities (Thompson, 1976a).

II.4.4 Summary

This section has reviewed the PFE process in terms of its history, claims for where it is and is not useful, and characteristics for using it. This is intended as a brief summary of more comprehensive descriptions which are reproduced in the appendix.

II.5 Summary

The purpose of this chapter was to provide background on the general problem of procurement of evaluation systems and on the specific method which ETIP chose to procure its evaluation systems. The intention was to give the reader a basis for understanding the utility of this research in terms of problems that exist and in terms other research which has come before. It was also intended to provide sufficient information on the Parametric Factor Evaluation

process to enable the reader to understand the information presented in the case study.

As review, the starting point for this research is that:

- o the evaluation community is beginning to recognize the importance of the source selection process;
- o the systems procurement community has done much writing on problems with the source selection process and of guidelines for solving it. A number of case studies exist but they are of a summary nature.
- o The writing on PFE is limited to articles by Thompson. No evaluations of the use of the process exist.

The next chapter describes the objectives of the author in furthering this existing state of knowledge and provides a description of the methods used.

CHAPTER III
OBJECTIVES OF THE RESEARCH

III.1 Introduction

This chapter is intended to be a guide to the central purposes of the research. It describes what the author set out to accomplish and the approach taken in meeting these objectives. A discussion of the proposed value of this research and a disclosure of the biases of the author which might affect the outcome are also given.

III.2 Purpose of this Research

The primary purpose of this research is to provide a detailed case study of an experiment in the selection of contractors to design and develop systems. Specifically, it is an evaluation of the use of the Parametric Factor Evaluation approach by the Experimental Technology Incentives Program to select contractors for the acquisition of two evaluation systems. These source selections occurred during the 1976 fiscal year.

The case study is based upon:

- o background on the PFE process from both historical documents and personal communications with its primary developer;

- o participation in the process at ETIP by the author and direct access to records of the source selection of the two contractors; and
- o interview and questionnaire information from other participants in the source selection.

The author's intention is to provide a full description, with data from the process, of ETIP's use of the PFE process and to evaluate how successful the process was in solving some of the important problems which existed. It is hoped that this will help those with similar problems to assess whether the technique is applicable to their own situation.

The selective sampling of the literature on source selection and procurement, partially reviewed in the last chapter, revealed an absence of detailed case studies. The closest similar case material found is in the form of summary recollections of the author without specific data from the process (Carnes, 1976). Most of the literature appears to be in the form of prescriptive guidelines following discussions of problems with the source selection process or problems in the work of the resulting contractors. That literature which is centered on "how to" often provides only the most general guidance for the potential user. There is little offered in the form of detailed procedures to relate these guidelines to the complexity of an actual procurement.

This research is, in part, an attempt to begin to fill in some of the gaps in the source selection literature.

It is intended to be a relatively full, self-conscious reconstruction of the PFE process as it was used by ETIP, presented together with the actual data from the evaluation. This is followed by an evaluation of how well the process controlled for some of the key problems which ETIP faced in the procurement.

III.3 Format Followed in the Case Study

The case study is accomplished largely in the next two chapters, with the final chapter used to discuss the relationship of the process to issues of broader significance than the ETIP procurements.

Chapter IV is a relatively full description of ETIP's application of the PFE technique to the selection of contractors for the acquisition of the two evaluation systems. Information is presented on background leading up to the writing of the RFP, the roles, extent, and timing of involvement of various people in the process, and issues which arose at various stages of the process. Both anecdotes and samples of data from the proposal evaluation process are given in the text. All of the initial and final ratings from the evaluation are provided in the appendix.

The process followed in writing Chapter IV was to draw upon various sources of information, including:

- o the author's recollections;
- o the formal records of the process (including tapes of the evaluation panel meetings and transcripts of the bidders' briefings);
- o notes from the files of the Contracting Officer's Technical Representative (COTR) and the author; and
- o interviews with the COTR and with the author of the RFP;

to write a draft chronology of the process. This chronology was then given to the COTR and to the author of the RFP to validate the statements made, to obtain additional cross validation of events which occurred and issues which arose, and to obtain additional information to fill in holes in the chronology. Later interviews with other participants were also used to obtain additional information on undocumented events. The emphasis in the chronology is to describe the process in a manner which would readily answer some of the basic questions which a practitioner might have. These would include:

- o What was ETIP trying to do?
- o What did ETIP actually do?

Chapter V is outcome-oriented. It presents an evaluation of how well the PFE process worked in solving many of the critical issues faced by ETIP which were raised by participants or are raised by the literature on source selection. Actual data from the process is used in assessing PFE's performance against each of the issues evaluated.

Where external standards exist in the literature or were raised by participants, they are compared to ETIP's experience. For issues where the author did not consider himself an acceptable source of information, either through lack of access to the required information or through his bias, additional information was solicited from other participants through questionnaires and interviews.

The chapter presents a list of issues which were considered for the evaluation. A sub-set of these issues was selected for thorough consideration. The choice was based on judgments of both the importance of the issue and the availability of information for evaluation of the issue. Next, the set of parameters, the factors which may affect the interpretation of the results, is presented. The potential impact of each one is described. Each selected issue is then evaluated. The issue is described, a conclusion about ETIP's experience in using PFE to deal with the issue is reached, and the data supporting this conclusion are presented. After all of the issues are evaluated individually, the results of using the process are summarized in terms of successes, failures, and issues where the results are uncertain.

The issues in Chapter V against which PFE is evaluated are those which relate solely to the source selection part of the system acquisition process and not to the outcome

of the projects for which contractors were selected. An evaluation of how accurately PFE predicted the performance of the successful bidders would have been a useful addition to this research. Unfortunately, time series evaluations, by the government, of the contractor's performance, were not collected and the author decided not to attempt to do a post hoc reconstruction of this. However, there are some comments in Chapter VI related to subsequent performance.

Chapter VI is a presentation of implications of ETIP's use of PFE and the results of this case study in terms of subsequent events, potential further applications of PFE, and potential future research. Subsequent events include a brief review of results of the two evaluation system acquisitions and a brief description of ETIP's later uses of PFE for other source selections. Potential further applications of PFE for both source selection and other problems are speculated upon. Finally, some suggestions are made for possible related research on topics beyond the scope of this case study.

III.4 Value of this Research

This project was undertaken at the request of the former Director of ETIP. After the two contracts for the evaluation systems had been signed, he asked the COTR to evaluate how well the process worked. At that time the author, an employee of the COTR, was trying to find a suitable dis-

sertation topic. An evaluation of the PFE technique seemed as though it might meet the requirements for a dissertation and at the same time satisfy ETIP's desire to evaluate how well the process worked. ETIP has recently been going through a reorientation and the acquisition of evaluation systems will probably not be an objective of the new organization. It is therefore useful to explore the value of this project for both the researcher and for those interested in acquiring evaluation systems. A claim and counter-claim will be used to try to illustrate the value for both audiences.

III.4.1 Research Value

The claim for researchers was made by Donald Campbell and Julian Stanley in their classic survey of designs for research (Campbell & Stanley, 1966). In their discussion of the one-shot case study, the method used in this research, they state that:

such studies have such a total absence of control as to be of almost no scientific value (Campbell & Stanley, 1966, p. 6).

They further state that:

It seems well-nigh unethical at the present time to allow, as theses or dissertations in education, case studies of this nature (i.e., involving a single group observed at one time only)(Campbell & Stanley, 1966, p. 7).

Finally they propose that:

The many uncontrolled sources of difference between a present case study and potential future ones which might be compared with it are so numerous as to make justification in terms of providing a bench mark for future studies also hopeless (Campbell & Stanley, 1966, p. 7).

The counter-claim for this research is that it will lead to judgments about the effectiveness of the technique being tested and that it will serve as a bench mark for those interested in improving upon and evaluating PFE. It will also set a bench mark for those interested in evaluation of source selection techniques.

This research is the first evaluation of an application of the PFE technique. Though PFE was developed and used several times by the Air Force in the 1950's, there is no published evaluation of its effectiveness. Also this was the first application of the technique in a very different setting. In addition, to the author's knowledge, no careful, well defined, evaluation of any system source selection technique exists. The existing literature on source selection describes many of the issues which are important; it examines problems which have occurred in past procurement. The literature serves as a departure point to enable the author to specify these issues and use them to structure an evaluation for system source selection techniques. This case study evaluation sets up a standard for comparative evaluations of other techniques. Both the issues selected and the method for evaluation may be improved upon.

When little or no information exists on a topic as broad as the one considered here, the traditional "controls" applied to a priori proposition testing are inapplicable. A good description and understanding of how the process works are important first steps for later more controlled research. The investigative method used in this research is felt to provide a scientific basis and point of comparison for future research on source selection procedures.

III.4.2 Administrative Value

The claim for those interested in acquiring evaluation systems was made by one of the bidders from ETIP's source selection during an interview for this evaluation. His claim was that, as a taxpayer, this research is "far too expensive" and the results "too insignificant" to justify it. The reasons he gave for his claim were related to his beliefs about how "policy change" gets made in Washington. He indicated that he felt that in an emergency, such as a war, people would move things rapidly in the direction of improving source selection. He indicated that whatever the results of this study, a thoughtful, reflective committee behind a powerful mover could have implemented it at considerably less cost and in greatly reduced time.

The counter-claim comes from the apparent differences between the author's beliefs and the bidder's beliefs about how change is caused in government. The author believes

that high level directives alone will not lead to meaningful change. It is primarily the bureaucrats, those people who survive changes in administrations and who are responsible for translating vague policy directives into specific procedures, who are the real movers in government. The author has experienced and observed how directives from the top get permanently delayed in red tape because those responsible for implementing the directives oppose them. This is not to say that support from the top is unimportant; however, the author believes that the key to change, at least in civilian agencies, is the user, the person who has to live with the change. Change occurs when a person has a problem, pressure to solve it, and a solution in which he has confidence.

The literatures on evaluation, systems and source selection clearly indicate that there are problems. These problems become specific to users, i.e., government project managers, contracting officers, and other government technical personnel when they are trying to acquire specific systems.

The pressure to solve these problems is not quite as obvious, particularly where evaluations are concerned. There is unlikely to be an emergency which would impact this type of work. The most direct pressure seems to have come from Congress, the Office of Management and Budget,

and the intended users of the systems. In some cases it comes from a high level administrator and in other instances from the independent desire of the users of source selection methods to do better.

The intent and thus value of this research is to increase awareness and, through a credible evaluation, modify confidence in a potential solution to source selection problems. Increased awareness is provided by the description of the process, its history, and the types of problems for which it might be applicable (Section II.4), and the full description of how it was implemented at ETIP (Chapter IV). The evaluation of how well ETIP was able to deal with the key issues of source selection by using the PFE process (Chapter V) is intended to enable a user to judge how confident he is that the process will be useful for solving his own source selection problems.

The author agrees with the bidder that this research alone will probably not convince anyone. The type of confidence required to use a technique such as this comes from either or both trust in the people advocating the approach (ETIP's reason) or the ability to verify independently for oneself that it solves the problems one has. The goal here is to provide the ability to verify whether the process works. Clearly, it is not a totally independent verification since the reader is dependent on the author's reconstruction and interpretation. However, a great deal of

raw data from the process is provided to enable the reader to reach his own conclusions on where the process did and did not work. This research is offered as a departure point for those who may consider using or improving upon the PFE process.

III.5 Biases of the Author

When examining the case study, the reader may find it helpful to keep the biases of the author in mind. These certainly have had some effect on the presentation of the problems, the emphases in the description of events, and the evaluation of results. This section is presented as an attempt to disclose the author's self-conscious biases.

The author is not an expert in procurement, though he has done some examination of the literature and talked with those involved in the process (i.e., contracting officers, project managers, and contractors). Procurement is not an area in which he claims special expertise. He has no background in contract law, and only a modest background in procurement policies and the practice of procurement.

The author does claim special knowledge in what occurred in the specific procurements under examination here. Working on these procurements was the author's first assignment when he arrived at ETIP in March 1976. He was involved

in recruiting members for the evaluation panel, scheduling of meetings, evaluating proposals, and assisting in the oral and written clarification process. He has participated in the use of the PFE process twice subsequently and had an active role in writing portions of the RFPs. He does not have personal experience with any other procurement techniques, though he has discussed with others their experiences.

Finally, and possibly most significantly, the PFE process was primarily developed by the author's dissertation advisor. Aside from the obvious potential bias caused by wanting to pass, there is the additional factor that the author's advisor has greatly shaped his values about what the important problems of contracting are and how to solve these problems. This has been a non-trivial influence.

This disclosure is intended as a caveat to the reader. The author has attempted to compensate for these biases by several methods. Raw data from the evaluation process are provided in both Chapter IV and in the Appendix. The reader is encouraged to examine it and to do his own independent analyses. Extensive use is made of reference notes in Chapter IV to indicate sources other than the author's own notes and recollections. Where available, cross references are used. Additional data collected from panel members and bidders is used in Chapter V in the evaluation of some of the issues. Where the author felt that he might

not be a credible source of evaluation information, he sought additional data through questionnaires given to other participants in the process.

III.6 Summary

This chapter has presented a guide to the objectives of this dissertation. It has described what the objectives are and the process being followed to achieve them. The claimed value of this research has been presented and the biases of the author, which are parameters to interpretation of results, have been disclosed.

Chapter IV is intended to describe how ETIP used PFE to try to solve its procurement problem. It presents much of the factual context for the evaluation portion of the case study which follows in Chapter V. If the reader has not done so already, it might be useful before proceeding, to glance at the sections of the appendix which contains copies of the RFP and of Thompson's (1976a) paper describing the PFE process. This will provide a useful context for the Chronology.

CHAPTER IV

CHRONOLOGY

IV.1 Introduction

This chapter describes how Parametric Factor Evaluation (PFE) was actually used at ETIP in 1975 - 1976 to procure the two evaluation systems contracts. The description is based on:

- o background on the PFE process available in the form of historical documents and descriptions by the primary developer;
- o the author's observations during his participation in ETIP's use of PFE and access to both the formal records of the process and the informal notes of some key ETIP participants; and
- o interviews with some key participants, including bidders and members of the evaluation panel.

The author's involvement in the procurement began two weeks prior to the second bidder's briefing (March 8, 1976), during the selection of the proposal evaluation panel. Sources for information on events prior to this date are the records and recollections of others. The author did not decide to use this problem as the topic for a dissertation until about two months after the contracts were signed. Therefore, no special effort had been made to set up a contemporaneous data collection scheme. Fortunately, the Con-

tracting Officer's Technical Representative (COTR) kept extensive files including his notes of meetings and phone conversations, and copies of drafts of various documents. These were used together with interviews and the author's own recollections in order to reconstruct the process. An attempt is made to note each source used in this reconstruction. Where the information was furnished recently through the recollection of a participant, as opposed to from the records, the reader will note a 1979 or 1980 research note. Any statements which are made without citations are the recollections of the author.

The organization of this chapter is, for the most part, chronological. It traces the procurements from the decision to contract for evaluations through to the signing of contracts and the debriefing of one of the unsuccessful bidders. For each section of the chapter information is provided on the decisions which were being made, the people involved, and the actual time frames in which events occurred. Issues which were raised during the process by participants, actions which were taken, and problems which were encountered are presented. The emphasis is necessarily the author's. Some details of the NBS project plan approval process which did not seem central to the problem have been omitted.

Several figures have been included to illustrate how the evaluation teams actually displayed the ratings of bidders during their meetings. A complete set of ratings from the process are provided in the appendix.

Figure IV.1 is provided as a reference point. It illustrates the relationship in time among the various overlapping activities which occurred over the course of the procurement. It also identifies the people or groups of people who were involved in these different activities. The figure has been reduced to one page to provide the total time perspective at one glance. A reproduction on a more legible scale is provided on two pages in the appendix.

This chapter does not contain a step by step guide on how to accomplish source selection by using Parametric Factor Evaluation. Nor does it contain explicit descriptions of the various documents which are included in an RFP using PFE. Such descriptions have been presented by Thompson (1976a) in a paper which is reproduced in the appendix. A summary of the process appears in section II.4 of this document.

IV.2 Decision to Contract for Evaluation Systems

The decision to contract for and develop evaluation systems was somewhat diffuse. It occurred over a period of about a year and a half and involved the input and deci-

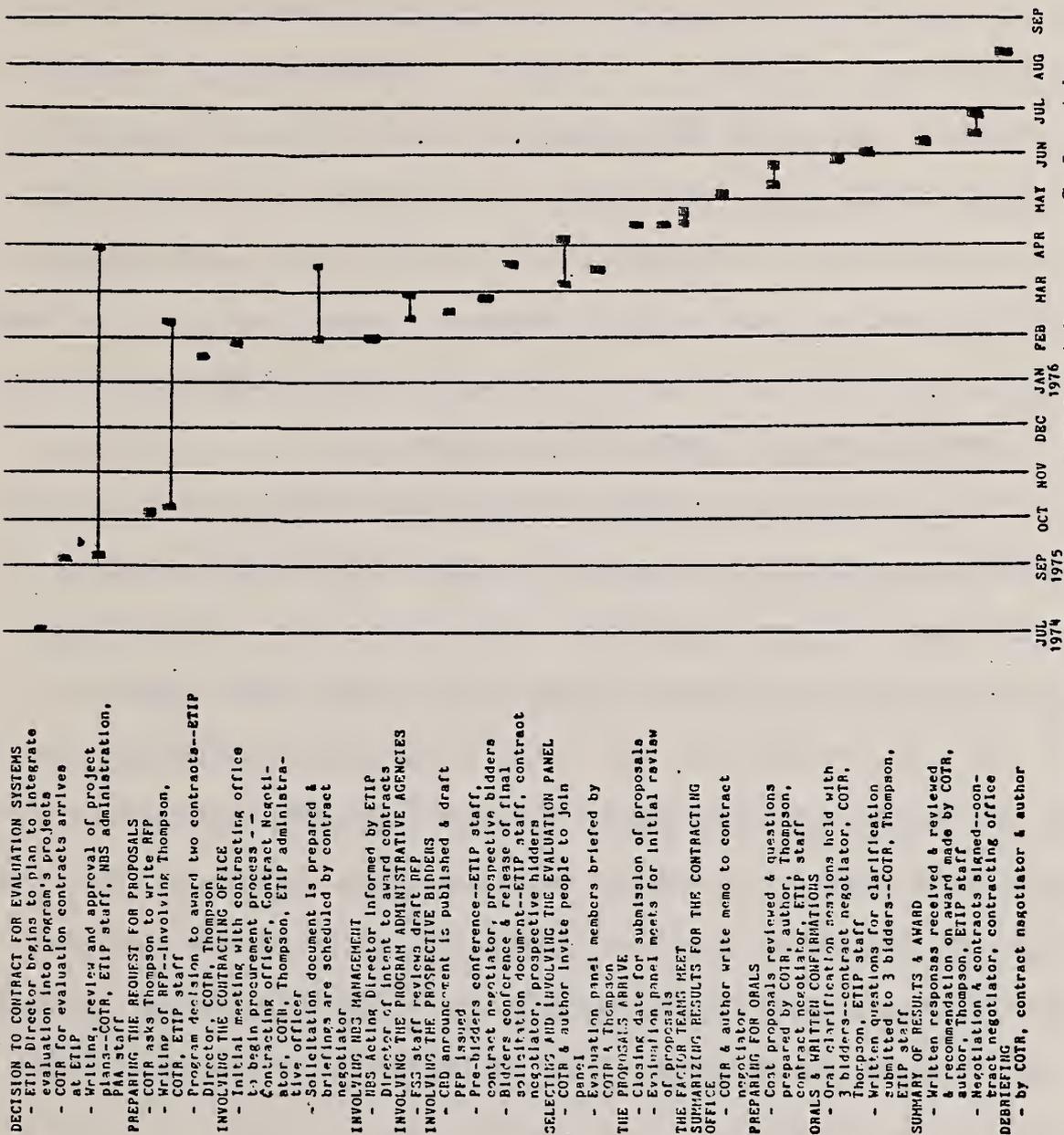


Figure IV.1 The Activities in ETIP's Source Selection

sions of several people. It originated in 1974 out of a desire by the director of ETIP for more explicit integration of evaluations into the programs' activities (ETIP Director, Note 1).

The major part of the program effort to develop an evaluation capability began in early September of 1975 with the arrival at ETIP of the person who became the Contracting Officer's Technical Representative for the two evaluation systems contracts.¹ The COTR was brought into ETIP on an Intergovernmental Personnel Act appointment. He was to provide evaluations of the program's experiments which would produce information for use in an overall ETIP program review scheduled for 1980 (COTR, Note 2).

The Director of ETIP decided that money would be obligated to contract for evaluation services (COTR, Note 3). Since the COTR had no staff, there was never any serious consideration of doing the work in-house (COTR, Note 4).

It was evident to the COTR that if the program were to continue to exist beyond its 1980 program review it would need some type of on-going capability to evaluate its future experiments, as well as its past and current experiments. He wished to develop an evaluation capability based on general evaluation designs which would build upon experience

¹This person will be referred to as the COTR throughout this document.

and not require having to start over by developing designs, data collection plans, and data analysis plans for each new experiment. He also wanted those capabilities to be developed within the government as opposed to having to depend largely on one or more contractors over an extended period of time for evaluation expertise. In order to do this he realized that he needed contractors who were capable of working with ETIP over a period of time to design, develop and transfer such an evaluation capability (COTR, Note 5, Note 6).

The use of the term system and the incorporation of other system concepts did not become part of the projects until work on preparing the RFP began (COTR, Note 7). In this earlier period of the development of the project the objectives were described in terms of developing designs, capabilities, and doing specific experiments (COTR, Note 8). These were all incorporated into what were later described as the systems.

Records indicate that the COTR started writing a plan for a project to evaluate the commercial impacts of ETIP's procurement policy experiments as soon as he arrived at ETIP (COTR, Note 9). The administration of NBS required ETIP to prepare and submit, for its review and approval, a plan for each project which would result in the obligation of more than \$10,000. At this time in the history of the program the approval process for ETIP project plans was

quite extensive. Four people, ending with the Acting Director of NBS, were required to sign off on the plans and several others reviewed them before they were submitted to those who were required to sign.

The COTR used the requirement to prepare the project plan as a method for familiarizing himself with the problem area with which he would be dealing in his new job. He spent several months talking with other staff at both ETIP and at the Program Administrative Agencies (PAAs)² and reading existing program publications in order to determine potential topics and methods for evaluation. When he completed the first draft of his plan he circulated it to the ETIP staff and used their comments to revise it into a format which the ETIP reviewers thought would be more acceptable for the NBS review process. The completed commercial impact evaluation plan was then used as the basis for writing a plan to evaluate the agency impacts of the same experiments (COTR, Note 10). This entire process of writing, review, and approval lasted until March, 1976 (NBS Acting Director, Note 11).

²Program Administrative Agencies (PAAs) is the term ETIP used to refer to the organizations having responsibility and authority for decisions to introduce experimental interventions. In this case the Federal Supply Service (FSS), the Veterans' Administration, and state and local procurement agencies (or their consortia).

An important uncertainty which existed was whether the required capabilities existed in any contractor organizations (Thompson, 1976a). No one in ETIP was aware of any instances where the government had successfully procured a similar evaluation capability. This was particularly troublesome since contracts for single evaluations had such a poor track record (see section II.2) and few people in the evaluation industry appeared to have the system design and development experience which seemed necessary to provide for the systems aspects of the project. In addition there were problems of attracting bids by any firms which might have the required capabilities and then evaluating the proposals to determine the degree to which the capability or potential capability did, in fact, exist. The procurement process would have to address these problems.

IV.3 Preparing the Request for Proposals

The COTR wanted to develop a RFP in parallel with his project plans. However, he realized that he would be unable to do both effectively within a time frame he felt satisfied with (COTR, Note 12). In early October he asked Charles Thompson³ to write an RFP for a contract to evaluate the commercial impacts of the ETIP experiments with state and

³Thompson had been familiar with ETIP since the summer of 1974. He had been associated with the program as a special employee reporting to the Director since September, 1975, while remaining at Northwestern University.

local procurement organizations (COTR, Note 13). He wrote to Thompson and sent him some background materials from a prior unsuccessful attempt at awarding a similar contract (COTR, Note 14). Thompson's background in both evaluation and systems management was an indication to the COTR that he might be able to provide the help which was needed (COTR, Note 15).

At this time the COTR had not thought through the number or structure of the contracts which would be awarded when he received NBS authorization on the two project plans he was writing. He knew that at least one RFP was needed and that he could use that as a model for other RFPs (COTR, Note 16).

The COTR and Thompson first met to discuss the RFP on October 20, 1975. They began talking about some of the issues which would be important in the proposed procurement. Thompson felt it was important that the RFP be successful in obtaining proposals and result in a contract award. Specifically, he was concerned that good companies would begin to turn down (not bid) or ignore ETIP work if the procurement process ended up rejecting all bids (COTR, Note 17). This concern was particularly salient since the prior RFP for evaluation of ETIP's procurement experiments had been cancelled that same year after the proposals had been evaluated.

Other items discussed during the October 20 meeting included:

- o how to provide for an information exchange through the procurement process which would be effective in satisfying the needs of both prospective bidders and the proposal evaluation panel. That is, the needs of prospective bidders to determine how to match his proposal with the requirements under the contract and the needs of the evaluation panel to be able to determine the bidder's understanding of the project and his capability to perform effectively;
- o how to assess the importance of the project to top management of a bidder's firm in order to be confident that the necessary resources will be devoted throughout the contract;
- o how to make ETIP's priorities clear in the RFP; and
- o how to determine whether a bidder will be able to meet the multiple objectives of various key people involved in the projects being evaluated (COTR, Note 18).

Thompson decided to use the Parametric Factor Evaluation approach (PFE) when he recognized the apparent similarities between the procurement of an evaluation capability which the COTR desired for ETIP and the procurement of the military hardware sub-systems, for which the technique was developed (Thompson, 1976a). He described, in a subsequent paper, three similarities which occurred to him in making this decision.

First, the evaluation requirements were not only constantly changing because of the on-going progress in the initiation and carrying-out of procurement experiments but also included a wide

variety of objectives ranging from very specific to very broad, and from intermediate to long-range. Second, ETIP had, with the exception of the writer [Thompson], little or no experience in systems procurement, and neither the time nor personnel to accomplish a problem or concept definition design. Finally, it did not appear that the "evaluation industry" had any significant present capability to design or manage an "evaluation system" to meet ETIP requirements (Thompson, 1976a).

The situation was one in which high mutual uncertainty existed between ETIP and its potential bidders. It was unclear what the specific nature of the final evaluation systems would be. Such basic issues as how many systems there would be and who would own them were still unresolved. It was also uncertain what specific steps would need to be taken in the development process. The nature of the situation seemed to suggest the need for a statement of work which would allow for the uncertainty rather than one which specified numerous details (COTR, Note 19).

For ETIP a flexible statement of work presented risks that the contract would not result in the desired systems. Therefore, it was important to be able to determine the degree to which it was within each bidder's interest as well as their capability to develop the systems. The RFP would have to provide the structure for making these assessments.

Thompson's role was to work with the COTR in developing the concepts of what ETIP would be procuring and to write

the RFP based on this. It was Thompson who introduced the concept of evaluation systems as the method for procuring the on-going evaluation capability which the COTR desired (Thompson, Note 20; & COTR, Note 21). Thompson's role also included participation in the evaluation and advising the COTR on all other aspects of using the PFE process.

The COTR and Thompson met for a second time on November 3 and 4 to further discuss issues of concern related to the RFP and the eventual contracts. These meetings served a mutual education purpose. Thompson learned the COTRs' and others' desires and concerns which he used in writing the sub-factors. He also worked to make the COTR aware of some of the important aspects of system procurement (COTR, Note 22).

On November 5, Thompson sent a letter to the COTR together with some key documents from the prior Air Force uses of the PFE process. The purpose of sending these documents was to begin to provide the COTR with perspective and background on the process and to build his confidence in the process by showing that it was not untested (Thompson, Note 23).

On November 17, Thompson met with the COTR and described a list of evaluation factors. There were two management factors and five technical factors. The management factors were:

- o management style of the contractor in relating to ETIP and
- o internal management of the project.

The technical factors were:

- o understanding and conceptualization of the problem,
- o collecting background on sites,
- o research design,
- o collecting data, and
- o analyzing data (COTR, Note 24).

The management factors came from a scaling down of the larger number of management factors used by the Air Force (Thompson, Note 25). Thompson derived the technical factors based on his knowledge of what ETIP was buying, his reading of ETIP background documents, and his discussion with ETIP staff (COTR, Note 26; Thompson, Note 27). This background suggested issues for the sub-factors and, at a higher level of aggregation, the factors. Determining the factors and sub-factors was an iterative process rather than sequential. Additional sub-factors were added after the factor groupings were determined (Thompson, Note 28).

Following his discussions with the COTR, Thompson wrote a draft of the document entitled "Proposal Evaluation Factors" (Thompson, Note 29). This was the listing of all of the factors and sub-factors which would be used as the structure for both the preparation and evaluation of propo-

sals.⁴ The structure would also be used for organizing the "Statement of Work," "Schedule," and "Scope of Effort" documents which remained to be written. Thompson worked on writing these and other documents which would be given to the contract officer to be included in the solicitation document. By February 11, he had completed drafts of the following:

- o "Introductory Note,"
- o "Definitions,"
- o "Statement of Work,"
- o "Statement of Work (with illustrative sub-items),"
- o Schedule (overall),"
- o "Schedule (Phase I),"
- o "Proposal Preparation Procedure,"
- o "Proposal Evaluation Factors,"
- o "Proposal Evaluation Factors (with illustrative sub-questions),"
- o "Scope of Effort," and
- o "Factor/Sub-factor worksheet" (Thompson, Note 30).⁵

⁴There were seven factors and 33 sub-factors in the final version.

⁵The form and in some cases the content of these documents followed that of prior Air Force procurements using PFE. Texts of the "Proposal Preparation Procedure" and "Scope of Effort" follow closely those used by the Air Force. The final version of each of these documents may be found in the appendix.

As drafts of documents and information about the PFE process became available at ETIP, questions and concerns about the procedure began to arise. An issue arose during discussion among some of the ETIP staff which related to the proposed "non-blind" evaluation of proposals. Some staff members felt strongly that the proposals should be evaluated "in the blind." This was the technique which ETIP had been using in its other procurements. That is, proposals were submitted with no identification of the bidders. The evaluation panel based its ratings solely on the proposed approach in the document without knowing who the bidders were. It was felt that this would produce a more objective evaluation and that the panel could not be accused of being biased (COTR, Note 31). By contrast, PFE requires explicit identification of the bidder and many of the illustrative questions for the sub-factors inquired into both prior and anticipated future work of the firm and the staff which would be assigned to the proposed project. Proposal evaluation panel members having any information which would bias their ratings either for or against a specific bidder are required to make this known to the others during the factor team meetings. This issue was resolved by the director of ETIP after Thompson argued that it would be impossible to evaluate the factors without knowing the identity of the bidders and that it would be impos-

sible to keep the identity of the bidders a secret even if it was blind. The director agreed to a non-blind evaluation (Thompson, Note 32).

When strategy for the scope and number of evaluation contracts was discussed in December, it was thought that four contracts would be awarded (Figure IV.2). There would be one to develop a system to evaluate the commercial impacts of federal, state and local procurement experiments, one each to develop systems to evaluate the agency impacts of a) federal and b) state and local experiments and a fourth to evaluate both the agency and commercial impacts of experiments with the Veterans Administration (COTR, Note 33; Note 34). The specific program decision to attempt to award two contracts for the design and development of one or more evaluation systems occurred on January 16, 1976, when this issue was discussed in a meeting among the Director of ETIP, the COTR, and Thompson. The COTR was instructed by the Director to award two contracts, one for each of the project plans he was writing, and to do so by June 30 (the end of the fiscal year). Thompson argued that ETIP would be unable to handle the evaluation process for more than two contracts (Thompson, Note 35). The Director felt that any more than two contracts would be too much for the COTR to manage effectively.

A budget needed to be established for each contract in order to indicate the size of the contracts to prospec-

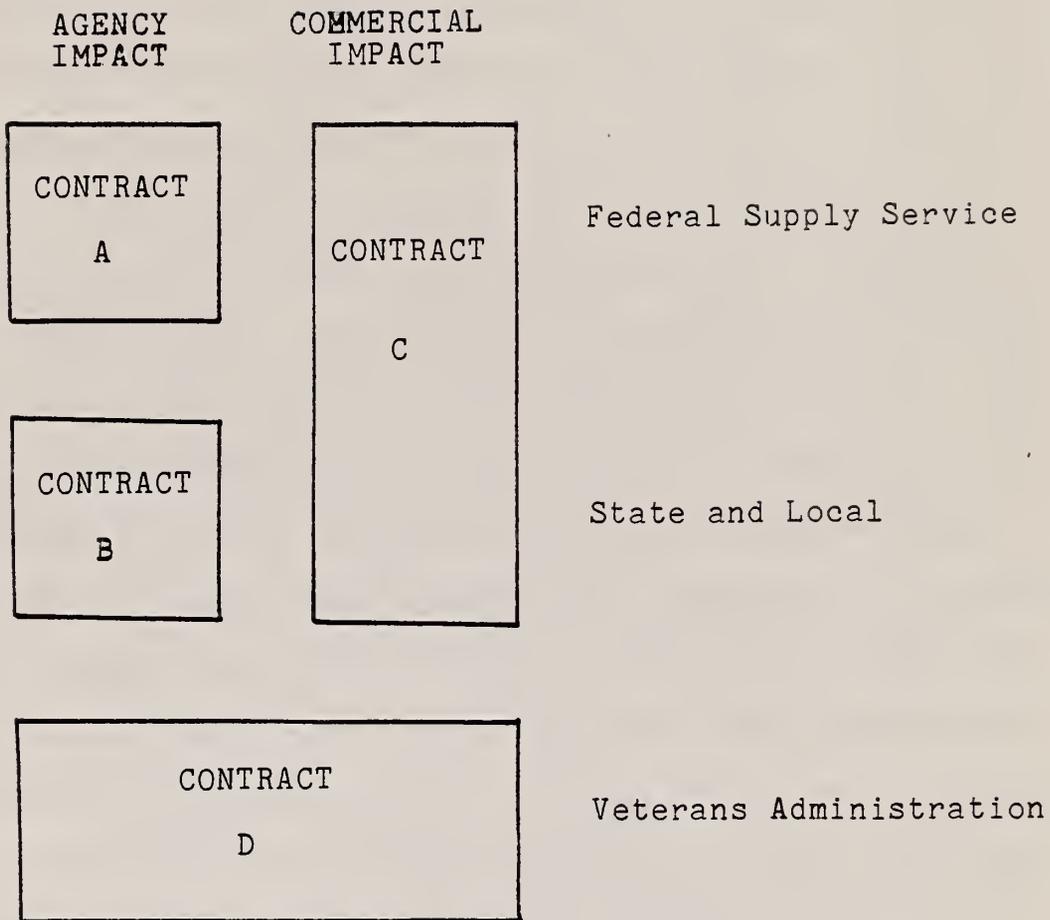


FIGURE IV.2 INITIAL CONCEPT OF THE STRUCTURE OF THE EVALUATION CONTRACTS

tive bidders. Due to uncertainties, anticipated and unanticipated, it was not feasible to determine what the eventual costs would be. The budgets needed to be attractive to bidders, be responsive to the pressures to obligate program funds within the fiscal budget cycle, and allow the government reasonable control over the development expenditures. If the budget were too small there was thought to be a good chance that organizations would not invest in responding. The program was under pressure from the Department to spend money so as not to have a budget carryover at the end of the fiscal year (COTR, Note 36). Counterbalancing pressures existed from the Program Office at NBS to control costs (COTR, Note 37). When the Director of ETIP decided to have two contracts, he also decided that they would be phased contracts and that the first two phases of each would be funded at approximately one million dollars (Thompson, Note 38). This presented projects of reasonable size to attract bids, allowed the program to obligate its budget, was thought to be an acceptable number of contracts for the COTR to manage. The phasing of the contracts provided a formal checkpoint at the end of the first year to determine whether the money was being spent effectively (Thompson, Note 39).

With drafts of the technical aspects of the RFP nearing completion and the assignment of a June 30 award deadline,

it was important to contact the Department of Commerce's contracting office in order to begin the solicitation process.

IV.4 Involving the Contracting Office

The contracting office had not yet been involved in any of the preparations for this procurement. It was now important to determine whether the PFE approach appeared to be acceptable in general and to begin working out the specifics needed in the process (Thompson, Note 40).

Thompson had been having arguments with the director of ETIP and another senior staff member over the statement of work. The statement of work followed the structure of the factors and was very broad. It indicated the categories of work to be done but was not specific about interim deliverables. The senior staff member and the director wanted it to be more detailed (Thompson, Note 41). The ETIP administrative officer set up a meeting with people in the contracting office to try to resolve whether the PFE process and the flexible statement of work would be acceptable. She arranged to meet with the contracting officer and contract negotiator who she knew would be most receptive to helping ETIP determine whether the process would be legal and workable (ETIP Administrative Officer, Note 42).

The meeting was held on January 27 and was attended by Thompson, the COTR, the ETIP administrative officer, the contracting officer, and the contract negotiator. The contracting officer was very receptive to the PFE approach. He had worked with the Maritime Administration and saw the approach as similar to those used to purchase ships (ETIP Administrative Officer, Note 43). After it was agreed that PFE process could be used, some of the specific steps were discussed. Since the PFE process was a departure from most other Department of Commerce procurement methods, it was agreed to brief the bidders twice. This would give the bidders an opportunity to familiarize themselves with the requirements and to ask questions. It was felt that an open exchange of information would enable bidders to see that ETIP had no sole source position and would help bidders to determine whether they wanted to respond (ETIP Administrative Officer, Note 44). Scheduling of the two briefings and of the evaluation process were discussed and the contracting officer assigned the responsibility for the next steps in the procurement to the contract negotiator (COTR, Note 45). It was agreed that the final RFP would be issued prior to the second bidder's briefing.

Though the contracting officer agreed that the broad statement of work was sufficient, the director of ETIP still wanted additional detail specified. To meet this require-

ment, Thompson wrote a second statement of work which contained detailed illustrative sub-items (Thompson, Note 46). This was included in the RFP, together with the actual statement of work.

The schedule which was worked out with the contracting office indicated that it was necessary to begin briefing prospective bidders in mid-February in order to be able to meet the June 30, award deadline. The announcement of the solicitation had to be made immediately.

IV.5 Involving NBS Management

On January 29, the director of ETIP sent a memo to the Acting Director of the National Bureau of Standards indicating ETIP's intention to award two parallel contracts for approximately one million dollars each. With the memo he sent a copy of the announcement of the procurement and the schedule of briefings which were being sent to the Commerce Business Daily. He indicated that this announcement did not obligate ETIP to make an award but that the importance of beginning to educate contractors about the procurement required publishing the notice before NBS approval of the project plans. He promised that the plans would be circulated for approval prior to the pre-bidders briefing of February 26th (ETIP Director, Note 47).

Issuing an announcement of intention to let contracts prior to NBS review of project plans was counter to normal procedure. However, this was thought to be necessary in order to achieve the June 30 award target. It is likely that this action combined with the size of the proposed contracts (large in comparison to most other NBS contracts) created a great deal of anxiety among the NBS administration. The program office wanted assurance that the output of the project would support commitments which NBS had made for future evaluations of the ETIP program and that no implicit future funding commitments were being made (COTR, Note 48, Note 49, Note 50). The COTR and others at ETIP met with the program office staff throughout the project plan review process to brief them and answer their questions about the projects. On March 31, 1976 the Acting Director of NBS approved the project plans (NBS Acting Director, Note 51). This cleared the way for the award of contracts following completion of the evaluation of proposals.

IV.6 Involving the Program Administrative Agencies

It was thought to be important to use the proposal evaluation process as a method for involving and educating people who would be involved in the project. Participation would engage people in a dialogue about what ETIP was trying

to do with the project and some of the problems involved in doing it. This was particularly important to staff of the PAAs.

By February 11, drafts of most of the technical documents for the RFP were completed and ready for review by the staffs of ETIP and the Program Administrative Agencies. Since people in the PAAs would be working with the contractors, it was important that they be involved in the solicitation process. Normally, as part of the PFE process, their aid would have been requested in determining the sub-factors and factors. However the time pressures of this procurement prevented this level of involvement (COTR, Note 52). All that could be accomplished now would be to obtain their review of the various draft documents to insert anything which may have been overlooked.

The only Program Administrative Agency to be involved actively in the review process was the Federal Supply Service (FSS). The National Institute for Government Procurement and the National Association of State Purchasing Officials, which coordinated ETIP's local and state purchasing experiments, could not be involved in the review of the drafts since people who were not federal government employees were not permitted to see the RFP prior to its release (COTR, Note 53). ETIP's work with the Veterans' Administration was in a state of flux. The primary contact point had recently changed and there was some disagreement and

confusion regarding the role that the contracts would play in this work. The VA was represented in the initial review of the RFP but did not participate in the eventual evaluation of proposals.

The primary ETIP contact at FSS had recently assumed his position there as Director of their Experimental Technology Division after having been chief of ETIP's procurement program. He was familiar with ETIP's plans for evaluation and was quite concerned about the large size of the effort and prospect of the resulting contractors working in his agency (COTR, Note 54). When the RFP documents were sent to FSS for review he and his staff made extensive comments on both the process and the specific sub-factors. Their concerns included the following:

- o that the amount of control and responsibility given to the contractor seemed excessive. They felt that many of the sub-factor issues which the contractors were being asked to respond to were ETIP's responsibility, e.g., rationalizing multiple and conflicting objectives of ETIP, telling them what information ETIP will need to review the project,
- o the work to be performed overlapped with existing projects,
- o the amount of money being allocated was "absurd" for the work they felt needed to be done,
- o much of the information provided to bidders was unnecessary, particularly that information which gave the history of the PFE process and the details of how the proposals would be evaluated,
- o that the organization of the RFP was bad and some paragraphs were confusing,

- o that it was unclear why two statements of work were included (one with illustrative sub-items),
- o that it would take the panel two to three months to evaluate the proposals which would be received in response to the RFP,
- o many of the sub-factors were not useful, especially those on management and reporting, and
- o that the RFP would scare off good bidders who would find it confusing,
- o that successful contractors would provide material to the PAAs which would be unusable (FSS representatives, Note 55).

These issues continued to be a source of concern to some FSS staff throughout the solicitation process (FSS representative, Note 56).

IV.7 Involving the Prospective Bidders

One objective of the PFE process is to provide prospective bidders with as much information, openly and explicitly, as is possible (Thompson, 1976a). One method used for doing this was through the use of two bidders' briefings. The first was to give bidders an overview of ETIP, a presentation of the objectives of the procurement, and to allow for extensive questions and answers. The second was to allow for further questioning after bidders had an opportunity to review both oral and written materials (Thompson, 1976).

On February 17th, the same day that the COTRs' two project plans were sent to the NBS program office for approval, notice of the solicitation appeared in the Commerce Business Daily (CBD). The announcement described the general subject nature, level of effort, and time frame of the intended contracts and announced the schedule and procedure for distribution of preliminary documents, briefings, and responses ("Design and develop evaluation systems for experiments...", 1976 & Figure IV.3). Individuals who wrote or stopped by the contracting office and those who were on the bidder's list⁶ were furnished copies of the preliminary RFP⁷ prior to the pre-bidders briefing. The CBD announcement was the first notification of the RFP to be issued to the contracting community. The only other prior related information was from conversations which the COTR (and probably others) had with contractor organizations to describe ETIP, its work and the general direction being taken in the evaluation of ETIP experiments. By doing this the COTR hoped to create an awareness of the program's activities so that when CBD announcements were published people would take the time to consider whether to bid (COTR, Note 57).

⁶The bidders list was composed of names of individuals and firms known to ETIP and thought to have a potential interest in learning about the project.

⁷The final version of the RFP was to be issued prior to the second briefing.

H--DESIGN AND DEVELOP EVALUATION SYSTEM FOR PROCUREMENT EXPERIMENTS on behalf of ETIP (Experimental Technology Incentives Program). Obtain evaluation system to measure the agency impact and commercial impact of a series of procurement experiments being conducted in cooperation with specific government purchasing agencies. Two contracts, one for the agency impact and one for the commercial impact, each with a level of effort of approx. 100 man-months are to be awarded. Each contract will be for a three year period, performance in three phases. Funding for the first two phases of each contract is presently available. Because of the complexity of the program, and the importance of selecting contractors qualified to provide comprehensive program management to design, develop and test an evaluation system and to carry out specific evaluations, information for prospective offerors will be extensive and will be furnished in the following steps: a) o/a 12 Feb 76 a preliminary description of both solicitations will be made available upon written request from prospective offerors; b) a preliminary briefing will be held at 10 o'clock am, local Washington, DC time, 26 Feb 76, in Rm 6802 at the Dept. of Commerce, 14th and Constitution Ave., NW. Washington, DC, to provide a full description of these requirements of the solicitations, and to answer questions; a copy of the solicitation will be furnished to each firm having a representative at the preliminary briefing, provided the firm has furnished the Government prior written notice of attendance; firms in attendance without prior notification will be mailed a copy of the solicitation as soon as possible thereafter. Other firms will be provided a copy as soon as possible upon receipt of a written request, accompanied by a description of the firm's capability to perform the type of work required; c) the formal pre-proposal conference will be held at 11:00 am, local Washington, DC time, on 18 Mar 76 in Rm 4833 at the Dept. of Commerce (same address as preliminary briefing) to provide additional information and answer questions. Proposals in response to Sol. 6-35756 shall be due o/a 15 Apr 76. See Notes 24 and 80 (P042)

US Dept. of Commerce,
Procurement Div., Research and Tech. Asst.,
Washington, DC 20230

FIGURE IV.3 THE COMMERCE BUSINESS DAILY ANNOUNCEMENT

Following the issuing of the CBD announcement and completion of his project plans the COTR turned his attention to planning the pre-bidder's conference. A dry run for the pre-bidders briefing was held on February 25th and was attended by the contract negotiator, several ETIP staff and staff from VA and NIGP. The COTR's objective for the first briefing was to communicate what it was ETIP was trying to buy, to generate enthusiasm for bidding, to give prospective bidders an opportunity to ask questions, and to obtain feedback on the preliminary RFP which would allow for clarifications prior to the next briefing (COTR, Note 58). He wanted to convey that ETIP was interested in buying both systems and specific evaluations and that methodologists were needed who could integrate the different type of specialists required into an effective team. He also felt it important to convey the message that ETIP was looking for contractors who would assume a lead position in doing the work while being sensitive to the needs of ETIP and its PAAs. Finally he wanted to convey to the bidders that ETIP did not have a sole source position on the contract and to provide as much information as possible about the program and the proposal evaluation process so that firms could make informed decisions about whether to bid (COTR, Note 59; Note 60).

The pre-bidders briefing was attended by representatives of 47 organizations ("Attendees at Briefing," Note 61). It was opened with some remarks by the contract negotiator. He indicated that though the solicitation document itself would not be available until a later date, the information which was already furnished to prospective bidders constituted the technical aspects of the solicitation. The document itself would include some additional instructions and conditions, special provisions applicable to the contract, and other boiler-plate provisions (Transcript, Note 62). He also indicated that the two contracts would be awarded to separate firms and he corrected an error which had appeared in the CBD announcement.⁸

With his announcements completed the contract negotiator introduced the COTR and turned the briefing over to him. In his presentation the COTR briefly described the ETIP program and the objectives of the specific procurements. He also indicated the interrelationship among the various items to be included in the solicitation document (Transcript, Note 63). After this, he introduced the chief of the procurment program for a description of the substantive area for which the systems were to be developed.

⁸The announcement had indicated that the proposed level of effort of the contracts was 100 man-months each rather than the actual forecast which was 200 man-months each. A corrected copy of the announcement was made available in the briefing room.

The chief of the procurement program gave a slide talk. He described the history of the procurement program and the philosophy used in selecting and carrying out specific experiments. He also described products and incentives which were being experimented with at that time (Transcript, Note 64).

After the second presentation was concluded the contract negotiator requested that questions be submitted. Questions were accepted anonymously in writing on index cards or orally from participants. The questions pertained to the following:

- o the scope of the work and the projected role of the successful bidder in the various activities related to ETIP procurement experiments,
- o coordination between the two contractors in developing the systems,
- o potential for and advisability of coordination among firms in bidding,
- o the availability of the names of contractors who had previously participated in the design of ETIP procurement experiments,
- o the projected role of the various PAAs in the projects, and
- o requested clarifications of statements made earlier in the briefing (Transcript, Note 65).

The meeting was adjourned after all questions were answered. Participants were given three weeks prior to the second briefing to reflect on the pre-bidders briefing and to examine the technical elements of the solicitation.

The second briefing was held on March 18 and was attended by representatives of 29 firms ("Attendees at ETIP pre-proposal conference, Note 66).⁹ It was primarily a question and answer session. The contract negotiator distributed copies of the solicitation document and indicated that it would be modified to require 20 copies of each proposal rather than the stated 15 (Transcript, Note 67). He then opened the meeting for questions. This time the questions included questions on:

- o whether the requirement for oral presentations remained,¹⁰
- o what outputs were expected from Phase I and Phase II of the projects in light of the small number of procurement experiments which were in existence,
- o how the efforts of the two contractors would be coordinated,
- o requirements and format for responding to factors, sub-factors, and illustrative questions,
- o whether a list of the attendees at the briefing would be available to aid people who were looking for co-bidders,
- o the expected involvement of state and local procurement organizations in the experiments,

⁹Eighteen of these had been at the February briefing and 11 were new.

¹⁰The process originally called for each bidder to make an oral presentation on their proposal to the proposal evaluation panel. This was modified to allow written questions submitted to bidders by the panel through the contract negotiator.

- o the anticipated transition process from Phase I to Phase II, whether much down time was expected, and about how the 200 man-months should be divided between Phase I and Phase II, and
- o where the PFE approach had been used previously (Transcript, Note 68).

After the questions and answers were completed the Director of ETIP spoke briefly. He thanked the representatives of firms for their time and interest and told them that things were beginning to move quite rapidly in the procurement program and that many more projects were expected to be in place soon (Transcript, Note 69).

With the briefings concluded, organizations had four weeks to determine whether to bid and to complete preparation of their proposals.

IV.8 Selecting and Involving the Evaluation Panel

A substantial portion of the time prior to the second briefing was spent preparing for proposal evaluation. It was during this period that the author arrived (March 8, 1976) and was assigned tasks of both contacting potential panel members to solicit their participation and planning for the panel meetings.

An effort was made to get significant participation on the panel by people outside of ETIP. Some of those contacted were from PAAs and others were people not directly related to the program. Those not directly related included:

- o people who were thought to be experts on some of the specific sub-factors being evaluated,
- o people who were familiar with some of the likely bidders,
- o people who could lend credibility to the project with the NBS program office, and
- o people who were responsible for managing other government evaluation programs who might have an interest in the PFE technique as a method for procuring contractor support (COTR, Note 70).

Nineteen of the 30 people who were invited to join the panel were from organizations other than ETIP (compiled from lists, Note 71).

When soliciting participation in the process, both the COTR and the author stressed the ability of a person to limit the extent of their participation. They were told that they could participate by evaluating as few as one sub-factor if their time was severely limited. Eleven of the 19 people invited from outside agencies eventually participated or sent representatives to participate in the evaluation.

Members of the panel who had been recruited by mid-March were called together for a meeting on March 17 to:

- o review the process for proposal evaluation,
- o determine any additional information which should be related to bidders at the second bidders briefing on March 18,

- o distribute copies of the the technical portions of the solicitation document and a list of supporting documents which had been made available to bidders, and
- o review the schedule for the April factor team meetings (COTR, Note 72).

Prior to this meeting Thompson had written a document entitled "Proposal Evaluation Procedure" and had prepared the forms which would be used by the panel during the evaluation process (Thompson, Note 73). One form was for rating the bidders on sub-factors and factors and the other form was for use in obtaining clarification from bidders between the time proposals arrive and the time that factor ratings are assigned.

At the meeting the documents from the solicitation and the list of supporting documents which had been furnished to the bidders were distributed to the 11 invited panel members who were present.¹¹ Panel members were encouraged to at least scan through all materials sometime in the month that remained prior to the arrival of proposals. The evaluation process was then reviewed and much of the remainder of the meeting was spent in an argument concerning the weighting of sub-factors within the factors.

¹¹Three of these later dropped off of the evaluation panel.

At least two of the people present felt strongly that the relative weights of sub-factors within each factor should be pre-determined by the COTR. Their reasons were that they felt that:

- o waiting until individual sub-factor scores are known with respect to the names of the proposers presents an appearance of conflict of interest, with the factor team being able to manipulate the weights in favor of a particular proposal ("Memorandum," Note 74; "Memorandum," Note 75), and
- o a great amount of time would be taken trying to reach agreement on the weights in the team meetings ("Memorandum," Note 76).

The argument was quite heated and resulted in several of the participants writing memos afterwards to clarify their positions ("Memorandum," Note 77; "Memorandum," Note 78; COTR, Note 79).¹²

The COTR decided not to request a change in the process. He felt that one substantial input which the panel members could have would be assessing the relative importance of sub-factors. He also felt that the time for decisions would not be adversely affected by the lack of pre-assigned weights (COTR, Note 80).

Another change in the process was proposed at the meeting by the representative of the NBS program office. He suggested that an executive committee be established to

¹²Two of these people were among the three at the meeting who eventually dropped off of the panel.

review the decisions made by the panel. The COTR rejected this proposal after conferring with the contract negotiator. The contract negotiator advised against such a committee. He felt that the process would provide him with a clear indication of the technical merits of the proposals and did not desire a panel which would filter these recommendations (COTR, Note 81). In his follow-up memo to those who attended the meeting, the COTR expressed his faith in the panel and the process and said that he felt that such a review committee would be unlikely to have sufficient familiarity with the individual proposals to be effective and would give the appearance of second guessing the panel (COTR, Note 82).

This was the only time the panel met as a group prior to the arrival of proposals. The remainder of the time prior to the closing date was spent recruiting additional panel members and making assignments of individuals to specific sub-factors. In general assignments were made so that individuals would evaluate sub-factors where they had a special expertise or interest. In several cases, where individuals were expected to have a close relationship with the projects, they were assigned to a wide range of sub-factors. Each sub-factor had at least two people assigned to it.

IV.9 The Proposals Arrive

The closing date for receipt of proposals was April 15. On this day the contracting office received eight proposals. Five were for consideration as the agency impact contractor and two were for consideration as the commercial impact contractor.¹³ One firm asked that its proposal be considered for both. Another firm had submitted separate proposals for each contract. That is, seven firms bid. Four bid on only the agency impact contract, one bid on only the commercial impact contract and two bid on both contracts.

The proposal evaluation panel was convened the morning of April 16. Nineteen of the 23 panel members were able to participate. The first agenda item to be covered was to review the evaluation process. Members were asked to look at the "Proposal Evaluation Process" document in their packet as it was reviewed with them. They were reminded that there were two minimum requirements on each member of the evaluation team. These were:

¹³The proposal submitted by one firm was not clear as to which contract the firm wished it be evaluated for. The contract negotiator was called and requested to obtain a clarification from the firm. The firm indicated that it was submitting for only the commercial impact contract. The factor teams on agency impact included this firm in their evaluation until the clarification was obtained. These ratings are not included in the data analysis in Chapter V.

- 1) If a panel member finds ambiguity or missing information which will substantially interfere with their ability to rate a bidder, it needs to be uncovered right away so the contract negotiator can obtain an answer back from the bidders in time for evaluation (question forms were provided to panel members for this purpose).
- 2) Panel members assigned to a sub-factor need to fill out one of the rating forms. The names of the bidders are to be put in the blank space. The rating can be based solely upon reading that one section of the proposal. What they want to read beyond that is up to each individual (Tape of meeting, Note 83).

Panel members were cautioned that they were not to acquire additional information from bidders except through the contract negotiator (Tape of meeting, Note 84).

Members were reminded that the factor team was responsible for coming up with a single rating across the factor for every one of the bidders and that each team had control of most of the process by which they chose to do this.

The ground rules were:

- o each individual was required to submit a signed sub-factor rating sheet at the start of the session,
- o the team had to reach an agreement on the ratings without voting,
- o all members of the team were to sign the factor rating form (any comments, references, and reservations were also to be included as a part of the record), and
- o the sessions were to be taped (Tape of meeting, Note 85).

The method for reaching agreement, including the order of consideration of sub-factors, the relative weighting of

the sub-factors in the final factor weightings, and whether to consider the factor as a whole rather than rating the sub-factors were up to each team (Tape of meeting, Note 86).

The panel was told that results of the individual factor teams would be combined using the factor weights listed in the RFP. A narrative description of the results of the panel process would be prepared for the contract negotiator. This would be followed by meetings for clarification with the contending bidders (Tape of meeting, Note 87).

Individuals' assignments to sub-factors were reviewed, factor/sub-factor rating sheets were distributed, copies of the proposals were signed out to panel members and the meeting broke for lunch (Tape of meeting, Note 88). During the break a tentative schedule of factor team meetings was worked up by charting the schedule conflicts which panel members had during the next week. The best schedule which could be worked out resulted in several panel members being unable to participate due to schedule conflicts.

The remainder of the day on April 16, was allocated to initial review of the proposals. Two question forms were submitted which pointed out some sections which were apparently missing from proposals submitted by two different bidders (Question for bidder #101, Note 89; Question for bidder #102, Note 90). These questions were called in to

the contract negotiator for transmittal to the bidders.

Figure IV.4 is a copy of the form which was used.

Team members who were unable to attend the April 16, meeting were briefed individually and provided with copies of the proposals and the schedule.

IV.10 The Factor Teams Meet

IV.10.1 Introduction

For the two projects there were a total of fourteen factors and thus fourteen teams. All fourteen factor team meetings were held during the week of April 19th (see Figure IV.5). They were scheduled at a rate of three factors per day with the exception of the first day, for which only two meetings were scheduled. The nominal time allocated for each meeting was two hours.

The meetings were held in ETIP's conference room.¹⁴ The room was equipped with a blackboard, a tape recorder and extra rating and question forms.

Each meeting having new participants who had not been in earlier meetings was begun with a brief discussion of the evaluation procedures and a decision on how to proceed. The meetings then continued until scores were determined for all bidders on each sub-factor and on the factor as a whole.

¹⁴An exception was the first factor team meeting which was held in a larger NBS lecture room.

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QUESTION FORM

Requested by:

Bidder:

Date:

Factor (or sub-factor):

Proposed
Specific
Question:

- To the bidder
- To (specify):

Note: Write the question as specifically as possible in a form that the bidder can respond to directly. Give this form to the COTR.

Question (Revised, if necessary):

Date given to CO:

Date answer received:

FIGURE IV.4 THE QUESTION FORM FOR USE IN OBTAINING CLARIFICATIONS

	M	T	W	Th	F
10-12	Agency Factor VI Data Collec- tion Process	Agency Factor III Objectives	Commercial Factor III Objectives	Commercial Factor VII Data Analysis Process	Commercial Factor VI Data Collection Process
12:30-2		Agency Factor I Management	Agency Factor VII Data Analysis Process	Commercial Factor II Reports and Reviews	Commercial Factor I Management
3-5	Agency Factor V Evaluation Design	Agency Factor IV Background Information	Agency Factor II Reports and Reviews	Commercial Factor IV Background Information	Commercial Factor V Evaluation Design

FIGURE IV.5 SCHEDULE OF FACTOR TEAM MEETINGS

What follows in this section are examples of how the team meetings worked. Anecdotes are presented from the meetings to illustrate the types of issues which arose and how they were resolved. They are presented to illustrate the types of discussions which took place over the course of the evaluation. They are not meant to represent the total discussion during any of the meetings. The sources of these are the tape recordings which were made of each of the meetings. Displays of the initial scores for each rater and the final scores for the teams are included in the appendix for readers who wish to follow the actual numbers from the evaluation process. The names of individuals involved in the discussion and firms being rated are not included in these descriptions or in the appendix.

The first factor scheduled to be evaluated was Factor VI, Data Collection Processes on the agency impact contract. This factor was selected as the first because it was felt to be less difficult to evaluate than some of the others, e.g., management, and would be a good one for panel members to get a feeling for how the process functioned. All team members had been encouraged to come and observe the first meeting.

IV.10.2 The First Factor Team Meeting

The first factor team meeting, Agency Impact, Factor VI, Data Collection Process, began Monday, April 19, 1976, at approximately 10 A.M. The four assigned panel members were all present. The tape recorder was turned on and the meeting began with some discussion on how to proceed. Ground rules were quickly reviewed and the first set of signed sub-factor rating forms were handed in by panel members. (Figure IV.6 is an example of what a completed subfactor rating form looked like.) Some time was taken getting the scores posted on the blackboard in order to determine a method which would make the distributions clear (Figure IV.7 illustrates the form that the postings took.) This was followed by discussion on how to proceed in order to obtain scores for each bidder. One panel member suggested averaging the scores. Another argued that this would not be acceptable since there was a need to know why one person's score for a bidder was a nine while another person scored the same bidder at one.

Discussion on the individual proposals began with people giving the reasons behind their ratings. A panel member inquired about the extent to which personal knowledge about bidders was admissible and he was assured by another member that it was a very proper thing to put onto the table. Another question was whether the panel should be concerned

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FACTOR (AND SUB-FACTOR) WORKSHEET

Factor or sub-factor (number & title):

VI.] Instrument Design

When used by team to record final
factor ratings only:

Signatures:

When used by individual team members for
sub-factor ratings:

Signature: EVAL205

Date: April 19, 1976

Date:

	Nothing can stop him from being a success	10
	Should perform well	9
B205	Almost as good	8
	Acceptable as is	7
B206	Acceptable with negotiation	6
	Marginal at best	5
B203 B204	Unacceptable without significant revisions	4
	Possibly still unacceptable with revisions	3
	Probably still unacceptable with revisions	2
B202	No hope (totally unacceptable)	1

 Check if continuation sheet accompanies this form

Note: Individual team members may use form as worksheet, making changes, erasures, etc., and adding notes. Prior to the team meeting, ratings should be entered in ink. Subsequent notes and revisions may be made during the meeting by cross-out, etc., and the resultant form will become part of the record.

FIGURE IV.6 A COMPLETED SUB-FACTOR RATING FORM

VI.1	EV205	EV208	EV210	EV211	VI.1	VI.2	VI.3	VI.4	VI.5	VI
10			B206							
9		B202 B205								
8	B205	B201		B202 B204 B205 B206						
7			B203 B204	B203						
6	B206	B203 B204 B206	B201	B201						
5			B206							
4	B203-B204									
3										
2										
1	B202									

FIGURE IV.7 THE FORM OF POSTING SCORES

at this point about whether certain people in a winning bidder's organization would be tied to the contract through a key personnel clause. He was told that anything which the factor team was concerned about which influenced its rating should be noted in the record of the process so that it could be discussed with potential winners.

It was pointed out during this and other panel meetings that all bidders falling into the competitive range would be called in for discussion and clarification prior to final evaluation. It was therefore important to enter notes into the record where the panel had uncertainty about their ratings. The related issues would then be raised with bidders during the subsequent discussions in order to reduce the range of uncertainty.

The key point of disagreement on sub-factor VI.1 was whether a specific bidder did, in fact, have the in-house capability to perform in the area of instrument design. The issue was resolved by agreeing that the bidder was probably acceptable on the sub-factor but the remaining uncertainty would be recorded with a note in the record. The note was to be sure that they have at least one person integrated into their team who is strong on instrument design in the event that they are found to be strong enough overall to be considered competitive.

As the panel arrived at a score for each of the bidders, that bidder's score was posted on the board under

the sub-factor column and removed from under the individual rater columns (see Figure IV.8). After all bidders had been rated on a sub-factor the left side of the board was clean and the column for the sub-factor score was complete (Figure IV.9). Panel members scores were then posted under their column for the next sub-factor (Figure IV.10) and the same process was repeated.

There was a great deal of variability in the amount of discussion required under each sub-factor to arrive at scores for different bidders. As would be expected, it seemed that in cases where there was substantial initial agreement the time would be brief. Conversely, the time required would generally be longer in cases where at least one panel member's initial rating varied from those of others on the panel. Often the panel began discussion on bidders for which there was greater initial agreement. This enabled the panel to make progress in rating and at the same time discuss some of the issues related to the sub-factor without strong arguments over the bidders.

Several times during the first meeting there was discussion about the significance of the different numbers on the rating form. This discussion seemed to establish the interpretation of the numbers for the remaining factor team meetings. The distinction between a score of six and a score of seven was emphasized. Using the words next to the numbers on the form as a guide, it was felt that any

VI.1	EVAL205	EVAL208	EVAL210	EVAL211	VI.1	VI.2	VI.3	VI.4	VI.5	VI
10			B205							
9		B205								
8				B204 B205 B206	B202					
7	B205	B201	B203 B204	B203						
6	B206	B203 B204 B206	B201	B201						
5			B206							
4	B203-B204									
3										
2										
1										

FIGURE IV.8 ASSIGNMENT OF THE FIRST SCORE ON SUB-FACTOR VI.1

VI.1	EVAL205	EVAL208	EVAL210	EVAL211	VI.1	VI.2	VI.3	VI.4	VI.5	VI
10										
9					B205					
8					B202					
7										
6					B201 B203 B206					
5					B204					
4										
3										
2										
1										

FIGURE IV.9 ASSIGNMENT OF ALL SCORES FOR SUB-FACTOR VI.1

VI.2	EVAL205	EVAL208	EVAL210	EVAL211	VI.1	VI.2	VI.3	VI.4	VI.5	VI
10			B205							
9		B205		B202	B205					
8				B201 B205 B206	B202					
7	B205		B201 B203	B203 B204						
6			B202							
5	B206	B202 B204	B204		B201 B203 B206					
4	B203 B204				B204					
3		B206								
2										
1	B202									

FIGURE IV.10 POSTING OF SCORES TO BEGIN RATING ON SUB-FACTOR VI.2

bidder who was rated at seven or above was thought to have an acceptable probability of performing with respect to the issues raised by the sub-factor. A bidder was rated at a six or below if there was some doubt that the bidder's performance would be acceptable. This meant that in the event that the bidder appeared to be acceptable overall they would be called in for discussions. These discussions would be used to resolve existing uncertainties over the bidders' scores, i.e., to clarify whether the bidder could be expected to perform well on the sub-factor if they were under contract. A six reflected a modest doubt as to the bidder's capability. The bidder was rated at a five if the panel had more serious doubts that the bidder would perform acceptably. Scores of four or below were used if the panel had very serious doubts about the bidder's present or potential capability with respect to the sub-factor issues. A bidder with more than one or two fours on sub-factors was thought to be unacceptable unless they were rated significantly higher elsewhere and could demonstrate that they could improve their score on these low sub-factors.

In arriving at sub-factor scores the panel was often reminded by its members that it was to assess bidders using the criteria of the bidder's understanding of the sub-factor, the proposed approach for dealing with the issues raised by the sub-factors, and the

bidder's present or potential capability for dealing with the issues. There were cases in the first factor team meeting, and in many of the others, where the panel felt that the bidder's response indicated an acceptable understanding and approach but there was a reasonable doubt that they had the capability to perform.

As an example there was one bidder who had a team that was quite heavily loaded with consultants. It appeared that the understanding of the issues was held by these consultants but it did not appear that these consultants were integrated effectively into the decision making process for the project. In this case the bidder was given a score of five, with the understanding that this point would be investigated during discussions if the bidder were in the competitive range.

Ratings seemed to be made on both an absolute and a relative basis. Bidders' responses were discussed as they compared with the standards which each panel member used in applying the three evaluation criteria to their ratings. There was also discussion across bidders of the relative degree to which they dealt with the sub-factor issues. For example, a panel member would indicate the evidence he used in his rating of a specific bidder and then contrast it with what another bidder said as an indication of why he rated that bidder either the same or differently.

After all of the sub-factors had been rated in factor VI, the panel was prepared to determine the factor score for each bidder. There was some discussion of how the various sub-factors should be weighted. The statement of the factor was read and the panel members proceeded to assign the factor score by visually averaging the sub-factor scores. No one had a compelling desire to weight any sub-factor greater than any other. The scores were posted on the board (Figure IV.11) and when the process was complete they were copied onto a factor rating sheet. The sheet was labeled with the factor name, dated, and passed to each member of the panel for a signature. (Figure IV.12 is an example of what a completed factor rating form looked like.) Determining factor scores once the sub-factor scores were complete took about five minutes. The first panel meeting was concluded two hours after it began.

IV.10.3 The Second Factor Team Meeting

The second meeting was Agency Impact, Factor V, Evaluation Design. It began Monday, April 19, at about 3 P.M. with the seven panel members present. After a brief review of ground rules, the ratings for the first sub-factor were posted and discussion began.

During rating on the first sub-factor (V.1) there was a case where information presented by a bidder as a strong

VI	EVAL205	EVAL208	EVAL210	EVAL211	VI.1	VI.2	VI.3	VI.4	VI.5	VI
10					B205					
9					B202	B205		B203	B202 B205	B205
8										
7						B202	B203 B205	B202	B203 B204	B203
6					B201 B203 B206	B203		B205		B202
5					B204	B206	B204 B206	B204 B206	B206	B206
4						B201 B204	B201 B202	B201	B201	B201 B204
3										
2										
1										

FIGURE IV.11 ASSIGNMENT OF FACTOR SCORES FOR FACTOR VI

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FACTOR (AND SUB-FACTOR) WORKSHEET

Factor or sub-factor (number & title):

VI Data Collection Process

When used by individual team members for sub-factor ratings:

Signature:

Date:

When used by team to record final factor ratings only:

Signatures: EVAL205
EVAL208
EVAL210
EVAL211

Date: April 19, 1976

	Nothing can stop him from being a success	10
	Should perform well	9
B205	Almost as good	8
B203	Acceptable as is	7
B202	Acceptable with negotiation	6
B206	Marginal at best	5
B201 B204	Unacceptable without significant revisions	4
	Possibly still unacceptable with revisions	3
	Probably still unacceptable with revisions	2
	No hope (totally unacceptable)	1

Note: Should B202 get the contract they must bring someone on board who is competent in instrument design (VI.1). B202's performance must be further examined on sub-factor VI.3.

Check if continuation sheet accompanies this form

Note: Individual team members may use form as worksheet, making changes, erasures, etc., and adding notes. Prior to the team meeting, ratings should be entered in ink. Subsequent notes and revisions may be made during the meeting by cross-out, etc., and the resultant form will become part of the record.

FIGURE IV.12 A COMPLETED FACTOR RATING FORM

example of their capability in the area of the sub-factor was disputed by a panel member with outside information. The bidder had claimed to be making a major contribution in a substantive area in which the panel member claimed to be knowledgeable. The panel member indicated that he had just completed a major review of work in this area and was unaware of this bidder's involvement in the field. It is unclear how much this information affected the final score for this bidder since others had argued in the firm's favor. Panel members had rated the firm between four and seven and a half and after discussion the team settled on a five.

When rating another bidder two panel members disagreed about prior performance of members of the bidder's proposed team in the area of evaluation design. This resulted in a discussion of the characteristics of the prior work in question and its relationship to the present work and the standards of judgement that each of these two panel members was using. The rating was resolved by the panel in favor of the claim that the work which the bidder had done effectively in the past was not sufficiently comparable to what was required here.

In discussion on a rating for another bidder, a panel member from outside of ETIP was familiar with their prior performance. There had been some argument for a low score

and this panel member was able to cite prior positive experience with the people from this bidder's organization to influence a higher rating for them than was desired initially by some of the ETIP raters.

The rating of sub-factor V.1 presented the panel with its first difficult problem in achieving consensus on a single rating for a bidder. After panel members had presented their views on the bidder there remained a strong disagreement between two panel members. One would not rate them below a six and the other would not come above a four. The panel agreed to leave this temporarily unresolved. The bidder was put at both four and six on the board with brackets around both scores indicating that the score would be resolved after the other sub-factors had been discussed and before assigning the factor score. Eventually they were given a score of six on this sub-factor and six on the factor. This technique was used several times during the week and proved to be useful in keeping the evaluation process moving and in resolving differences.

The time to accomplish the rating for the first sub-factor was about 75 minutes. Lengthy discussion on the first sub-factor tended to be a pattern throughout the factor meetings. The arguments which were made provided a context for the discussion on other sub-factors which then proceeded more rapidly (Figure IV.13). The ratings on sub-factor V.2 were accomplished in about five minutes.

I	.1	.2	.3	.4		
Agency	38	6	18	9		
Commercial	11	7	4	21		
II	.1	.2	.3	.4		
Agency	43	25	18	16		
Commercial	18	22	14	4		
III	.1	.2	.3	.4	.5	
Agency	31	19	25	15	23	
Commercial	38	18	15	24	7	
IV	.1	.2	.3	.4	.5	
Agency	26	10	16	8	8	
Commercial	14	10	10	4	2	
V	.1	.2	.3	.4	.5	.6
Agency	74	8	20	8	30	9
Commercial	33	16	6	7	2	11
VI	.1	.2	.3	.4	.5	
Agency	39	21	19	11	23	
Commercial	31	6	12	6	27	
VII	.1	.2	.3	.4		
Agency	39	38	20	25		
Commercial	63	5	15	5		

FIGURE IV.13 TIME REQUIRED TO RATE SUB-FACTORS
(estimated from tapes of meetings)

This factor team meeting (factor V) lasted a little over two and a half hours. Since it was held at the end of the day, three of the team members had to leave after the fourth sub-factor, when the time got late.

In this case, and in several others during the week, panel members were unable to be present for part or all of the team meeting. If they had furnished their signed rating forms to the panel, their ratings were posted on the blackboard as a reference point for the team. If the team felt it needed to inquire into the reason for a rating of a person who was not present, that person could be called. This option was used in one of the later meetings where the absent team member had rated a bidder higher than other team members who were present.

IV.10.4 The Third Factor Team Meeting

The third factor team met at approximately 9 A.M. on Tuesday, April 20. This was factor III, Objectives for Agency Impact. The team had six members, one who arrived after discussion of the first sub-factor had been completed.

One issue which was pointed out during this meeting was that at least two of the team members were tending to take extreme positions when rating certain bidders. This was because one member stressed the importance of bidders'

qualifications with respect to the substantive area of procurement, while the other member stressed the importance of qualifications in methodology. They tended to rate bidders as extremely high or extremely low on many sub-factors according to these biases. In effect they were evaluating the proposal as a whole on each sub-factor. This led to discussion on the importance of various experiences and skills and how they relate to potential performance with respect to the specific sub-factor issues. Discussion and recommendation of consensus ratings by other team members was important in forcing team members to examine biases against the specific requirements of each sub-factor.

IV.10.5 The Fourth Factor Team Meeting

The fourth team to meet was Factor I, Management for Agency Impact. This team met on Tuesday, April 20, at 12:30, with four team members.

Much of the discussion during this meeting was about the distinction between capability to do general project management and the capability to manage this specific project to develop evaluation systems. At least one panel member felt that the former was sufficient. Others argued the merits of experience in the management of specific related types of work.

There was also discussion on the commitment of the firms to provide a full time team for the necessary two

to three years of the project. Sub-factor II.2 specifically raised the issue of the internal commitment of the firm to the project. On this sub-factor the team was unable to differentiate among bidders from any readily available information. It was decided that all bidders would be rated at 6, and the necessary clarification on this sub-factor would be obtained during any subsequent oral discussions with the bidders.

IV.10.6 The Fifth Factor Team Meeting

Agency Impact, Factor IV met on Tuesday, April 20, at 3 p.m. Five panel members were present for the meeting.

In this meeting there was a situation in which one panel member was arguing for a rating of four for a bidder on a sub-factor. Two other panel members had rated the bidder at seven and one had rated them at nine. The high rating was from a subordinate of the person who gave the low rating.

One of the people who rated the bidder at seven indicated that he had used information which the bidder provided under another sub-factor (within the factor) to support his relatively higher rating on this one. The person who was at a nine indicated that he would be willing to come down to a seven if his boss would come up. At this point, the low rater indicated that he would not want to come above a six.

There was additional discussion in which the panel member who had found information elsewhere in the proposal pointed out the specific sentences which he felt were relevant. The low panel member eventually agreed to come up to seven, indicating, however, that he was uncomfortable in doing so.

IV.10.7 The Sixth Factor Team Meeting

Commercial Impact, Factor III, Objectives, met on Wednesday, April 21, at 10 A.M. Five panel members were present. In determining ratings under this factor there was a substantial amount of discussion concerning the appropriateness of various sub-objectives as related to the overall objective of developing the systems. One panel member explained that he had rated a bidder low on a sub-factor where the bidder had indicated that ETIP should do some simplistic evaluations early in the project in order to have some favorable outcomes. He felt that ETIP's objective was to produce credible results. Another panel member argued for the bidder's position and stressed the importance of ETIP having some successes in the first year in order to build constituency support for the evaluation systems. The first panel member was persuaded and raised his rating.

Another series of discussions on this factor surrounded the match between the approach proposed by a bidder and the objectives of the project. The bidder had been developing a specific model which they believed was applicable

to ETIP's requirements. The proposal indicated that they would further test and develop this model using the various procurement experiments. One panel member stressed that this bidder wished to pursue his own independent objective of developing his model and was not considering other methods which might be far more appropriate under various circumstances which would occur during the project. This panel member was successful in persuading others on the team to reduce their ratings.

IV.10.8 The Seventh Factor Team Meeting

The next meeting was Agency Impact, Factor VII, Data Analysis Process. It met Wednesday, April 21, at 12:30 with four panel members. During this factor meeting a discussion occurred concerning the capability of a bidder who admitted to a lack of capability in dealing with a priori proposition testing. One team member used this as a justification for his low rating. He was reminded by another team member that the standard for evaluation is present or potential capability. Since the bidder seemed to have a good understanding of where their specific weakness was it was argued that they had a strong potential capability. The panel settled on a score of seven.

This was one factor where the team made specific use of a panel member from outside of ETIP who was an expert in the substantive area of the factor. This panel member

presented discussion on what knowledge and skills he felt contractors would need to have in order to match with what he saw as the requirements of the project. He also discussed the appropriateness of the data analysis techniques which various bidders were suggesting.

During this meeting one team member inquired as to whether it was possible to determine which bidders could no longer be considered acceptable and to save time by eliminating these bidders from further rankings. That is, since this was the sixth factor team meeting on the agency impact contract it would be possible to determine whether any bidder's ratings were so low overall that they would be unacceptable no matter how well they did on this and the remaining factor ratings. Another panel member pointed out that the rules of the procurement did not allow the panel to do this. The procedure required evaluation of each bidder on all sub-factors.

IV.10.9 The Eighth Factor Team Meeting

Agency Impact, Factor II, Reports and Reviews was the final Agency Impact factor team to meet. The meeting was convened at 3 P.M. on Wednesday, April 21, with five panel members. During this factor team meeting a lengthy discussion took place when one panel member wanted to rate one of the bidders as a 10 on the first sub-factor. The panel member claimed that this was one of three sub-factors in the procurement where he was an expert and that he felt

that this particular bidder really understood the issues here. To support his argument he referred to his prior experience with other contractors on other projects in dealing with these issues. In the end the panel could not be convinced to come above an eight.

IV.10.10 The Ninth Factor Team Meeting

The Commercial Impact, Factor VII, Data Analysis meeting began at 10 A.M. on April 22. Four panel members were present. The ground rules were reviewed since a panel member who had not previously participated was present. Following this brief review the team was asked to turn in their first set of ratings. The new panel member indicated that he was prepared to discuss the proposals as a whole but that he had not attempted to follow the rating sheet format. He was told that the rules of the procurement specified that each panel member is required to hand in at least one sub-factor rating form in order to participate as a team member. He indicated that he was unwilling to do that since he felt that rating sub-factors was evaluating the issues out of context. Discussion with the other panel members continued for several minutes concerning the bases for the evaluation and what the new panel member felt they should be. He indicated that he would summarize his views of the

three proposals in a memorandum¹⁵ and said that he would not go through the PFE evaluation process. He said that he thought it was "hogwash." At this point he left the room and the panel proceeded with its evaluation.

IV.10.11 The Tenth and Eleventh Factor Team Meetings

Commercial Impact, Reports and Reviews (Factor II) and Background (Factor IV) met on Thursday, April 22, at 12:30 and 3 P.M. respectively. Factor II had five panel members and Factor IV had seven members. These factors were rated fairly rapidly. Some of the discussion referred back to points brought out on the same factors under the agency impact evaluation.¹⁶ There tended to be considerably less discussion on the commercial impact evaluation as compared to the agency impact evaluation.

IV.10.12 The Twelfth Factor Team Meeting

The final day of panel meetings was April 23. The day began with Commercial Impact Factor VI, Data Collection Processes. Five panel members were present including two new panel members. After the evaluation process was reviewed

¹⁵This same panel member had sent a memorandum to the director of ETIP on April 16, indicating his concern over ETIP's plans to commit up to \$2 million for the projects and stating that he found the procurement process "overly complex and poorly focused."

¹⁶Two of the three bidders on the commercial impact contract had been bidders under agency impact.

one of the panel members expressed a preference for discussing each bidder on the entire factor before doing any ratings. Rating sheets for all of the sub-factors were turned in and about 15 minutes was taken to discuss what the various bidders wrote under factor VI. The rating process then proceeded as in the other team meetings.

IV.10.13 The Thirteenth and Fourteenth Factor Team Meetings

The final two factor team meetings were Commercial Impact Factors I, Management and V, Evaluation Design. They met at 12:30 and 3 P.M. with four and five panel members respectively. These meetings were again relatively short, with discussion referring back to prior team meetings. The last meeting concluded at about 4:15 p.m.

IV.11 Summarizing the Results for the Contracting Office

Following the last factor team meeting the COTR and the author began the summary of results for presentation to the contract negotiator. The factor scores for each bidder were multiplied by the preassigned factor weights to obtain the overall ratings. The scores were then summarized in tabular forms for each of the two contracts to obtain a visual display of the factor and sub-factor distributions. A determination of a recommended competitive range

was made by looking at both the final overall scores and the distribution of each bidder's scores across all factors and sub-factors. It was felt that bidders with low overall scores or bidders which had acceptable overall scores but had an unacceptable number of factors rated at four or below could be considered unacceptable. An examination of the distribution of scores revealed that on the Commercial Impact contract bidder #101¹⁷ clearly dominated the other two bidders. In fact there were no sub-factors where the scores of either of the other two exceeded bidder #101. On the agency impact contract the situation was quite different. Here three of the six bidders were rated significantly higher overall than the other three. They were also quite close to each other in overall score. One of the three more favorable bidders on the agency impact contract was the same bidder which dominated on the commercial impact contract. However, since ETIP had stipulated at the outset of the solicitation that it would not award both contracts to the same firm, this bidder could not ultimately be considered for both contracts.

The recommendation which the COTR was prepared to make was that bidder #101 be given further consideration as the

¹⁷The bidders will be referred to by number rather than name. These numbers are also used with the data presented in figures in the text and in the appendix.

commercial impact contractor and that bidders #202 and #203 be given further consideration as agency impact contractors. In this case further consideration would require clarification on sub-factors where various factor teams had raised issues for clarification with each bidder, or where the bidder was rated below a seven.

In a May 4, 1976 memorandum, the COTR conveyed these recommendations to the contract negotiator. He provided a chart (Figure IV.14) giving the scores and then provided seven pages of narrative to summarize the issues on which each bidder had problems. (COTR, Note 91). The narrative followed the break points set out on the factor/sub-factor rating sheet. A bidder was said to be acceptable or better on factors where their score was seven or greater and unacceptable on factors where the score was less than seven. In elaborating further, a bidder was said to have moderate problems on issues related to sub-factors where the agreed upon score was six, more serious problems where the score was five, and very serious problems where the score was four or below (COTR, Note 92). As an example, the section from the memo on bidder #206 read as follows:

Bidder #206

The ETIP panel rated #206 as acceptable on only two of the seven proposal evaluation factors. #206 was considered unacceptable on:

- o Management
- o Reports and Reviews
- o Background Information
- o Evaluation Design
- o Data Collection Process

Among the issues with which #206 had moderate problems were:

- o Its evaluation management capability
- o Its understanding of and capability to define the detailed evaluation objectives
- o Its ability to anticipate the incorporation of the results of Phase One in the restated objectives for Phase Two

Among the issues with which #206 had more serious problems were:

- o Its understanding of the specific objectives of the program(s) and/or experiment(s) that are to be evaluated
- o Its ability to design the overall data collection process
- o Its ability to design the overall data analysis process

Among the issues with which #206 had very serious problems were:

- o Its ability to coordinate its activities with those of other related individuals and organizations not specifically referred to in section II
- o Its understanding of the programs, organization policies and procedures of other relevant organizations.

This gave the contract negotiator considerably more information than was available in the final numerical score

The final ratings are based on the following factor ratings assigned by the ETIP panel, and by the weights established at the outset of the solicitation:

WEIGHTS	15	15	20	15	15	10	10	FINAL RATINGS
	Management	Reports and Reviews	Objectives	Background Information	Evaluation Design	Data Collection Process	Data Analysis Process	
FACTORS	I	II	III	IV	V	VI	VII	
BIDDERS								
Agency Impact								
B205	7	7	8	9	7	8	7	760
B202	6	6	8	8	7	6	7	695
B203	7	8	7	6	6	7	8	695
B206	6	5	7	5	5	5	7	575
B204	6	6	4	4	4	4	5	470
B201	4	4	5	5	4	4	4	435
Commercial Impact								
B101	8	7	8	8	8	8	5	755
B102	5	4	4	4	4	5	4	425
B103	4	4	4	3	3	3	4	360

FIGURE IV.14 SUMMARY DISPLAY OF SCORES FOR THE CONTRACT NEGOTIATOR

and in a manner which was consistent across all bidders. In this way the important issues for use in clarification, negotiation and debriefing were not obscured by the numbers.

IV.12 Preparing for Orals

Preparation for face-to-face discussions with the three remaining bidders was accomplished by the COTR, the contract negotiator and several ETIP staff through a review of the notes on issues for clarification which were raised by the factor teams. That is, on any sub-factor where the bidder was rated at six or below or where the panel had otherwise requested a specific clarification, the COTR went back to the notes of the evaluation process to prepare questions to initiate the discussions. At least one question was written for each sub-factor where the panel required clarifications. During this time period, telephone calls were placed to people referenced by the bidders in their proposals as being familiar with their past performance.

With the factor team meetings completed, the bidders' cost proposals were provided for review by both the COTR and a cost analyst in the contracting office. There was a considerable difference in the costs proposed by the two remaining bidders on the agency impact contract. The cost difference was accounted for by a number of factors including, primarily, different total man months of effort

proposed, different costs for direct and indirect labor (benefits), overhead, and G&A (General and Administrative), and different travel and secretarial costs.

The task which remained for the COTR was to improve the estimates of each bidder's actual sub-factor score (i.e., decrease the range of uncertainty), obtain clarification of cost estimates and consider all of the information together to make a determination of which offer appeared to be in the best interest of the government (cost and other factors considered). A meeting was held with the contract negotiator on May 12 (COTR, Note 93) to plan the process for this review. It was decided to invite each bidder in for three hours. They would be allowed to make a brief presentation on their proposal, followed by a question and answer period on both cost and technical information. All meetings would be tape recorded.

The bidders were called by the contract negotiator and told that ETIP wished to meet with them for face-to-face clarifications of some issues in their proposals. They were told which sub-factors these issues related to so that they could prepare for the meeting.

IV.13 Orals and Written Confirmations

Bidder #203 was invited to appear at the Department of Commerce the morning of May 25, 1976. They arrived with

six members of their proposed team, including the project manager and various technical area leaders.

Following initial introductions the project manager was given the opportunity to make a brief presentation on the organization's proposal. He responded by discussing the characteristics of the organization including its size, the technical skills of its staff, and some of its areas of prior work. He said that in responding to the format of the RFP they were unable to bring out a comprehensive illustration of how they might deal with an experiment and hoped to do so during the discussions. The meeting then proceeded with a dialogue surrounding the specific questions which ETIP had prepared (Tape of meeting, Note 94).

Questions were asked about both management and technical aspects of the project. The management questions ranged from asking which senior management people would be full time on the project to asking about the internal process for resolving conflict among people on their team. The technical dialogue included questions on who wrote specific portions of the proposal to discussion about what the appropriate research techniques would be for specific evaluations under various circumstances (Tape of Meeting, Note 95).

Bidder #202 was invited to appear on the afternoon of May 25. They brought four members of their team including the project manager, one of the technical group leaders and two technical staff members.

Following introductions, the project manager described the process which was used in preparing their proposal and discussed in very general terms what their organization would do in carrying out the work. He also indicated that they had some questions concerning the extent and nature of the involvement of the ETIP staff in the project. The meeting proceeded with discussion related to the issues on which the evaluation panel suggested clarifications. (Tape of meeting, Note 96).

Questions covered both management and technical aspects of the project. Management questions included asking about costing of various aspects of the proposal relative to the work to be done and asking about the process of integrating various technical specialists into the work as they are required. Technical discussion ranged from asking where specific expertise was within their team to questions of what specific technical methods would be appropriate for various potential types of evaluations (Tape of meeting, Note 97).

Bidder #101 was invited to appear the morning of May 26. They brought six people to the meeting including a representative of company management, the project supervisor, the project leader, technical group leaders, and technical staff.

The project supervisor introduced those present and described the corporate commitment to the project. He then turned the presentation over to the project leader who discussed what bidder #101 saw as some of the key issues of the work and how they generally intended to deal with these issues. This was followed by a dialogue on the issues which required clarification. (Tape of meeting, Note 98).

Again, this covered both management and technical matters. Management questions included asking about the level of commitment that specific people would make to the project and asking about how resource allocation decisions would be made. Technical issues tended to center around the process for developing and finding a home for the commercial impact evaluation system (Tape of meeting, Note 99).

Following the face-to-face meetings the COTR sent the contract negotiator written lists of questions and statements for each of the three bidders. This was to be used to obtain written confirmation of positions taken by the bidders or observations made by the ETIP staff which participated in the oral discussions. The approach taken, as indicated in the memo transmitting the questions to the contract negotiator, was to present to the bidders with both:

- o A standard concerning where ETIP felt the bidder should be with respect to understanding, approach or capability along a single or particular set of factors or sub-factors, and

- o ETIP's observations as to where the bidder actually was with respect to this standard (COTR, Note 100).

In other words, the purpose was to indicate clearly where ETIP felt that the bidder still required improvement his position.

For example, one of the questions was:

The commercial impact contract requires knowledge and experience in the area of economic analysis at the firm level of aggregation. It is important for the contractor to be able to obtain access to data which is not generally publicly available. The contractor must also be able to analyze this data from economic perspective. Your proposal does not evidence this capability. Please comment on this in terms of past experience of the individuals who are proposed for this project with respect to subfactors VI.2, VI.3, VII,1. Limit your response to 1 page (COTR, Note 101).

The questions were sent out by the contracting office on June 4, and responses were requested in by the close of business June 11, 1976. Bidder #203 was sent three questions, bidder #202 was sent nine questions, and bidder 101 was sent one question.

IV.14 Summary of Results and Award

The COTR and two other panel members reviewed the written responses from each of the three bidders, together with the records of the face-to-face meetings and the findings of the technical evaluation team. For each sub-factor where an issue had been re-examined a more precise rating was assigned by this team based on the clarifications and ad-

ditional information which were provided by the bidders. The overall results were that bidders #203 and #101 were both considered acceptable on all seven proposal evaluation factors while bidder #202, considered unacceptable on three factors after the panel evaluation, was now considered unacceptable on an additional three factors. The COTR's decision was therefore to recommend that bidder #101 be negotiated with for the commercial impact evaluation contract and that bidder #203 be negotiated with for the agency impact evaluation contract (COTR, Note 102).

These recommendations were conveyed to the contract negotiator in a memorandum on June 17, 1976. The form of this memorandum followed the narrative form of the COTR's May 4 memorandum, i.e., discussion of acceptability based on factor scores of seven or greater and unacceptability based on factor scores below seven with elaboration of moderate, more serious and very serious problems based on the specific sub-factor scores.

The COTR sent a second memorandum to the contract negotiator describing additional information which needed to be considered during final negotiations. This included:

- o advising that the total sum of both contracts could not exceed \$1.8 million and that it would be technically appropriate to award a \$.9 million contract to bidder #101 and a \$.9 million dollar contract to bidder #203.

- o suggesting a method for negotiating on the sub-factor issue where bidder #203 continued to have a moderate problem, and
- o suggesting obtaining full time commitments from two individuals on bidder #203's team (COTR, Note 103).

Best and final offers were requested on June 23, and received by telecopy on June 24. They were reviewed by The COTR and on June 25 he sent memos to the contract negotiator indicating that he felt the quality and quantity of effort proposed to be reasonable and necessary for execution of the projects (COTR, Note 104, Note 105).

The contracting office then requested a written indication of the shifts which resulted in bidder #202's sub-factor ratings based on additional information which was provided from the oral and written clarifications. This listing was prepared by the COTR and the author and sent to the contracting office and June 28 (COTR & Libman, Note 106).

Contracts dated June 30, 1976 were signed with both bidder #101 and #203 and work on the projects began during the second week of July.

IV.15 Debriefing

On July 9, the COTR and the author sent a memorandum to those who participated on the evaluation panel. The process which followed the evaluation panel meetings and its results were described and panel members were thanked for their participation (COTR & Libman, Note 107).

The contracting office received one request for a debriefing. This was from bidder #202. The COTR, the author and the contract negotiator met with three representatives of bidder #202 on August 4, 1976. The initial discussion centered around the factors on which bidder #202 was found to be less than acceptable (COTR, Note 108). The dialogue and tone of the meeting indicated that bidder #202 disagreed considerably with the evaluation of their technical capability and were angry about losing when they considered themselves more qualified than the winner (COTR, Note 109). However, they did not file a formal protest.

IV.16 Summary and Transition to Chapter V

This chapter has provided a chronology of events related to the procurement of two evaluation systems contracts by the Experimental Technology Incentives Program. Information was presented on issues which participants brought to the process and on how they were resolved. Data from the actual evaluation process were presented in figures and anecdotes were related to give the reader a picture of how the process resulted in ratings for bidders. The review and summary process was described to show how the process progressed from the evaluations by the panel to the signing of contracts.

The next two chapters will evaluate the results of using PFE against some of the issues which participants

in the procurement raised. The results will also be evaluated against some of the issues which are raised by the literature which was reviewed in Chapter II. The description presented in this chapter and other data from the process located in the appendix will be used in this evaluation. This information is presented to enable the reader to perform his own independent evaluation.

CHAPTER V
EVALUATION/CRITIQUE

V.1 Introduction

The purpose of this chapter is to evaluate the outcome of ETIP's use of the Parametric Factor Evaluation process. It presents an assessment of how well the PFE process worked in solving many of the critical issues which ETIP faced during its source selection. The issues for this evaluation are those which were raised by participants in the ETIP project, together with a selection of issues from the literature which the author felt were applicable to ETIP's problem.

The format for presenting the evaluation is to provide some general discussion of the issues and procedures for evaluation, to discuss the outcome for each selected issue individually, and finally to summarize the results of ETIP's use of PFE in terms of successes, failures, and uncertainties. The general discussion of the issues indicates how an initial set of issues were accumulated and placed into categories and how a specific set of issues were singled out for in-depth discussion. The technique for gathering additional data from participants in the source selection is described and the parameters which may affect the inter-

pretation of the results are discussed. The evaluation of each specific issue contains a conclusion about how successful PFE was in dealing with the issue and presents the information which the author used in reaching this conclusion. Finally the summary of the evaluation is presented in which the issues are placed into categories of those for which PFE appears to present a successful solution, those which PFE appears to be unsuccessful at solving, and those for which a conclusion cannot be confidently made using the data available. An indication of the points at which ETIP departed from the process as it was originally used at Wright Field and a description of changes which ETIP made in its own subsequent applications of the process are presented as part of Chapter VI.

V.2 The Issues, Additional Data, and Parameters

V.2.1 Listing of Issues

The issues presented in this section provide the basis for evaluating the effectiveness of the PFE process in solving ETIP's source selection problem. The list of issues, which is presented in Figure V.1, was drawn by two methods. The first was by examining the records of ETIP's use of the PFE process for questions which were raised before, during, and after the source selection by the people who were involved. The second was by writing down issues the author came upon, through his readings, discussions with others, or reflection on the problem, which seemed appli-

cable to ETIP's situation. Comprehensiveness in covering the major issues rather than independence among the issues was the objective. In fact, it is partly the underlying interrelatedness among these issues which makes system source selection a difficult problem. The listing of issues is not meant to imply that they are necessarily of equal importance. Also, issues of significance to some source selections but not directly relevant to ETIP's problem are not covered here.

V.2.2 Categories of Issues

When a preliminary listing of issues was accomplished, the list turned out to be quite long. In order to provide some structure to this evaluation, a grouping was sought. Each issue was sorted into a group with the other issues to which it seemed most closely related. As this was being done, the common elements within groups emerged and headings were assigned. A statement was written for each heading to try to illustrate the common elements. Issues were then moved among these groupings if, upon re-examination, they seemed like they fit better elsewhere. As a few new issues were later discovered, they were placed in one of the existing groups. In some cases an issue could have fit under one or more other headings and was assigned somewhat arbitrarily. For evaluation purposes the issue is more important than the major category under which it is grouped.

ISSUE CATEGORIES

1. Effective Communications
2. Sensitivity and Selectivity in Obtaining Bids
3. Assessment of Bidders' Capability
4. Use of Experts in the Evaluation of Proposals
5. The Panel's Role in Evaluation of the Proposals
6. Equity of Treatment Across Bidders
7. Risk Associated with Statement of Work
8. Basis for Award
9. Traceability of the Process
10. Relationship with the Contracting Office
11. Resource Requirements
12. Education of Government Personnel
13. Education of Bidders

FIGURE V.1 ISSUES AND ISSUE CATEGORIES

1. EFFECTIVE COMMUNICATIONS

Did the format and content requirements of the PFE process provide for effective communications between the government and potential bidders and between bidders and the ETIP proposal evaluation panel?

Format

- + Did PFE provide too much structure for the bidders' response?
 - Is the bidder able to display his competence?
 - Does it present problems for the bidder or the panel when no formal structure is used for the object of the procurement?
- + Did the panel have difficulty evaluating the proposals on a sub-factor basis?
 - Was the panel able to find the information it needed?
 - Did they feel that the evaluation was being done out of context from the project?

Was the RFP poorly organized?

Was the RFP confusing?

Was the existence of two statements-of-work confusing?

Was the RFP too long? Should its size have been limited?

- + Should the size of proposals have been limited? (Did length correlate with final scores?)

- + Did the bidders understand what the evaluation panel looked at in making their evaluations? Did knowing this help?

Did the briefings allow for adequate questioning by the prospective bidders? (differences in information among bidders)

- + Did the process enable the panel to deal effectively with differences in uncertainty in information among bidders during the evaluation?

Did the question form provide an effective mechanism for obtaining missing information and clarification after the proposals were received?

- + indicates that the issue is explicitly discussed in Section V.3

FIGURE V.1 Continued

Content

+ Did the process communicate to potential bidders what it was the government wanted to buy?
(Did bidders know what they were bidding on?)

+ Did the process communicate to prospective bidders the skills which would be required to do the work on the project?

Did the process succeed in explaining to bidder the reasons why it was being used?

Was information provided to bidders on the history of the PFE process harmful or useful or unnecessary?

+ Were many of the sub-factors not useful to the bidders or the panel (e.g., Management or Reports & Reviews sub-factors)?

Was too much detail required from the bidders?

(Information which was not useful for effective communication.) Does the process encourage gold plating of proposals?

Did the process make the priorities of the government clear?

Did the process enable the government to describe aspects of the project for which few details were known as well as those for which there was a great deal of detail?

Were problems caused by the requirement for the bidder to respond to issues which are traditionally thought to be the responsibility of the government? (e.g., how to rationalize multiple and conflicting objectives of the project).

+ Was parroting back of information from the RFP by bidders to the exclusion of other information a problem for the panel?

2. SENSITIVITY AND SELECTIVITY IN OBTAINING BIDS

Was ETIP successful in obtaining an acceptable number of responsive bids?

FIGURE V.1 Continued

- + Were enough responsive bids received to allow for a confident evaluation?
 - + Did the process enable prospective bidders to self-select effectively on bidding?
 - Were a large number of non-responsive bids received?
 - Did a lot of qualified firms not bid?
- Did the process help the bidder to know which people to use in responding to the RFP?

3. ASSESSMENT OF BIDDERS' CAPABILITY

Did PFE enable ETIP to assess whether bidders had the required capabilities when there was no track record in contracting organizations, i.e., of having a large number of people with the diverse skills and interests which were required here to work together over a long period of time to develop the evaluation systems.

- + Did PFE provide for an effective evaluation of management capability?
- + Did PFE provide for an effective evaluation of technical capability?
- + Did PFE anticipate the problems which were known to exist in doing evaluations and in developing systems?
 - Did the criteria provide for an assessment of the relationship between what was proposed and later performance?
 - Was the award based upon proposals which would have some relationship to the approach subsequently used?
 - Was the material provided by the successful contractors useful or not to the PAAs?

4. USE OF EXPERTS IN THE EVALUATION OF PROPOSALS

Was ETIP able to obtain and make use of experts in the evaluation of proposals?

- + Was it difficult to get experts (specialist and those with prior experience with prospective bidders) to participate when there was a large RFP and the proposals were expected to be large?

Was expert information useful in the evaluation? Did the panel always follow the advice of experts?

FIGURE V.1 Continued

How difficult was it to identify people to put on the evaluation team? How difficult was it to train them in the evaluation process? How difficult was it to motivate them to do a good job?

5. THE PANEL'S ROLE IN EVALUATION OF THE PROPOSALS

Did the Factor Team process work effectively in obtaining agreement on ratings on all sub-factors for all bidders?

- + Did panel members who agreed to participate actually show up?
How difficult was it to schedule the meetings?
- + Were panel members able to arrive at initial ratings prior to factor team meetings?
- + Was the panel able to arrive at final scores without voting?
Was the panel able to deal effectively with strong individual disagreements?
- + Did the panel members realize how their individual positions affect the final score, i.e., do they see other panel members modifying their position in response to the discussion.
Do panel members understand how the final score is reached?
- + Do the final scores differ significantly from the means of the initial scores of the individual panel members?
- + Were the panels ratings and recommendations used after the panel meetings were concluded?
- + What impact did those with extreme scores or greater variability in their ratings have on the final scores?
What affected the time to reach agreement?
The distribution of initial scores?
The specific panel members present?
- + How long did it take to reach agreement on factor scores after the sub-factor scores were agreed to?
- + Were "junior" panel members able to affect the score if their bosses were in the room and their initial scores differed?

FIGURE V.1 Continued

Did panel members read the correct parts of the proposals in arriving at their ratings?

6. EQUITY OF TREATMENT ACROSS BIDDERS

Did the process provide for a fair and equitable treatment of all of the bids?

- + Did the panel deal effectively with the biases of its members?
- + Did the criteria used in evaluation provide for a consistent evaluation across proposals? Were the criteria applied consistently across proposals?

Were any problems caused due to the lack of a requirement on the bidders to respond to all of the illustrative questions?

- + Did the lack of restriction on admissible information lead to any inequity in the process?
- + Did evaluation of the proposals while knowing the identity of the bidders create any problems - biases in the final ratings, protests?

7. RISK ASSOCIATED WITH THE STATEMENT OF WORK

Did PFE enable ETIP to deal effectively with the "added risk" associated with a flexible statement of work.

- + Was ETIP able to write a statement of work which would spell out deliverables and yet avoid numerous contract changes which generally occur in situations where requirements, policies, and the state of the art are changing?
 - Did ETIP management accept it?
 - Did the contracting officer accept it?
- + Did the flexible statement of work scare off bidders?
- + Was ETIP able to assess the commitment of the bidders' top management to devote the necessary resources to the project?
 - Was ETIP able to determine whether it was within the longer term interest of management to develop the desired systems?

FIGURE V.1 Continued

Did PFE deal with the lack of incentive for cost control in CPFF contracts?

Would PFE allow ETIP to alter the timing and level of effort of the project after the contract was signed?

8. BASIS FOR AWARD

Did use of PFE provide a basis for discriminating among bidders on criteria other than price in determining who to negotiate with?

- + Did PFE provide for overall technical discrimination among bidders? Was there a sufficient distribution in the final scores to determine a competitive range?
- + Did PFE provide a basis for discriminating among bidders on specific technical issues? i.e., Did the specific issues get washed out by the overall technical score?

How much of a factor was schedule in the final decision?

Did PFE provide a capability for meeting requirements to allow a bidder to improve his proposal?

- + Was technical leveling a problem?
- + Was technical transfusion a problem?

Did the process provide the contract negotiator with the information he needed to negotiate a contract award?

- + How much of a factor was bid price in the final decision? Did the procurement turn out to be a price competition? Did the process provide a capability for dealing with potential buy-ins?

9. TRACEABILITY OF THE PROCESS

Are the results of the evaluation traceable so that an independent examination of the record would reconstruct the bases for the final selections?

- + Did the process communicate that there was no sole source position? Can the process be fixed?
- + Did bidders understand how the decisions on who wins actually get made?

FIGURE V.1 Continued

- + Can changes in scores be traced between the initial ratings of panel members and final panel ratings and between final panel ratings and the award decisions?
- + Did the panel follow the written procedure?
- + Did leaving the relative weightings of the sub-factors up to the teams lead to any problems (e.g., appearance of inequities)?

10. RELATIONSHIP WITH THE CONTRACTING OFFICE

Did the contracting office feel vulnerable to award protests by using PFE?

- + Is PFE legal under the Federal Procurement Regulations?
- + Did the contracting officer feel that the selections made by using the process would be defensible if there were a GAO investigation?
- + Did the contract negotiator accept the evaluation of the panel? Did he want the panel to revise their report? Did he want another level of technical review of the panel's evaluation?
- + Did using PFE result in timely awards?
- + Were there any protests of the award?
- + Were any debriefings requested?

11. RESOURCE REQUIREMENTS

What level of resources over what interval of time were required to effect the procurements?

- + How much time was required to do system or evaluation design work prior to issuing the RFP?
 - o elapsed
 - o total time of various people
- How much time did it take to write the RFP?
 - o elapsed
 - o total time of various people
- + How much time did it take for bidders to respond to the RFP? What was the volume of material submitted (as a surrogate for cost of responding)?

FIGURE V.1 Continued

- + How much time did it take for the panel to evaluate the proposals? How much time did it take to read the proposals? How much time did the panel meetings (and preliminary meetings) take? How much time would oral presentations have taken?
- + How long did it take to make an award once the panel's evaluations were complete?
 - How much time did it take to write up the results of the panel meetings?
 - How long did it take to prepare for oral clarifications? How long did it take to request written confirmations of oral clarifications? How long did it take to reach a decision once the written clarifications were received?
- + How long did it take to prepare for the debriefing?

Would the same decision have been made by using another method? Does another method deal as effectively with the same issues for less effort?

12. EDUCATION OF GOVERNMENT PERSONNEL

Did use of PFE result in education of government personnel who would be involved in the evaluation system development projects?

- + Did use of PFE result in education of government personnel so that they would be able to effectively evaluate the bidders' proposals?
- + Did use of PFE result in education of government personnel so that they would be better able to work with or manage the resulting contractors?
 - Were program participants willing to be involved in the procurements?

13. EDUCATION OF BIDDERS

Did use of PFE result in education of bidders useful to their future interactions with ETIP?

- + Did use of PFE result in training, learning, and education of the successful bidders which was useful for their performance on the contracts?
 - o early performance
 - o later performance

Did use of PFE result in education of unsuccessful bidders which was useful in bidding on other ETIP RFPs?

FIGURE V.1 Continued

The categories serve mostly as a structure for the discussion which follows in Section V.3.

V.2.3 Selection of Specific Issues for Discussion

Equal treatment of all of the issues was thought to be neither desirable nor possible within the scope of this case study. It was therefore necessary to make some decisions concerning depth of evaluation for each issue. There were two criteria for these decisions. They were: 1) the relative importance of the issue to the problem; and 2) the availability of data to support an evaluation of the issue. The issues treated most extensively are those which were considered most important and for which data was available or obtainable. The issues treated least extensively, or ignored, are those which were considered less important and for which no data was available or reasonably obtainable.

V.2.4 Additional Data

At the time when the specific issues were selected for evaluation, the data which were available to support the evaluation included the history of the PFE process, Thompson's written description of the process, and the written records and the author's recollections of ETIP's use of the process which were used to construct the chronology. The process of selecting issues helped to highlight those for which this data was insufficient to enable presentation

of conclusions which represented anything more than the author's own beliefs. Questionnaire items were written for those issues where it seemed that additional information could be obtained from other participants in the process which would enable a more confident evaluation of specific issues.

The items were divided into a questionnaire for panel members and a questionnaire for representatives of bidders' firms. Each questionnaire was then pilot tested. The panel questionnaire was given to a person who was familiar with PFE through his participation on later panels where ETIP used the process. The bidder questionnaire was given to two people in a firm which had bid on subsequent source selections where ETIP used the process. Some minor modifications were made in the wording of several items and additional background material was included with the questionnaire as a result of the pilot test. The test also indicated that response to the bidder questionnaire is sensitive to the person in the firm who answers the items. The two individuals in the same firm who were both closely involved in preparing their firm's proposal had divergent responses to some of the items.¹

¹This served to highlight the importance of knowing the values and beliefs of individuals and what role they will have in management of the system development. Firms are not monolithic in the way they view a given problem and thereby in the way they manage an approach to solving it.

The method for administering the items combined a questionnaire and interview format. Questionnaires were mailed² to participants together with some background information on the source selection (a list of the factors and sub-factors and a list of other material which had been included in the RFP) to help remind them of the process. The bidder questionnaire was mailed to the person in the firm who appeared to have managed the firm's response to the RFP. The cover letter indicated that the author would phone to provide clarifications and to obtain their responses.³ Participants were then interviewed after having at least a week to review the items.

During the interviews each item was reviewed with the respondents. For the yes/no answers, people frequently provided additional information to justify or qualify their responses. After all of the questionnaire items were answered, the author asked two additional questions. One was whether it was difficult to recall the events and their reactions related to the items they were being asked about. The other was whether there was anything which they had not already been asked about which stood out in their mind

²Several were hand delivered.

³One participant, who was called in advance to obtain his new address, asked that additional background information be sent with the questionnaire. In this case, the set of illustrative questions was also included with the sub-factors.

concerning the source selection process.⁴ Copies of the questionnaires and cover letters are presented in the Appendix.

Response to the questionnaires was very good. All panel members were interviewed and all but one bidder representative were interviewed. The one bidder was traveling quite extensively during the three weeks the author tried to speak with him and could not be reached.

Of the seventeen panel members, fifteen provided full responses and two provided partial responses. The two who provided partial responses indicated that:

- o I didn't remember participating and would be giving reactions to your current description of the process;
- o I remember that it was an interesting day and that the proposers that came to the top we all agreed and they were indeed the best.

The first had participated on four sub-factors and did not answer any of the questionnaire items. The second had participated on two sub-factors and only answered several of the questionnaire items. All six out of the seven representatives of bidders firms who were interviewed provided full responses.

V.2.5 General Parameters to the Evaluation

When interpreting the data to determine the effectiveness of PFE in dealing with the specific issues, it is impor-

⁴One panel member mailed his questionnaire back and was therefore not asked these questions.

tant to consider parameters which might lead to plausible rival interpretations. A summary list of general parameters is presented in Figure V.2 and discussed in the next several paragraphs.

- o Memory
- o Subsequent Experience with the Systems Development
- o Subsequent Experience with the PFE Process
- o Other Related Source Selection Experience
- o Outcome of the Source Selection
- o Ego Issues Related to Arguments About What To Do
- o Lying by Respondents or the Author

FIGURE V.2 GENERAL PARAMETERS TO THE EVALUATION OF THE OUTCOME OF ETIP'S USE OF PFE

V.2.5.1 Memory. One of the main parameters is memory. Much of the data used in this case study is it is based on the recollections of various participants in the source selections and was collected three to four years after the events occurred. Present recollections of facts and prior opinions may contain errors due to difficulty of recall.

Respondents were asked how much of a problem recall was, in order to obtain their self-report on this parameter.

Of the fourteen panel members who responded to this item, three said that memory was a problem, seven said that it was not, and four said that it presented some problems. Of the six bidders, one said that memory was a problem, four said that it was not, and one said that it presented some problems. Figures V.3 and V.4 list additional responses under each of these categories.

It should be noted that a response of "no" does not necessarily mean that a respondents' recall was always accurate. The author found factual errors in the recall of at least one panel member who reported that memory was not a problem.

V.2.5.2 Subsequent experience with the systems development. Many of the participants in the source selection subsequently had a role in working on the development of the evaluation systems. This is true for some of the panel members, the contract negotiator, the author and, of course, the successful bidders. Responses by these people concerning the effectiveness of the PFE process in dealing with some of the issues of source selection may be mediated by these later experiences. No data was collected to try to measure participants on this parameter.

V.2.5.3 Subsequent experience with the PFE process. ETIP has used the PFE process on two subsequent procurements. One each in 1977 and 1978. Some of the participants in

Was recall a problem in responding to the questionnaire items?

Yes - 3

No - 7

Somewhat - 4

Remarks by those answering Yes

- o Remembering was a problem, particularly memories of specific exchanges, circumstances, and my own reactions (PM5).
- o Memory was quite a problem. The reprint of the factors and sub-factors helped (PM9).
- o Without seeing a proposal it was very hard to remember (PM4).

Remarks by those answering No

- o No, but these were reflex answers. I might have answered differently if you asked closer to the events (PM11).
- o No, since I had some notes from the experience to help. Otherwise it would have been more difficult (PM1).
- o No, it stuck in my mind because it was unusual (PM15).
- o Not a major one. It made quite an impression on me. It was the most elaborate, largest exercise of this type I'd ever been through. There may have been a lot of specific points I would have remembered if it weren't four years ago. What stands out are the elaborateness of the process, the fact that I didn't find that to be a problem, the interaction among the people who reviewed each section was very constructive, and the overwhelming sense that it was an inappropriately written RFP (PM3).

Remarks by those answering Somewhat

- o My answers were more on impressions than on substance. I do not remember any of the substance of the proposals (PM10).
- o My overall impressions of strengths and weaknesses are accurate. Some things were a little hard to remember (PM6).

FIGURE V.3 PANEL MEMBERS' SELF-REPORTS ON PARAMETER OF RECALL

- o I remembered fairly well, even specific deliberation. It wasn't easy though. I have a moderate amount of memory of it (PM7).
- o It wasn't as bad as I thought it was going to be, but it was still somewhat of a problem. Since I haven't been on other panels it made it easier (PM16).

FIGURE V.3 Continued

Was recall a problem in responding to the questionnaire items?

Yes - 1

No - 4

Somewhat - 1

Remarks by person answering Yes

- o As I thought about it more items of memory seemed to be coming back to me (BR1).

Remarks by those answering No

- o If you had not sent me the material I would not have felt as comfortable with my answers (BR4).
- o Not in relation to the questions you posed, given the appendix you attached (BR6).
- o Not the least bit. It was a big job to propose on it. I didn't even have to refer to the extracts which you included (BR3).
- o I'll never forget that RFP. It was quite different (BR2).

Remarks by person answering Somewhat

- o Not my feelings about the process. What we wrote, I don't remember (BR5).

FIGURE V.4 BIDDER REPRESENTATIVES' SELF-REPORTS ON
PARAMETER OF RECALL

the 1976 source selection participated in one or both of these later procurements. The author, for example, was closely involved in writing project plans, writing portions of the RFPs, and coordinating the evaluation panel meetings for both of the later procurements. The same contract negotiator was responsible for the 1977 procurement. One of the bidders on the 1976 source selection also bid in 1977. Some of the same panel members took part in one or both of the later procurements. The responses by these people concerning the 1976 source selection may be influenced by their experiences in these later procurements. No special data was collected to try to measure the effect of this parameter on responses.

V.2.5.4 Other related source selection experience.

Experiences of participants in system acquisition, and specifically source selection, probably effects their reaction to the PFE process and therefore their answers to the questionnaire items. If a respondent has no systems or related experience, they may not understand some of the problems which the process was trying to address. Two items were included in the questionnaires in order to obtain an indication of experience in source selection. One asked how many RFPs/evaluation panels the respondent had responded to/served on. The other asked how many of these were for projects of similar size, complexity and uncertainty to this one. Definitions of complexity and uncertainty were given in

the background note at the beginning of the questionnaire. These terms were used to describe characteristics of systems related experience. It is possible that respondents interpreted them differently than the author intended. The responses to these items are presented in Figures V.5 and V.6. As might be expected there is quite a bit of variation in experience among respondents, both panel and bidder.

V.2.5.5 Outcome of the Source Selection. Another parameter to consider is the effects of the outcome of the source selection. Responses to subsequent questions about the effectiveness of PFE in solving specific problems may be partially a function of who won. A bidder who lost may find the process less effective than one who won. A panel member who disagreed with the selection of the successful bidder may be biased against the process and visa versa. No specific measurement was attempted to try determine the extent to which this affected responses.

V.2.5.6 Ego issues related to arguments about what to do. Chapter IV indicated that there was heated debate among some of the panel members concerning many of the events related to the procurement. Some involved the selection of PFE as the method which would be used for the source selection. There were also many clashes, after the signing of the contracts, concerning the development of the systems. It is possible that the responses of some of the panel mem-

Approximately how many other evaluation panels have you served on?

Of the total number of other proposal evaluation panels which you have served on, about how many were for projects of the magnitude (i.e., 200 man-months), complexity, and uncertainty of this one?

1/0	(PM10)
3-4/3-4	(PM11)
10-11/3-4	(PM12)
20/8	(PM1)
10/7	(PM13)
35/5	(PM2)
30/3-4	(PM50)
10/0	(PM14)
6/3	(PM9)
0/0	(PM6)
25/5	(PM7)
2/2	(PM8)
6-7/1	(PM4)
3/0	(PM15)
6/0	(PM3)
0/0	(PM16)

FIGURE V.5 PANEL MEMBERS' SOURCE SELECTION EXPERIENCE

Approximately how many other RFPs have you responded to?

Of the total number of RFPs which you have responded to, about how many were for projects of similar size (i.e., 200 man-months), complexity, and uncertainty as this one?

150/20	(BR5)
600-1000/175	(BR4)
100/25-50	(BR6)
100/less than 12	(BR3)
30/2-3	(BR2)
30/5	(BR1)

FIGURE V.6 BIDDER REPRESENTATIVES' SOURCE SELECTION EXPERIENCE

bers may have been influenced by ego related issues such as the degree to which they felt involved in the development of the RFP and the degree to which they perceived they had influence in various parts of the systems developments. Though no specific measurement was attempted here, it is unlikely that this parameter affected the responses of more than two or three panel members.

V.2.5.7 Lying. A final parameter to consider here is whether the respondents are telling the truth. For responses from bidder representatives this may be mostly a function of whether the person who knows the truth was the

one who answered the questions. In a large RFP many different people are involved in preparation of the proposal. The answer to a question is partially a function of whether the author located the person who was responsible for the aspects of the proposal related to the issue under question. For the bidders, telling the truth may also be a function of their expected future with ETIP. If they feel that their responses may affect this, they may portray themselves as more favorable than they actually are. For the panel members (including the author) and for the contract negotiator, there is the possibility that the truth is being altered by the desire to not admit that anything might have been done incorrectly. This is part of a well known phenomenon in government circles which is known as "covering your ass." The responses and interpretations of the author may also be suspect on the grounds that he would like to complete his degree requirements. Since his committee chairman is the primary developer of PFE, his ability to be candid may be questioned by some readers. Responses of at least two of the panel members, the COTR, and Thompson might also be questioned on the basis that they have a stake in the success of PFE and are favorably biased toward it.

The author's impression was that all of the bidder representatives who were interviewed were closely involved in the preparation of their firm's proposal in response

to the RFP. It also seemed that the respondents were quite candid in their responses to the questionnaire items. However, as one respondent was careful to point out, the answers represented his personal views and not necessarily those of the firm. Others who worked on the proposal may have had quite different responses.

The author believes that the panel members were equally candid in their responses. In part this may be due to the fact that most of these people no longer have any relationship with the resulting projects or with ETIP. Some who were outside evaluators never had a close relationship with the project and others who were ETIP or PAA employees have since taken new jobs. No special steps have been taken to control for the responses of the author, the COTR, or Thompson. However, steps have been taken to try to compensate for biases which may affect the author's interpretations of data. An attempt has been made to provide the reader with as much unfiltered information describing the process and data from the process as possible. This has been done through including:

- o the history of the process (Section II.4)
- o the chronology of ETIP's use of the process (Chapter IV),
- o prior documents from and about the RFP (Appendix),

- o respondents' elaborations on their responses to the questionnaire items (Figures in this chapter), and
- o the actual ratings from the evaluation process (Appendix).

It is hoped that this information will enable the readers to form their own evaluations on both the issues treated extensively by the author and on those issues which readers feel are important but which the author has selected to treat in less depth.

V.3 Evaluation of the Parametric Factor Evaluation Approach Against the Specific Critical Issues

V.3.1 Introduction

This section is divided into sub-sections according to the category groupings of the issues. For each sub-section the category is described and the issues which are evaluated within it are listed.

The paragraphs in each sub-section which follow the category description are used for the evaluation of the issues within that category. Each issue is identified and its significance is noted. A statement is then made about whether the information available indicates that ETIP was successful or unsuccessful at dealing with the issue by using PFE or whether the data are equivocal. The information used in reaching this conclusion is then described. In some cases this information will be from the analysis

of questionnaires sent to participants in the process or analysis of the factor teams' ratings. In other cases the author merely reports the results as he was able to observe them through his participation in the process. An identifying number was assigned to each of the respondents so that readers may compare their remarks across items when reviewing the Figures in this section.

V.3.2 Effective Communication

The category of effective communication encompasses issues dealing with both format and content requirements of the RFP and the proposals. The issues are concerned with whether PFE provided for effective two way communications between the government and potential bidders during the source selection. That is, whether the information provided by the government and the form in which it was provided allowed bidders to assess what needed to be done and whether the responses and the form in which they were required enabled the evaluation panel to accurately determine the capabilities of the bidders.

Eight issue discussions are included under this category. Four are primarily related to format of communications and three are primarily related to content of communications. The issues are:

Format

- 1.a) Did PFE provide too much structure for the bidders' response?
 Is the bidder able to display his competence?
 Does it present problems for the bidder or panel when no formal structure is used for the object of the procurement?
- b) Did the panel have difficulty evaluating the proposals on a sub-factor basis?
 Was the panel able to find the information it needed?
 Did they feel that the evaluation was being done out of context from the project?
2. Should the size of the proposals have been limited?
 Did length correlate with final score?
3. Did the bidders understand what the evaluation panel looked at in making their evaluations?
 Did knowing this help?
4. Did the process enable the panel to deal effectively with differences in information among bidders during the evaluation?
 Did the question form provide an effective mechanism for obtaining missing information and clarification after the proposals were received?

Content

- 1.a) Did the process communicate to bidders what it was the government wanted to buy?
 Did bidders know what they were bidding on?
- b) Did the process communicate to prospective bidders the skills which would be required to do the work on the project?
2. Were many of the sub-factors not useful to the bidders or the panel (e.g., the Management or Reports & Reviews sub-factors)?

3. Was parroting back of information from the RFP by bidders to the exclusion of other information a problem for the panel?

V.3.2.1 Effectiveness of the structure. The first format issue is whether PFE provided too much structure for the bidder's response. The primary concern here was that constraining bidders to follow the sub-factor structure would lessen their ability to effectively demonstrate their qualifications. The corollary of this concern was that the sub-factor structure would interfere with the panel's ability to evaluate effectively the capability of the bidders. The aspect of PFE which is salient to this issue is that it did not provide for information exchange in terms of the object or program to be procured. Bidders were not asked to propose a design for the evaluation systems. They were asked instead to respond to the problems which the government thought would arise in developing such a system. At least one panel member voiced concern during a team meeting that this reduced the bidders' ability to demonstrate their capabilities.

The structure was generally well received by both the panel and the bidders. A question with three sub-items was included in both the panel and the bidder questionnaires to obtain reactions to the issues related to the structure. The items and responses to them are presented in Figures V.7 to V.12. Figure V.13 lists responses to the open ended

questionnaire items which pertain to structure. The panel members generally felt that:

- o the structure enabled bidders to demonstrate their ability to deal with the critical problems of the project (Yes - 13; No - 1; Yes & No - 1);
- o the structure did not create any critical gaps in evaluating bidders' capabilities (Yes it created gaps - 4; No, it did not create gaps - 10; Don't know - 1); and
- o information relevant to the issues being evaluated was readily located in the proposals (Yes -14; No - 1).

One aspect of structure which came out in the responses of some panel members is the tradeoff between consistency of evaluation across proposals which occurs when using the PFE structure, and the possibility of missing some insights which might have been presented by bidders under a less structured format. In fact one panel member felt that the structure was both the strongest and the weakest aspect of the process (see Figure V.13). The author believes that this tradeoff needs to be examined as a function of what the government is trying to procure. If the object of the procurement is uncertain and complex, a structure which tends to be free of gaps and consistent across proposals is probably more appropriate than one which evaluates proposals for solutions which may be inappropriate under a changed environment.

Did you feel that the factor/sub-factor structure enabled bidders to demonstrate their ability to deal with critical problems which might arise during the project?

Yes - 13

No - 1

Yes & No - 1

Remarks by those answering Yes

None

Remark by person answering No

- o It confined bidders to a tight recipe for how to answer and did not provide them with the ability to innovate. It didn't demonstrate their ability to deal with the critical problems. You only found out which contractor could write best. They could demonstrate that they could identify problems but I don't think they could show whether they could deal with the problem (PM4)

Remark by person answering Yes and No

- o Yes, the structure covered it and allowed bidders to demonstrate their ability.
No. it got too refined. Too many sub-factors. The kind of interconnection between judgments gets lost. There were too many factors and sub-factors by a factor of about two. The result of the judgment was not necessarily the sum of the parts (PM9)

FIGURE V.7 PANEL MEMBERS' RESPONSES TO QUESTION 1a
ON THE EFFECTIVENESS OF THE STRUCTURE

Did you feel that the factor/sub-factor structure enabled bidders to demonstrate their ability to deal with the problems which might arise during the project?

Yes - 4

No - 2

Remarks by those answering Yes

- o I thought it was too structured (BR2).
- o It was fairly well thought out. It covered all of the points quite well, to the point of exhaustion. There seemed to be some repetition (BR1).

Remarks by those answering No

- o I think the structure stunk. The approach is suitable for hardware not program evaluation and/or experimental

design. When dealing with program evaluation you are dealing with nominal data at best and therefore the summation of nominal data might not hold. It also forced people to prepare proposals in a non-research way. One that would be used for an RFQ, not an RFP. The project was poorly defined and so were the parts of the proposal. The documents loosely pointed to the evaluation but there wasn't a clear set of program or project objectives (BR5).

- o We were trying to create objectivity where the problems arising and the sensitivities that had to be appealed to were things which were subjective. The desire to be objective is to be applauded. However, we tried to create objectivity where it didn't exist. That's not saying it wasn't a good RFP (BR4).

FIGURE V.8 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 1a ON THE EFFECTIVENESS OF THE STRUCTURE

Did you feel that there were critical gaps in evaluating the bidders' capabilities to perform effectively on the project?

Yes - 4

No - 10

Don't know - 1

Remarks by those answering Yes

- o It's strictly a feeling only. I don't remember what they were. I was somewhat uneasy about how well I understood it (PM16).
- o Some of the sub-factor statements seemed too theoretical. I'm not sure it's a result of the structure. For example, sub-factor I.2. You can't measure that sub-factor as it is stated. It needs to be broken down further to make it operational (PM1).
- o The structure of the factors and sub-factors was too complicated. Some elements of the required skills were included in more than one factor, or at least the possibility of this seemed to exist. The large number of sub-factors meant the distribution of points was too great to enable sufficient weighting of the most important. Although this was not necessarily the case, it had a tendency to work out that way (PM2).
- o The evaluation criteria and the RFP were written from an academic, formal, research design perspective that rewarded firms who could respond as if this were an exam-

ination in graduate school, rather than an opportunity to develop a process for program evaluation in the real world. Thus, a bidder's recognition of the constraints of reality of evaluation was not given much, if any, weight, even if such considerations were present in the proposal. The RFP discouraged bidders from including such discussions (PM3).

Remark by a person answering No

- o I don't remember how the proposals were written so I don't know if there were any gaps. I guess there probably weren't any critical gaps (PM4).

Remark by person answering Don't know

- o Any structure presents problems of addressing questions at interfaces between sets of factors/sub-factors. I don't remember whether I sensed that with this evaluation. What most of us do in evaluating complicated proposals is form an overall impression and then segment it. This process assured that we all segmented it in the same way. It had the advantage of consistency and the disadvantage that if we had done it differently we might have received some added insight (PM5).

FIGURE V.9 PANEL MEMBERS' RESPONSES TO QUESTION 1b ON THE EFFECTIVENESS OF THE STRUCTURE

Did following the factor/sub-factor structure create any problems for your team, in trying to demonstrate its capability, which would not have been present if a different structure had been used?

Yes - 4

No - 2

Remarks by those answering Yes

- o It was a problem of trying to prepare a proposal to conform to an evaluation structure rather than the design of the project. It was designed to facilitate the giving of scores to be added up and although I can understand the desire to do that, from the reviewers' point of view, I don't see that as the way to present an approach to a problem. An alternative would be to post a sample task and evaluate everyone on their response to it. People would be bidding on the same job or at least the same task (BR5).
- o It was a new structure. The biggest problem was figuring out what you meant. You came out with a glossary. The

definitions were not clear enough. They were generally too short. On sub-factor I.2 (Importance of Program to Bidder), you can't do this with a large corporation. If it's a large corporation, it's going to do it. If it's a new corporation, it's going to go beyond what it said in the proposal. The point is that you really can't measure that. It is subjective, not objective (BR4).

- o The cost to develop it was rather exorbitant for a small firm. Following the structure was not difficult. It didn't create problems to understand it. The relationship of the factors and sub-factors was excellent (BR3).
- o There was repetition which made it very tedious and discouraged people. It was too highly structured with apparent repetition of things (BR2).

Remarks by a person answering No

- o It forced us to go through each of the points you wanted us to go through. The redundancy may have inhibited our style of writing. On some of the points we felt that we didn't have much to say or that they didn't deserve to have much said about them, but that may have been an indication of some areas in which we were lacking (BR1).

FIGURE V.10 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 1b ON THE EFFECTIVENESS OF THE STRUCTURE

Was your team in any manner placed at a competitive disadvantage because you had to follow the factor/sub-factor structure?

Yes - 2 No - 3 Don't know - 1

Remarks by those answering Yes

- o It inhibited market entry for smaller firms to bid on a larger project, because of the manpower required (BR5).
- o Because we are small and we try to put our best foot forward. Small companies are not as able to bear the cost. It took a hell of a lot of work, research, and coordination (BR3).

Remarks by those answering No

- o Because everyone had to go through it. It created an element of confusion and unnecessary concern because of its newness (BR4).

Remark by person answering Don't know

- o Those people who evaluated the submittals would be able to tell better. At the time I don't think we had any feelings of being placed at a disadvantage (BR1).

FIGURE V.11 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION
1c ON THE EFFECTIVENESS OF THE STRUCTURE

Were you able to readily locate the information in the proposals which was relevant to the issues you were evaluating?

Yes - 14

No - 1

Remarks by those answering Yes

- o In most cases. Some bidders followed the directions better than others (PM6).
- o There may have been one or two exceptions. It was a matter of the bidder not following directions (PM7).
- o However, sometimes it took quite a bit of reading when there was extensive cross-referencing (PM8).
- o If the bidders did it right (PM4).

Remark by person answering No

- o Some of the bidders didn't follow directions. In cross-referencing if you follow it to where they referenced and read that section, they still haven't dealt with what they should have. I don't think the problem was in the instructions in the RFP (PM1).

FIGURE V.12 PANEL MEMBERS' RESPONSES TO QUESTION 1c ON
THE EFFECTIVENESS OF THE STRUCTURE

Responses From Panel Question 5 on Strongest Aspect of the Process

- o The common structure for the evaluation. It was a good structure. Without more thought or experimentation I can't say whether it was the best possible structure (PM5).
- o The structure provided by the factors simplified the process for evaluating and comparing proposals (PM6).

- o The factors. They covered many of the essential aspects and having them specifically laid out and paid attention to was the great strength (PM9).

Responses From Panel Question 6 on Weakest Aspect of the Process

- o The common structure perhaps inhibited generation of insights which might have contributed something of value (PM5).
- o It was a little like a college exam. You lead them too far along so you're not sure how much is their writing what they think would be a successful response vs. their actual capability (PM10).

Responses From Panel Question 10 on Any Other Aspects of the Process Which You Wish to Get Out

- o At the time I had an instinctive reaction that the process was overstructured. I still don't know whether or not it was. Defining the dimensions and defining the factors seems hard but worthwhile (PM5).
- o For a million dollar or more proposal you would need something like this to be able to find things. If it were \$500,000 or less I wouldn't bother with this technique. It would be overkill. The structured approach seemed better for guiding the reviewer than for letting the proposer show his ingenuity. Another question is what the process did to keep people from wanting to bid (PM4).

Responses From Bidder Question 10 on the Strongest Aspect of the Process

- o Concern for the structural process. The pre-bidders conference. Giving a lot of thought to weights (BR2).
- o The need to specify ideas and expertise in all of the sub-groups which were specified. It caused us to test within ourselves whether that detail met the objectives of the project as we understood it (BR1).

Responses From Bidder Question 11 on the Weakest Aspect of the Process

- o The weakest element at the time the proposal was written was the confusion of the new system which we had to respond to (BR4).

FIGURE V.13 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO STRUCTURE

The bidders were more divided in their reactions to the structure. They tended to feel that the structure enabled them to demonstrate their ability to deal with the critical problems of the project (Yes - 4; No - 2). They tended to feel that structure created some problems in trying to demonstrate their capability which would not have been present under a different structure (Yes - 4; No -2). They were divided on whether they felt that they were placed at a competitive disadvantage by the structure.

A remark which one bidder representative (BR4) made in his answers to the questions on structure, and in answers to some of the other questions, is that the evaluation tried to measure subjective things in an objective manner. He cites sub-factor I.2 (Importance of Program to Bidder) as an example, saying that it cannot be measured. The respondent seems to treat objective and subjective as dichotomous variables. The author believes they are ends of a continuum. Nowhere does PFE claim that the measurements of bidders on sub-factors are at the objective extreme of the continuum. The method of measurement is for the panel to agree on subjective probability estimates through sharing all available information, arguing about the confidence in this information, and using the same criteria (understanding, proposed approach, and present or potential capability) for all bidders. The degree of subjectivity may vary from sub-factor

to sub-factor and the confidence intervals around the probability estimates on each sub-factor may vary from bidder to bidder. This is true for all proposal evaluation. PFE makes confidence in the ratings explicit. Where the confidence interval is wide enough so that a factor team feels that a bidder may actually be unacceptable on a sub-factor where his score is acceptable (and vice versa) the team notes this for use in clarification sessions.

Under PFE, if an issue is considered critical to the success or failure of the project, it is written down as a sub-factor and an attempt is made to measure it. If the issue is not measureable, then it cannot be used as a basis for competitive selection (with PFE or any other method). It is a risk which applied across all bidders and the project (Thompson Note 1). The program must then determine whether it is willing to assume this risk and award a contract.

Sub-factor I.2, on Importance of Program to Bidder, was considered to be one of the most critical issues of the evaluation. Because of the uncertainties involved in the program, including changes which would certainly occur in ETIP and PAA management and staff, it was important that the contractor have a continuing long-term interest in the implementation of the systems. This was considered to require evidence of an interest beyond the norm of the bidder

assuring that he would do a good job because the firm does a good job on all of its contracts. Such a commitment may affect issues such as contractor staff stability, access to the best staff in the firm, and the willingness of the contractor to work toward the long term requirements of system implementation, rather than responding to short term variations in government objectives.

This issue proved troublesome but possible to measure. The Management Factor Team for Agency Impact was the fourth team to meet. After deliberation on the information available the team decided that it was unable to differentiate among the bidders and that clarifications would be required on this issue with any bidder who appeared to be possibly acceptable overall. All bidders were rated at six. As the team meetings continued, information was occasionally brought out which related to sub-factor I.2 (e.g., see Section IV.10.7, paragraph two). This information was available for use in the oral clarifications and for use in rating firms who also bid on the commercial impact contract.⁵ Attention was paid during the oral clarifications to remarks which related to the firms' commitments to developing the systems. When all available information was considered, ETIP was able to differentiate among bidders on this issue.

⁵When the Management factor team met for Commercial Impact (the 6th factor team on that contract) it was able to find a basis for differentiating among the bidders on that contract.

The author feels, from recalling the discussion at the time, that the confidence intervals around these estimates were greater than for some of the other sub-factors, but that there was definitely evidence for differentiation.

Bidder representatives' responses to the question on whether the structure created any special problems (Figure V.10) did not show any patterns. Four respondents indicated that it did create problems. One said that trying to understand what ETIP wanted was a problem. Another felt that there was repetition which caused problems. A third felt the "relationship of the factors and sub-factors was excellent 'but' the cost to develop it was exorbitant." The fourth said it was difficult to prepare a proposal to conform to an evaluation structure but didn't specify why.

Two bidders felt that their team was placed at a competitive disadvantage by the structure (Figure V.11). They felt that the process was too costly for small firms to respond to. This is clearly an issue the government must consider in determining whether or not to use PFE. The author has heard estimates of cost to respond placed between \$10,000 and \$20,000. This must be weighed against the type of project and the total estimated cost of the contract. If a less costly process will enable sufficient confidence in the selection of a contractor, given the nature of the contract, then PFE should not be used. If the size of the

contract is too small to enable bidders to invest the amount required to respond, then the government must decide whether other available procedures will provide sufficient confidence to allow the government to assume the added risks.

A final point about the structure of PFE is its strong interrelatedness. Morris (1973) indicates that RFPs are frequently difficult to respond to because the various parts do not mesh. The evaluation requirements do not correspond to the statement of work, scope of effort, etc. In PFE this is not a problem. The statement of work, scope of effort, schedule, and evaluation criteria are all tied to the factor/sub-factor structure. This enables a comparable basis for evaluating capability, division of effort, and schedule.

V.3.2.2 Size of proposals. The second format issue is whether a limitation should have been placed on the size of the bidders' proposals. PFE allows the proposals to be as long as the bidder feels is necessary. Some members of the ETIP and PAA staff were concerned that the proposals which would be received would be excessively lengthy and would take an unusually long time to evaluate (see section IV,6). This is related to one component of what the literature identifies as "goldplating" of the proposal. If the bidder feels that the length of the proposal is going to be one of the major factors in determining their rating, they will present as much information as possible.

The results of ETIP's source selection would indicate that there was no need to place a length limitation on bidders' proposals. The proposals did not seem long for the size and nature of the procurement. The time to evaluate them did not seem excessive.

Proposals ranged from 90 pages for the shortest to 186 for the longest (see Figure V.14). The average size for agency impact proposals was 141 pages and for commercial

Pages in proposals, excluding appendicies, resumes, supporting documents, and scope of effort information.

AGENCY IMPACT	COMMERCIAL IMPACT
Pages	Pages
167	90
104	186
112	119
186	
163	
<u>113</u>	<u> </u>
$\bar{x} = 14$	$\bar{x} = 132$
S.D. = 35	S.D. = 49

FIGURE V.14 SIZES OF THE PROPOSALS

impact proposals was 132 pages. This is only an approximation of the volume of information since the type faces, spacing, and margins varied.

Goldplating of the proposals did not seem to be a problem. Most of the bidders did not seem to be concerned with providing the evaluation panel with information in excess of what was specifically requested in the sub-factors. The primary exception to this being one bidder who submitted a 23 page introductory section. Bidders who wished to supply evidence to support claims made in their sub-factor responses did so in the proposal appendix in the form of resumes and past project summaries or they sent along reports from prior contracts.

The panel members were given the proposals on a Friday and the first factor team was able to meet on Monday. Though some panel members had to read over the weekend and at night during the next week, there were no requests for delays in any of the factor team meetings. At most there were comments about the pace of the team meetings by some of the panel members who were participating on a large number of the factor teams. Since there were fourteen team meetings in a one week period, people who participated heavily could spend four to six hours a day in meetings.

As one rough check on the significance of length of response as a factor in determining ratings, the relation-

ships between final score and overall length of the body of the proposals are displayed in Figure V.15. Inspection of the graphs indicates that page length does not seem to be directly related to score. Bidders were not rewarded for volume.

The issue of length of response is also considered to be closely related to the next issue on whether the bidders understood what the evaluation panel looked at in making their evaluations.

V.3.2.3 Understanding basis for evaluation. The next format issue is whether the bidders understood what the evaluation panel looked at in making their evaluations. Of concern here is whether the bidders understood what information to include and where in their proposals to place it so that they would feel confident that the panel would use it in evaluating specific capabilities. This is related to the issue of size of proposals since if the bidder is unsure what the panel will base their evaluation on that there is incentive to put everything possible into the proposal. To avoid receiving overly long proposals the government sometimes uses page limitations when it cannot tell the contractors exactly what it wants to know (Thompson, Note 2). This adds additional uncertainty to the proposal evaluation process. If the panel does not find the information it is looking for in a bidder's proposal, it will not

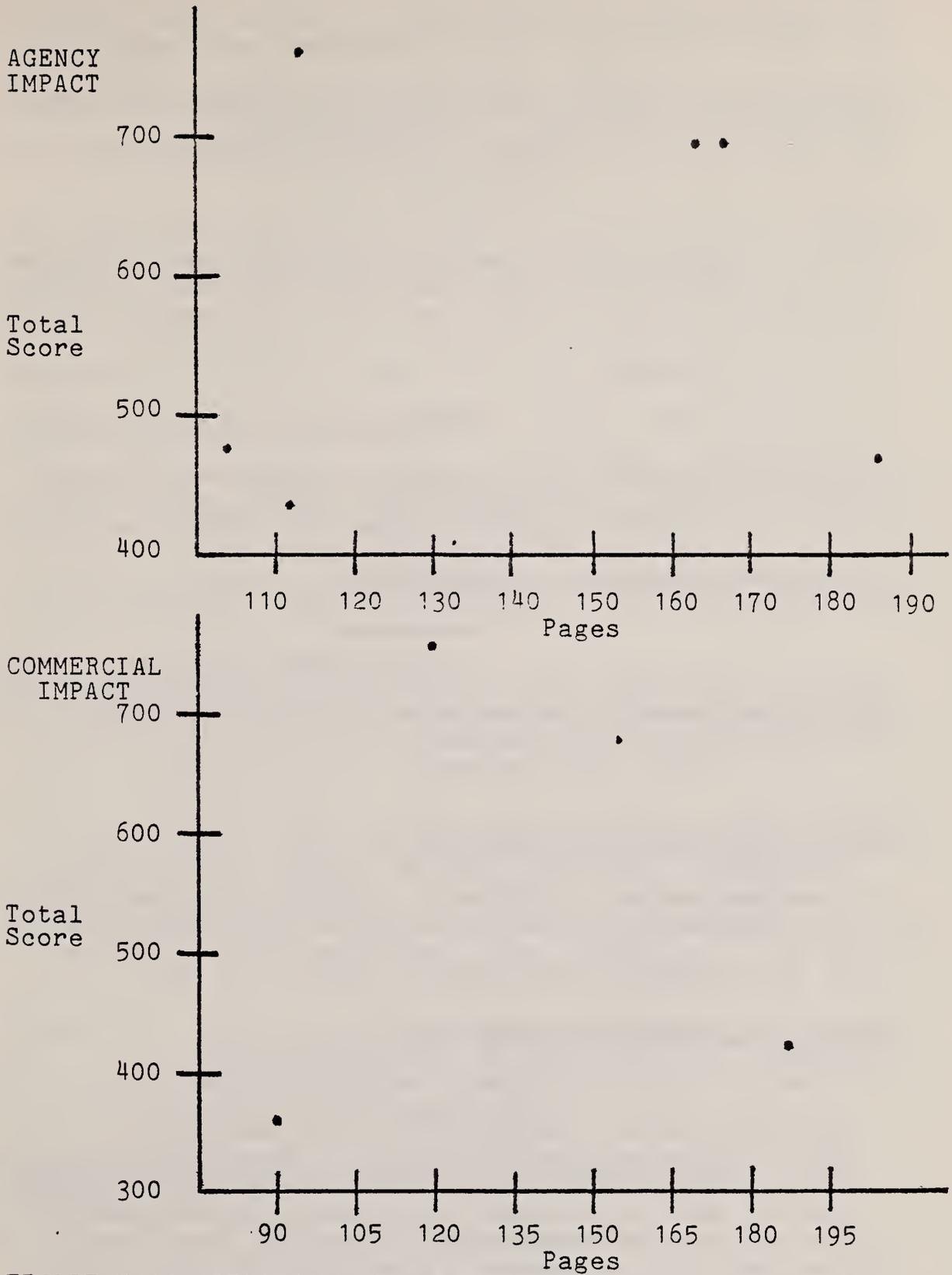


FIGURE V.15 RELATIONSHIP BETWEEN LENGTH OF PROPOSAL AND TOTAL PANEL SCORE

know whether the information was excluded because the bidder was weak on the issue they are evaluating or whether the bidder merely guessed wrong on the government's priorities and excluded the material in order to meet the page limitation.

The bidders were generally confident about being able to communicate their qualifications to the evaluation panel. A question with two sub-items was included in the bidder representatives' questionnaires to determine this. The items and responses are presented in Figures V.16 and V.17. Figure V.18 lists responses to the open ended questionnaire items which pertain to this issue.

Were you confident that you had written something to demonstrate your qualifications on all of the capabilities which the panel would be evaluating?

Yes - 5

No - 1

Remarks by those answering Yes

- o As we had understood things. We did not have confidence that we know what the evaluators would be thinking (BR4).
- o We went through point by point (BR1).

Remark by person answering No

- o It wasn't clear what they were trying to evaluate. There were no a priori objectives defined, therefore, the respondents weren't responding to the same project. It wasn't clear whether the notion of cross-referencing mentioned in the RFP could be used. It was questionable whether any one reviewer would have a whole package to look at to cross-reference. It wasn't clear how any panel

member would be able to see how any particular part fit the overall project (BR5).

FIGURE V.16 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 2a ON CONFIDENCE IN BEING ABLE TO COMMUNICATE QUALIFICATIONS TO PANEL

Were you confident that the panel would find the information in your proposal which was relevant to each specific capability at the time when that capability was being evaluated?

Yes - 4

No - 2

Remarks by those answering Yes

- o But we were trying to create objectivity where the problems arising and the sensitivities that had to be appealed to were things which were subjective (BR4).
- o I think we had a cross-reference sheet, therefore, I would feel confident that the information would be found (BR1).

Remarks by those answering No

- o It wasn't clear that cross-referencing would work. It wasn't clear that the reviewers would have the whole package so that they could cross-reference (BR5).
- o With the mixed panel I didn't feel that they were capable. I didn't think that they knew enough about ETIP. I didn't know all of the people on the panel but I remember at the time I felt uneasy. The nuances of the program, I had problems with whether the average government guy sitting on the panel would have the discipline to go through the structure to make it really carry (BR2).

FIGURE V.17 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 2b ON CONFIDENCE IN BEING ABLE TO COMMUNICATE QUALIFICATION TO PANEL

Response from Panel Question 6 on Weakest Aspect of the Process

- o Trying to get bidders to understand what you want them to put into the procurement package so that they could be evaluated on their ability to do the job, since it was new and different. Wanted to be sure that we got

indicated that the only times they had problems were when the bidders did not cross-reference properly or otherwise follow the directions.

V.3.2.4 Differences in uncertainty among bidders.

The final format issue concerns the panel's ability to deal effectively with differences in uncertainties among bidders during the evaluation. There were two ways in which this became an issue. One was that bidders who had worked with ETIP before had a greater prior knowledge of the program, its projects, and the interests of its staff. They would therefore be able to write and speak more knowledgeably about program content than bidders who had no prior experience. The other way was a corollary of this. The panel would have more information about bidders who had worked for ETIP before than those who had not. Its ability to rate capabilities on some of the sub-factors for bidders who had been past contractors would be greater than for those who had not. This relates closely to the issue in section V.3.7 on whether there were problems in dealing with the lack of restrictions on admissible information.

The PFE process seemed to be successful in dealing with both of these types of uncertainties. It provided for an evaluation based on present or potential capabilities rather than on present knowledge. It also provided mechan-

isms for using all useful information about bidders where it was available and for obtaining clarifications where it was not. One outcome measure here is that one of the two contracts was won by a bidder who had not previously worked for ETIP.

There are two structural mechanisms of PFE which dealt with the problem of enabling bidders without prior program experience to compete effectively. One is that the process provided as much information about ETIP's plans as was possible. The other is that the evaluation was based upon the bidder's understanding, approach, and present or potential capabilities to deal with specific management and technical problems rather than upon a proposed design requiring integrating detailed knowledge about the program into the proposal.

Information about ETIP and the proposed evaluation systems was provided in the form of the two bidders' briefings and the supporting written materials and bibliography available with the solicitation document. The goal was to provide information about both areas of high and low certainty concerning the proposed systems and to allow prospective bidders to obtain clarifications through questions. The one problem which arose in providing information was ETIP's inability to distribute the COTR's project plans.

Since the plans had not been approved by NBS administration until after the second briefing, they were unavailable for distribution to bidders. If they had been available, they would have provided some additional written detail on the projects to support the information presented during the first bidder's briefing.

By evaluating proposals based on responses to problems which the government felt were going to be critical, rather than on proposed systems designs, ETIP minimized the degree to which prior knowledge of the program would be critical. Also, the criteria for assessing capability was whether the bidder had a present or potential capability. If a bidder did not have a specific in-house capability but recognized the need for such a capability and had an approach for obtaining the capability, he was not penalized. Chapter IV presented an example of a situation where a rating was resolved in favor of a bidder based on a potential capability (section IV.10.8).

There were two primary mechanisms for dealing with the panel's differences in uncertainty about the various bidders. The first was the question form for obtaining specific information to resolve uncertainties. The second was the process of making notes in the record on specific uncertainties and obtaining subsequent oral and written clarifications following the panel meetings.

In measurement terms the amount of uncertainty can be thought of as the confidence interval around the panel's estimate of the bidder's score. On bidders for which there is less uncertainty the confidence limits are tighter. The clarification process can be thought of as a process for tightening the confidence intervals in the areas where there was the greatest amount of uncertainty.

The question form proved to be of minimum usefulness. Only two forms were used and they were submitted to obtain sections which were missing from two of the proposals. The process of submitting question forms to obtain clarifications was used in place of having each bidder make an oral presentation on their proposals to the panel. This was done since it was uncertain how many bids would be received and it was thought that there might be scheduling difficulties in having the panel hear the presentations. Since there were no oral presentations to the panel and since the question form was not used for clarification, the burden for clearing up uncertainties was placed on oral and written clarifications after the panel meetings.

The oral and written clarification process worked quite well. If the team had difficulty reaching agreement on a single score because of uncertainty about the bidder, a note was included in the written record indicating that the specific area of uncertainty needed to be investigated

during the oral clarifications. This usually happened when there was strong disagreement between team members concerning how to interpret something which a bidder stated in his proposal. Someone on the team would usually propose a score which the majority of the panel seemed to be favoring and suggest that the strong disagreement be resolved by adding a note which would require clarification prior to negotiations. An example of this was given in chapter IV in the description of the first factor team meeting. The example tells of a disagreement over whether a bidder did, in fact, have the in-house capability in instrument design. The issue was resolved by giving the bidder an acceptable score (seven or above) and adding a note to the record to verify this score (section IV.10.2). All of the notes from the record were compiled and used to prepare questions for the oral clarifications.

One panel member, in responding to item 10 on the panel questionnaire (see Figure V.19), indicated that he would like to have had information from reference checks available

Responses From Panel Question 10 on Any Other Aspects of the Process which You Wish to Get Out

- o Checking of bidders' references should be organized more thoroughly in advance of the panel meetings (PM12).
- o The orals were very important. Since I didn't participate I don't know how well they worked. They shouldn't be considered pro forma. It's your last chance to ask tough questions and see the answers (PM10).

FIGURE V.19 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO DIFFERENCES IN UNCERTAINTY AMONG BIDDERS

during the factor team meetings. The way the process worked was that references (people listed under Factor I as having knowledge of the bidder's past performance) were checked after the team meetings and before the oral clarifications. The author believes that this information and information which would have been available from orals prior to the panel meeting would have enabled the panel to tighten the confidence intervals around its scores and take some of the burden off of the subsequent oral clarification sessions.

V.3.2.5 Communication of nature of project and required skills. The first content issue under the Effective Communications category is whether PFE communicated to bidders what it was the government wanted to buy? Of importance here is whether the bidders understood the general nature of the projects well enough so that they could effectively respond to the sub-factors. A level of understanding which conveyed both the skills required and the context for responding to the sub-factors in terms of the project objective was important. Related to this is that it was important that the requirement for the projects which were conveyed in the RFP were the requirements which the government actually undertook after the contracts were signed, i.e., the actual projects be the projects on which the source selection was based. Often the criteria for competitive selection turn out to have little relationship to the pro-

ject which the successful bidder ends up undertaking (see Section II.3.5).

The extent to which the process was able to communicate the general nature of the projects and the required skills is somewhat uncertain. A question with two sub-items was included in the bidder questionnaire to obtain information on this. The items and responses are presented in Figures V.20 and V.21. Figure V.22 presents a response to the open ended questionnaire items which pertains to this issue.

The bidders were:

- o split on whether they felt that the information provided by ETIP allowed them to assess the skills which would be required to do the work (Yes - 3; No - 3); and
- o almost unanimous in feeling that ample information was provided in the briefings and supporting documents so that they were confident that they had sufficiently related the sub-factor issues to the objectives of the projects (Yes - 5; No - 1).

Remarks under the first item (question 3a, Figure V.20) indicate that some of the bidders did not feel that the objectives of the project and ETIP were clearly defined. Another bidder felt that he did not know enough about the shortcomings of the people managing ETIP.

The latter concern is one for which it would be difficult to fault the structure of content of the source selection process. It is doubtful that any process could effectively provide information on the management styles of pro-

Did the information provided by ETIP allow you to assess the skills which would be required to do the work?

Yes - 3

No - 3

Remarks by those answering Yes

- o Generally. I didn't think ETIP exactly knew what it wanted. The RFP was as good as it could be under the circumstances. It was the nature of the program. ETIP was very into process and could have discussed more of the substance of the program. Especially the politics and communications skills to handle a job like that (BR2).
- o We felt the information was there to assess the skill requirements but we had a feeling that more skills were asked for than were really required. That may have been due to a misinterpretation of the RFP which could be construed as poor wording in the RFP or maybe not (BR1).

Remarks by those answering No

- o There weren't any well defined project objectives. Since there was no general task, one couldn't show what selection of skills was necessary (BR5).
- o We needed a clearer picture of what ETIP hoped to accomplish. It didn't have anything to do with the factor/sub-factor issues. It was that the mission of ETIP was not clear (BR4).
- o We needed a better way to anticipate the ineptitude on the part of ETIP management (BR6).

FIGURE V.20 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 3a ON WHETHER THE RFP COMMUNICATED WHAT THE GOVERNMENT WANTED TO BUY

Was ample information provided in the briefings and supporting documents so that you were confident that you had sufficiently related the sub-factor issues to the objectives of the projects?

Yes - 5

No - 1

Remarks by those answering Yes

- o Qualified by that I didn't feel the true feelings were reflected. You were trying to take an objective approach where in the end subjective feelings had a lot to do with it (BR4).
- o Thompson was too much into process. I felt he didn't really know government and it showed. More substance and less process (BR2).

Remark by person answering No

- o There were no good objectives or purpose other than that ETIP was politically in trouble at the time (BR5).

FIGURE V.21 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 3b ON WHETHER THE RFP COMMUNICATED WHAT THE GOVERNMENT WANTED TO BUY

Response to Bidder Question 13 on Any Other Aspects of the Process Which You Wish to Get Out

- o There seemed to be a great deal of jargon in the RFP. We spent quite a bit of time trying to figure out what you were really saying (BR1).

FIGURE V.22 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO WHETHER THE RFP COMMUNICATED WHAT THE GOVERNMENT WANTED TO BUY

gram personnel. This seems to be the type of information which is somewhat available to bidders through contact with others in the professional community.

The former concern of lack of clarity of objectives is difficult to reconcile with the near unanimous response to the second item (question 3b, Figure V.21) which asked whether the information presented was sufficient to relate the sub-factor issues to the project objectives. In part one bidder (a successful bidder) may be responding to problems which occurred after the source selection was completed and work began on the projects.

The problem of the project actually undertaken bearing little relationship to the project described in the RFP was eliminated by using PFE. Since the source selection material specified both the areas of certainty (e.g., evaluation systems for commercial and agency impacts of procurement experiments were required) and uncertainty (e.g., the number of evaluation systems, their eventual owners, and the specific projects to be evaluated during the development) the bidders were not responding with specific solutions to objectives which would change.

V.3.2.6 Appropriateness of the Specific Sub-factors.

The next content issue deals with the appropriateness of the sub-factors which were selected. One of the PAA staff members who reviewed a draft of the RFP indicated that he felt that many of the sub-factors under Management and Re-

ports & Reviews would not be useful in the evaluation (see Section IV.6). Another related concern is whether there were any significant issues which were not included as sub-factors. The first concern, if true, would result in some waste of resources by bidders in responding to the RFP and by the government in evaluating the RFP. The second concern would be more serious, since it could result in selecting an unqualified bidder by not evaluating some critical issue.

Both panel members and bidder representatives largely felt that the selection of sub-factors was appropriate. A question with two sub-items was included in both the panel and bidder questionnaires to obtain reaction to the specific set of sub-factors which was used. The items and responses to them are presented in Figures V.23 to V.26. Figure V.27 presents a response by a bidder to the open ended questionnaire items which pertains to this issue.

Did you feel the sub-factors encompassed most of the issues which would be critical to designing the evaluation systems which ETIP desired?

Yes - 12

No - 2

Don't know - 1

Remark by a person answering Yes

- o If you cover everything you don't miss much. The sub-factors covered just about everything, probably too much (PM4).

Remarks by those answering No

- o Economic issues were given insufficient weight in the commercial impact solicitation (PM2).

- o A bidder's recognition of the constraints of reality of evaluation was not adequately covered (PM3).

Remark by person answering Don't know

- o I assumed ETIP knew best what it wanted (PM6).

FIGURE V.23 PANEL MEMBERS' RESPONSES TO QUESTION 2a ON
APPROPRIATENESS OF THE SUB-FACTORS

Did you feel the sub-factors encompassed most of the issues which would be critical to designing the evaluation systems which ETIP desired?

Yes - 4

No - 2

Remark by a person answering Yes

- o Most of the sub-factors were O.K. but they weren't really important. More emphasis should have been placed on the problems of working with other agencies. You had a generally inexperienced staff (BR2).

Remarks by those answering No

- o There weren't any objectives, therefore it's hard to say what issues derive from them (BR5).
- o Failure on the part of ETIP management to comprehend the process by which innovations take place (BR6).

FIGURE V.24 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION
4a ON APPROPRIATENESS OF THE SUB-FACTORS

Did you feel that many of the sub-factors dealt with issues unimportant for designing the evaluation systems which ETIP desired?

Yes - 1

No - 13

Don't know - 1

Remark by person answering Yes

- o Many of the agency and system-related factors are either of marginal importance or can only be developed through an inductive process over time, not through a deductive process which was the strategy behind the evaluation system (PM2).

Remarks by those answering No

- o Comments from people who saw it or bid on it felt it was complex to respond to. But it was simple to respond to if you read it and understood the format. It was not complicated. It was a question of devoting time to it (PM10).
- o A few seemed superfluous (PM1).
- o A lot of things are important but not important enough to be set out as separate sub-factors. You could subsume the sub-factors under the factors. You're cutting the pie too fine (PM4).
- o But "design," in the formal sense, received too much emphasis (PM3).

Remark by person answering Don't know

- o Didn't feel I had enough information about the total project to judge the importance of the issues covered (PM6).

FIGURE V.25 PANEL MEMBERS' RESPONSES TO QUESTION 2b ON
APPROPRIATENESS OF THE SUB-FACTORS

Did you feel that many of the sub-factors dealt with issues unimportant for designing the evaluation systems which ETIP desired?

Yes - 2

No - 4

Remarks by those answering Yes

- o I felt yes at the time but I really don't remember why (BR5).
- o I don't remember which ones (BR1).

Remark by a person answering No

- o There was a lack of balance and some of them could have been handled under more general topics. A more substantive discussion could have given better balance (BR2).

FIGURE V.26 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION
4b ON APPROPRIATENESS OF THE SUB-FACTORS

Response to Bidder Question 10 on the Strongest Aspect of the Process

- o Its balance and its all inclusiveness. It was an awesome job to take it initially. After analysis, it was still awesome but you could see where it was going. It was clear and the requirements were in balance. Nothing was missing (BR3).

FIGURE V.27 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO APPROPRIATENESS OF THE SUB-FACTORS

The panel members generally felt that the subfactors:

- o encompassed most of the critical issues for designing the evaluation systems (Yes -12; No - 2; Don't know - 1); and
- o did not deal with issues unimportant for designing the evaluation systems (Yes they did deal with unimportant issues - 1; No they did not - 13; Don't know - 1).

The bidders were more evenly divided. However, they also felt that the sub-factors:

- o encompassed the critical issues (Yes - 4; No - 2); and
- o did not deal with unimportant issues (Yes they did - 2; No they did not - 4).

No trends appear in the remarks of the respondents. However, it is interesting to note the not unexpected contrast in perspective between two people responding to the same RFP. Bidder representative 2 (under question 4b, Figure V.26) indicates that there was a lack of balance among the sub-factors, while bidder representative 3 (under question 10, Figure V.27) indicates that the balance and all inclusiveness was the strongest aspect of the process.

V.3.2.7 Parroting. A final content of communication issue is concerned with whether the bidders supply information in their proposals which goes beyond problem statements or potential solutions which are contained in documents supplied as part of the solicitation. Parroting of information from the solicitation is a problem when it is done to the exclusion of information which would enable the panel to evaluate the bidders. Some ETIP staff had raised this issue prior to the release of the RFP (Thompson, Note 3).

There did not seem to be any significant problems with parroting. Since the bidders were not given a specific system design to respond to, there was no proposed solution to echo back. The bidders' responses addressed the issues which were raised in the sub-factor statements or the illustrative questions. In several cases the team found that the information which was provided under a specific sub-factor section of the proposal was sparse and the bidder had not cross referenced other sections of his proposal. If a panel member had read information in other parts of the proposal which seemed relevant to the sub-factor being evaluated, this information was presented to the panel for consideration (see Section IV.10.6).

V.3.3 Sensitivity and Selectivity in Obtaining Bids

The category of sensitivity and selectivity covers issues relating to whether ETIP was able to obtain an accept-

able number of responsive bids. The two issues under this category are:

1. Were enough responsive bids received to allow for a confident evaluation?
2. Did the process enable prospective bidders to self-select effectively on bidding?
Were a large number of non-responsive bids received?
Did a lot of qualified firms not bid?

V.3.3.1 Sensitivity. The issue of sensitivity was one of how to attract bidders who might have the required capabilities. The program's budget was small compared to other federal programs offering evaluation or systems contracts. It was therefore not attractive as a continuing source of funds. Also, it did not have the visibility in the professional evaluation community that a bidder might desire. The program had begun to establish a poor track record in contracting by cancelling its last RFP for an evaluation contract after the proposals were evaluated. One of the concerns of people at ETIP both prior to and after the writing of the RFP was whether enough responsive bids would be received to allow for a confident evaluation and selection of qualified bidders (see Section IV.3). Also, when the RFP was circulated for review, a PAA staff person felt that it was so confusing that it would scare off good bidders (see Section IV.6).

The responses of the panel members suggest that enough bids were received to allow confidence in the accuracy of

the evaluation. Whether or not any firms with greater qualifications did not bid is uncertain.

An item in the panel questionnaire asked respondents whether being able to rate more proposals would have increased their confidence in the accuracy of the scores which were assigned. For the agency impact contract the answers were: Yes - 1; No - 10. For the commercial impact contract they were: Yes - 3; No - 7 (see Figure V.28).

Did you feel that being able to rate more proposals would have increased your confidence in the accuracy of the scores which were assigned?

a) Agency Impact

Yes - 1

No - 10

Remark by person answering Yes

o About a dozen in all. If you were evaluating, you need to see a number of selections. It was more of an issue for those participating in only one factor team (PM1).

b) Commercial Impact

Yes - 3

No - 7

Remarks by those answering Yes

o About two more. You want to weigh them to be sure you've seen the best that's around (PM12).

o About two more (PM7).

o At least three more and maybe ten total (PM15).

Remark by a person answering No

o I could have picked the winners without any scoring (PM4).

FIGURE V.28 PANEL MEMBERS' RESPONSES TO QUESTION 3 WHICH RELATES TO SENSITIVITY

The responses for the commercial impact contract, for which three proposals were received, seem to indicate that it is possible to scale bidders with the process when only a small number of proposals are received. However, the confidence that some of the panel members had in their evaluation on the commercial impact contract may have been increased by having been able to scale two of the bidders during the agency impact evaluation (i.e., two out of the three had bid on agency impact as well and had already been evaluated once on most of the factors).

Even though enough responsive bids were received to allow for confidence in the evaluation, there remains the question of whether any better qualified firms did not bid and if so whether this was a function of the PFE proposal. This question had been raised by several people following the source selection.

The problem with this question is that there is probably no way to answer it. Since there was not a well established group of firms with a track record in implementing evaluation systems (one of the conditions for using PFE), it was not possible to assess a priori, or without evaluation, who the more qualified contractors were. People observed that some of the firms that they expected to bid did not. This, however, may be a function of many variables including the novelty of the source selection method and effective self-selection.

V.3.3.2 Selectivity. The goal of self-selection is to allow those prospective bidders who would not be qualified to do the work to determine this themselves and not invest in bidding. In this way resources of both the bidders and the government are saved. The literature has discussed the waste which occurs when many unqualified bidders submit proposals (see Section II.3.5). This issue relates to the issues on resource requirements which are described in section V.3.12.

The RFP seemed to be relatively effective on the issue of self-selection. Though bidders were evaluated by the teams as being unacceptable on specific sub-factors and some bidders were unacceptable on a large number of sub-factors, the solicitation did not result in a large number of obviously unacceptable proposals. Those which ended up as unacceptable required consideration by the teams on each sub-factor to determine this (see related responses to open-ended questions displayed in Figure V.29).

Response to Panel Question 5 on the Strongest Aspect of the Process

- o It weeded out the trivial bidders. You don't want the casual people taking up your time. Those who responded clearly were sincere (PM10).

Response to Panel Question 10 on Any Other Aspects of the Process Which You Wish to Get Out

- o It provides information to potential bidders for self-selection (PM13).

FIGURE V.29 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO SELECTIVITY

Self-selection may have occurred by each of two mechanisms. One was by prospective bidders balancing the objectives of the project against the objectives of their firm and the resources available to their firm. The other was by determining whether they would be able to respond effectively to the RFP. The author has heard, third hand, about both types of selections by firms which some ETIP staff had expected would bid. The first being firms where management decided that the project did not match their current or long term objectives. The second being firms which were upset about the form of the RFP and did not wish to invest in responding. One possibility is that some of the firms which were upset about the form of the RFP would have been equally upset about the complexity of the requirements of the projects if they were under contract.⁶

V.3.4 Assessment of Bidders' Capability

The category of Assessment of Bidders' Capability is concerned with issues of whether PFE enabled an effective evaluation of both management and technical capabilities

⁶On a later procurement using PFE, one firm which declined to bid was quite open about their opposition to the form of the RFP. They listed numerous problems which they found with it. A staff member of this firm later indicated that in his opinion the firm was not set up to handle the type of unstructured system development work which was required and that the management was upset because they wanted a contract to work in the substantive area of the project in the manner which they felt was required.

and whether this evaluation could be related to subsequent performance. This was an important problem since there was no known track record of developing evaluation systems in the contracting community. The meaning here of effective evaluation is that the process be successful in enabling an ordering of bidders from best to worst, with demarcations for acceptability and unacceptability, and that this ordering be based on the actual capability of the bidders proposed team rather than on the capability of the proposal writers. The question of subsequent performance is concerned with whether an evaluation in terms of capability for dealing with problems known to exist is effective in predicting a bidder's actual performance.

Three issues are included in this section. They are:

1. Did PFE provide for an effective evaluation of management capability?
2. Did PFE provide for an effective evaluation of technical capability?
3. Did PFE anticipate the problems which were known to exist in doing evaluations and in developing systems?
 - Did the criteria provide for an assessment of the relationship between what was proposed and later performance?
 - Was the award based upon proposals which would have some relationship to the approach subsequently used?
 - Was the material provided by the successful contractors useful or not to the PAAs?

V.3.4.1 Evaluation of management capability. The need for source selection procedures to be able to deal more effectively with management capabilities is evident in both the evaluation and the systems literature. The evaluation literature indicates an insensitivity of evaluators to problems of liaison and scheduling (e.g., Patton, et al., 1977) and some of the systems literature indicates the need to develop better capability for evaluating management during source selection (e.g., Helman & Taylor, 1976). This issue primarily examines whether ETIP was able to differentiate among bidders on the various management issues which were included as sub-factors. The question of the relationship between these ratings and future performance is discussed under section V.3.4.3.

The author believes that PFE provided a strong basis for evaluating management capability. The discussion by the factor teams of the management sub-factors was extensive. Much of the time was taken to draw out the differences between the management requirements on these projects and general project management requirements. The teams used the written sections in the proposal and all supporting evidence (resumes, project summaries and information from panel members who were familiar with the bidders) to assess understanding, approach and capability. For the most part the teams were able to come to agreement on unique scores for each bidder. However, there was an important management

sub-factor which proved difficult for one of the teams to measure. On sub-factor I.2, Importance of Program to the Bidder, the agency impact contract factor team assigned a 6 to all of the bidders. The team felt that from the information available to them there was no basis for distinguishing among the bidders. The score of six was assigned because the team felt that this issue needed to be explored during clarifications with any bidders considered competitive.

Sub-factor I.2 was considered by some to be one of the most important in predicting the success of the projects. Therefore, a considerable amount of attention was devoted to it during clarifications. The bidders were asked directly about what assurances they could give of top management support of the project. Their responses to other questions were, in part, assessed to determine what they felt the primary objectives of the project were and what they saw as their role in the systems developments. It was important for ETIP to know if a bidder had strong ideas about what the primary objectives were and if so whether the bidder would subordinate ETIP's objectives to its own. The oral clarification session proved very useful in enabling ETIP to more confidently assess these issues and assign scores. However, there was recognition that the confidence intervals

on some of the bidders was still relatively large, especially in trying to predict commitment into the future.

The clarifications on management also allowed ETIP to determine which people on the bidders' teams held the understandings which the panel had rated favorably. For example, in one instance it became evident which member of a bidder's proposal team wrote the responses to certain sub-factors which received high ratings. ETIP was then able to negotiate for this person's involvement in the project.

V.3.4.2 Evaluation of technical capability. The second issue is whether PFE provided for an effective evaluation of technical capability. As with the preceding issue, this primarily examines whether ETIP was able to differentiate among bidders on the various issues which were included as sub-factors. The relationship between these ratings and anticipated future performance is also discussed in section V.3.4.3.

All of the technical factor teams were successful at agreeing upon unique orderings for the bidders on each sub-factor. The teams were able to discuss the information available on each bidder under each sub-factor and compare it against issues in question and the criteria for evaluation.

Discussion on the categories of the Panel's Role in Evaluation of the Proposals (section V.3.6), Equity of Treatment Across Bidders (section V.3.7), and Effective Communication (section V.3.2) indicate some of the elements which affected the panel's ability to assign scores. Such things as the range of panel members' initial ratings, the biases of various panel members, and the amount of information available under each sub-factor heading seemed important.

As with the management sub-factors, the clarifications sessions proved useful for gathering additional information where the panel had greater uncertainty in the scores which they assigned.

V.3.4.3 Anticipation of problems known to exist in the project. The final issue under this category asks whether PFE anticipated the problems which were known to exist in doing evaluations and in developing systems. The last two issues indicated that the teams were able to differentiate among bidders and assign scores on both management and technical sub-factors. However, these scores have very little meaning unless they have a positive relationship to subsequent performance. Before the RFP was issued, a PAA staff member indicated that he felt that the relationship would be inverse. He thought that any bidder who would be successful in responding to the RFP would supply the PAAs with useless materials once under contract (section IV.6).

In order to do an adequate job of responding to this issue, the subsequent performance of the successful bidders would have to be assessed and compared to the problems which arose during the contracts and the sub-factors which were included in the RFP. Such a detailed analysis of the post award time period is not within the scope of this dissertation. However, some of this information is contained in a report by Garrity (1980). Without doing a detailed analysis, the most that can be said about the relationship between the evaluation and subsequent performance is that it seemed mixed.

In analyzing how well PFE anticipated future performance, there are two variables which seem important. One is whether ETIP knew about all of the critical issues in advance and the second is whether there was a way to measure accurately the bidders acceptability on each issue.

On the first variable of whether the critical issues were known, ETIP seemed fairly strong. One measure of this is that on subsequent procurements for similar contracts in support of ETIP's regulatory work very few new sub-factors were added.

There were more substantial problems on the second variable of measurability. In large part this was a problem of trying to predict bidder's ability on sub-factors into the future. The author believes that ETIP's measurements of the bidders against the criteria were fairly accurate

at the time that they were made. However, circumstances which occurred over time seemed to change the bidders position on some of the sub-factors. This was particularly problematic on sub-factor I.2, Importance of Program to the Bidder. The bidders' acceptability on this sub-factor seemed to change over time. Since this sub-factor affects the resources which are devoted to capabilities on other sub-factors, the acceptability on other sub-factors also varied over time.

The inability to make measurements which predict capability into the future seemed to be one of the failings of the source selection. However, it is difficult to attribute this to the PFE process since it is doubtful that any other source selection techniques are effective at this either. It is one of the risks of awarding a contract.

V.3.5 Use of Experts in the Evaluation of Proposals

The category of the Use of Experts in the Evaluation of Proposals is concerned with the issues of both how to obtain the participation of experts and how to make use of the information provided by experts.

V.3.5.1 Obtaining participation by experts. The issue of obtaining the participation by experts includes identifying them, convincing them to participate, and having a schedule which allows them to participate. This is identified as a problem in the literature on systems procurement (e.g., Carnes, 1976). ETIP was quite successful on this issue.

Experts were identified by the COTR and the author through discussion with other ETIP and PAA staff and from their own knowledge of relevant people who might participate. The nineteen people outside of ETIP who were identified included those who were:

- o either part of or closely related to the procurement experiments in the PAAs,
- o thought to be experts on some of the specific sub-factors being evaluated, or
- o familiar with some of the likely bidders.

Some of these people were considered because in addition to their expert information they:

- o could lend credibility to the project with the NBS program office, or
- o were responsible for managing other government evaluation programs and might have had an interest in learning of the PFE technique as a method for procuring contractor support.

In convincing experts to participate, the project and evaluation process were explained to them and the ability to limit participation to specific sub-factors was stressed. Of the nineteen outside people who were invited to join the team, nine agreed to participate and two agreed to send representatives. Those who declined generally indicated prior commitments during the week for which the evaluation was scheduled. It was easiest to get people in other programs in NBS and in related programs in the National Science Foundation. People who were in evaluation programs which

were not substantively related to ETIP's work most frequently indicated that they were busy.

Scheduling was, for the most part, quite successful but did present some problems. The schedule for the times when specific factor teams would meet was not drawn up until the panel met to receive the proposals. The best schedule which could be drawn up resulted in several people being unable to participate due to conflicts at different points during the evaluation week. In all, eight people from outside of ETIP participated.

V.3.5.2 Use of expert information. The panel members were mixed in their reaction to the use of outsiders in the process. In response to the question on the strongest aspect of the process, one of the ETIP panel members felt that being able to allow experts to limit their contribution was the greatest strength of the process (see Figure V.30). However, three outside participants had doubts about the usefulness their contributions to the evaluation. Two of their responses suggest that experts should at least have some knowledge of, and relationship to, the projects.

Response to Panel Question 5 on the Strongest Aspect of the Process

- o It enabled people with particular expertise to limit their contribution to the relevant areas (PM2).

Responses to Panel Question 6 on the Weakest Aspect of the Process

- o Being present at only some of the factor team meetings limited the contribution a person could make and stimulation they could receive which might prompt further useful responses. There was clearly a trade-off with the burdens of having everyone participate in everything. These tradeoffs are difficult to make (PM5).
- o You have to be very careful of the people that you pick for it. I may not have had enough knowledge of what the actual program was and a good enough understanding of just what was wanted in the contract (PM16).
- o There were too many people with too little understanding of the total project. If you had fewer people and limited it to ETIP and GSA staff, you would have gotten the same or better results. It took us a long time to get an idea of what you wanted (PM6).

FIGURE V.30 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO EXPERT PARTICIPATION

V.3.6 The Panel's Role in Evaluation of the Proposals

The category of the Panel's Role in Evaluation of the Proposals is concerned with the effectiveness of the factor teams in reviewing the information available about the bidders and reaching agreements on ratings for all of the sub-factors.

Six issue discussions are included under this category.

They are:

- 1.a) Did panel members who agreed to participate actually show up?
How difficult was it to schedule meetings?
- b) Were panel members able to arrive at initial ratings prior to factor team meetings?
2. Was the panel able to arrive at final scores without voting?
Was the panel able to deal effectively with strong individual disagreements?

- 3.a) Did the panel members realize how their individual positions affect the final score, i.e., do they see other panel members modifying their positions in response to the discussion?
Do panel members understand how the final score is reached?
- b) Do the final scores differ significantly from the means of the initial scores of the individual panel members?
- c) Were the panels' ratings and recommendations used after the panel meetings were concluded?
4. What impact did those with extreme scores or greater variability in their ratings have on the final scores?
5. How long did it take to reach agreement on factor scores after the sub-factor scores were agreed to?
6. Were "junior" panel members able to affect the scores if their bosses were in the room and their initial scores differed?

V.3.6.1 Meeting attendance and ability to determine initial ratings. The first issues related to the panel process is whether people who agreed to participate actually showed up at the factor team meetings and whether they were able to arrive at initial ratings prior to the start of these meetings.

Participation in the evaluation by those who agreed to be panel members was good. Each of the two contracts had 12 people on the panel, with some overlap in membership. Of the people who received copies of the proposals at the April 16 proposal distribution, two were unable to attend due to other activities which had higher priority for them.

With one exception, the panel members were able to arrive at initial ratings of bidders prior to factor team meetings. The one exception was a person who felt that rating bidders on the sub-factors was evaluating the issues out of context. He came to his factor team's meeting to indicate his willingness to discuss the proposals as a whole but he declined to participate in the evaluation process (see Section IV.10.10).

The initial ratings for each sub-factor can be found in the appendix. In several cases one of the panel members had a range of uncertainty with respect to one or more bidders. This panel member placed the bidders initials at two different scores and indicated to the panel that he felt that the bidder was somewhere in the range between the scores. In the cases where this occurred, the average value was used for purposes of plotting and statistical computations.

V.3.6.2 Reaching agreement. One of the major issues in controversy prior to the beginning of the evaluation was whether the panel would be able to arrive at final scores without voting. This was particularly important because of the large number of places where agreement was needed, i.e., on 33 sub-factors for each of two contracts and on combining the sub-factor scores into factor scores. It was known that some of the panel members held divergent

views about the objectives of the projects and were likely to have strong disagreements during the evaluation.

In all cases the panel was able to arrive at final scores without voting. In cases where strong disagreements persisted after team members presented the information on which they based their ratings, the teams used two mechanisms to facilitate agreement. The method most commonly used was to assign the score which most of the team was tending toward and indicate that the issue needed further investigation during any subsequent clarifications. The other method, which was used twice, was to post both scores on the board and proceed with discussion on other sub-factors within the factor, leaving the decision on the sub-factor in question until more discussion had occurred on related issues. In no case did the panel have to resort to the mechanism available in PFE of having a dissenting team member enter a signed exception into the record.

The way the rating process generally worked was that following the posting of initial sub-factor ratings a bidder was selected for discussion and a panel member with either the highest or lowest score was asked to present the reasons for his rating. After he finished, someone with the opposing opinion would be asked to talk. Other panel members entered into the discussion indicating what evidence they were using in either agreeing or disagreeing with the posi-

tions presented or adding an additional perspective. As the discussion continued, team members would either reinforce or modify their initial perspective. If most of the team was tending toward one score but one or two members still felt that a different score was appropriate, the panel would focus on the minority views. People would look for information either opposed to or in support of the minority opinion. In some cases related information on the bidder's understanding, approach or capability for dealing with the sub-factor would be discovered under another sub-factor which had not been cross referenced. In other cases information from a panel member who was familiar with the bidder's past performance on the issues would be presented. Discussion would continue until the panel agreed on a score.

In some cases the score would be closer to that held by the minority position than that of the majority. For example Figure V.31 shows the initial and final ratings for sub-factor VI.2 on the agency impact contract evaluation. There are two examples in this sub-factor of a minority opinion convincing the majority. Evaluator 205 was able to convince the other team members that Bidder 204's proposal was unacceptable on this sub-factor without significant revisions (a score of four). Likewise Evaluator 211 was able to convince the team that Bidder 202 was acceptable as is (a score of seven).

VI.2	EVAL205	EVAL208	EVAL210	EVAL211	VI.1	VI.2	VI.3	VI.4	VI.5	VI
10			B205							
9	B205			B202	B205	B205				
8				B201 B205 B206	B202					
7	B205		B201 B203	B203 B204		B202				
6			B202 B204		B201 B203 B206					
5	B206 B203	B202 B204 B201 B203			B204 B204	B203 B206				
4	B204		B206			B201 B204				
3		B206								
2										
1	B202									

FIGURE V.31 EXAMPLE OF MINORITY OPINIONS PREVAILING

The time taken to get through the factor meetings varied. The shortest team meeting was forty minutes and the longest was two hours and thirty-five minutes. The average time was about an hour and a half (see Figure V.32).

Factor	Agency Impact	Commercial Impact
I	74 minutes	46 minutes
II	104	58
III	113	105
IV	74	40
V	155	76
VI	120	91
V11	<u>127</u>	<u>115</u>
	$\bar{x} = 110$	$\bar{x} = 76$
	SD = 29	SD = 29
	R = 81	R = 75
		$\bar{x} = 93$
		SD = 33
		R = 115

These numbers are estimates of the meeting times which were computed from running the tapes of the meetings. They do not include times for breaks which were taken during several of the meetings.

FIGURE V.32 TIME REQUIRED FOR THE FACTOR TEAM MEETINGS

Figure V.33 presents responses to the open ended questions which to some degree relate to reaching agreement on sub-factor scores. Several panel members felt that the deliberation and reaching agreement on the sub-factors was either the strongest aspect of the process or the one which they remember best. Two others felt that the requirement to make judgments or reach consensus on each sub-factor

Response to Panel Question 5 on the Strongest Aspect of the Process

- o The detail of the sub-factors. More thought was given to what you really wanted and there was quite a bit of deliberation on the sub-factors (PM7).
- o The group discussion. Everyone brought relevant information and people had different impressions of what the bidders meant and you were able to agree on what they meant (PM4).
- o The combination of formal disaggregated review and discussion periods presented and, in some cases altered, in light of other reviewers' arguments, information, and perspective (PM3).
- o The group meeting and discussion in coming up with final factor scores was by far the strongest part. The team effort.

Response to Panel Question 6 on the Weakest Aspect of the Process

- o The sub-factors. Making an individual judgment on each one got too complicated. You could have let them address the factors and use the sub-factors as things to think about (PM9).
- o The insistence on a consensus and the unnecessary complexity (PM2).

Response to Panel Question 10 on Any Other Aspects of the Process Which You Wish to Get Out

- o The one thing I remember quite well is that every single person initially had different rankings and they were able to arrive at consensus. It was either that, or people were very tired of the lengthy process (PM15).

FIGURE V.33 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO REACHING AGREEMENT

was the weakest aspect of the process. Other issues in this category which are closely related to this one are those on: 1) whether panel members realize their impact on the team's scores (section V.3.6.3), 2) the impact of those with greater variability on the final scores (section V.3.6.4), and 3) the time required to reach agreement on the weighting of sub-factors within a factor (section V.3.6.5). The issue dealing with the bias of panel members is also closely related to this one (section V.3.7.1).

V.3.6.3 Motivation of panel. An issue which is important to the motivation of panel members is whether they understand how their individual contributions affect the results of the process. As part of this, they must also feel that these results will be used and that they are not just going through the motions. This is an issue which appears, to a small degree, in the group process literature (e.g., Bradford, et al., 1953).

The mechanics of PFE ensured that panel members were able to realize the impact of their contributions to the scores. This occurred through the requirements for all team members to put their initial ratings of bidders into the formal records of the process, to reach agreement on the sub-factor scores, and to sign the final factor rating sheets. Through the discussion of each bidder the panel was able to see others modify their initial positions as information was put onto the table and evaluated. By not

allowing voting, the panel had to confront and resolve their differences. A dissenting opinion could not be ignored. This was true for both the individual sub-factor scores and the final factor scores. The contrast between this and the methods used by some other proposal evaluation techniques was highlighted to the author by a colleague who had returned from participating on another proposal evaluation panel. He indicated that in contrast with his experience on a PFE panel, he had a very fuzzy understanding of how his discussion affected the panel's scores. He also had no idea how these scores would be combined to reach a decision on which bidder to negotiate with.

Another way the panel members realized their impacts is that each team owned the process for coming to agreement. They could decide upon the order of discussion of the sub-factors and the methods for reaching agreement. In most cases the team chose to discuss each sub-factor sequentially and reach agreement prior to moving on. Section IV.10.12 described the one meeting where the team chose to discuss the factor as a whole prior to rating the individual sub-factors. Both methods worked well.

Several of the responses listed in Figure V.32 pertain to the issue of satisfaction with the group process. Five of the panel respondents chose to mention their satisfaction with the group decision process under the open ended questions. Two mentioned dissatisfaction.

The other part of this issue is whether the panel's inputs were used following the final team meeting and whether the panel members had any indication of how they would be used. The PFE process was very effective at incorporating the panel's recommendations into clarification sessions with the bidders who were in the competitive range. The COTR's report to the contract negotiator was written by using the actual sub-factor scores to describe the areas where bidders were found to have problems requiring clarification, negotiation, or revision (see section IV.11). The competitive range was determined by examining both the overall scores and the distribution of individual sub-factor scores.

During the panel meetings, areas of uncertainty were noted in the formal record of the process when the panel indicated that clarifications were required. Since the process for noting issues for clarification was mentioned quite frequently, the panel knew that these notes would go to the contracting office for follow-up. The questions for the oral clarifications were based upon these notes and the sub-factors on which the teams had rated the bidders below a seven.

Some additional discussion related to this issue is included in section V.3.11 which described the reaction of the contracting office to a suggestion for a committee to review the panels' recommendations.

V.3.6.4 Dealing with extreme scores or great variability. One of the difficult problems to deal with in proposal evaluation is how to agree upon a final score when individuals are using different standards for their evaluation. This includes the question of what impact those team members with extreme initial scores or greater variability in their ratings had on the final scores. Figure V.34 illustrates the different types of distributions in scores which are possible. Graph A is an example of the range of scores of a team member with a great deal of variability in his ratings. He finds that some bidders are excellent and that some bidders are awful on the sub-factor issues. Graph B is an example of the range of a team member with a moderate amount of variability in his ratings. He seldom assigns extremely high or extremely low scores. Graph C is an example of someone with a small amount of variability in his ratings. He finds that most or all bidders are acceptable on the sub-factor issues. Graph D is an example of someone with a small amount of variability in his ratings. To him most or all bidders are unacceptable on the sub-factor issues. All of these situations arose during the team meetings.

Through discussion the team members were able to agree on scores. Those who took extreme positions were required

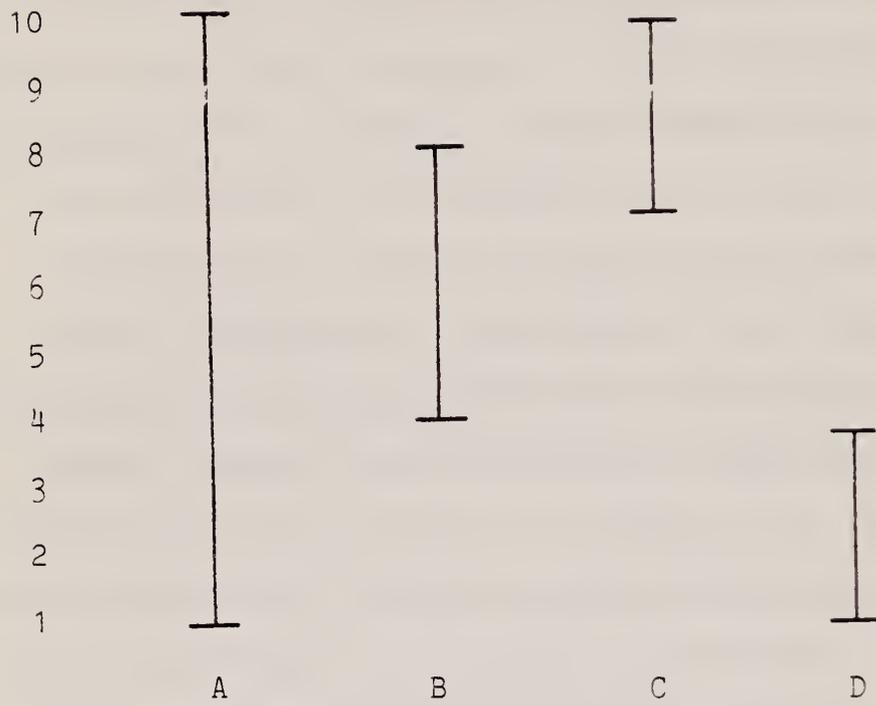


FIGURE V.34 EXAMPLES OF DIFFERENT TYPES OF VARIABILITY USED IN RATING THE BIDDERS

to justify their scores against the scale. For example, if someone rated a bidder as a four, in contrast to higher ratings of others, the other members pressed him to indicate why the bidder was unacceptable without significant revisions and to describe what specific types of revisions he felt were necessary. Referring to the words on the scale and making relative comparisons to ratings assigned to other bidders seemed to be very helpful in achieving agreement.

Figure V.35 presents a good example of differences in variability among evaluators and shows the factor team's ability to deal with it. Note that Evaluator 205 and 208 made considerable changes in their ratings after the team's discussions comparing standards and other information related to the proposals.

Despite the teams' ability to reach agreement, one panel member still felt that insufficient attention was given to comparing standards on the meaning of sub-factors during the evaluation (see Figure V.36).

V.3.6.5 Time required to agree on sub-factor weights.

One of the major concerns prior to the evaluation was that the process of arriving at factor scores once the sub-factor scores were known would be extremely time consuming (see section IV.8). It was feared that it would be difficult to determine the relative weightings of the sub-factors

III.3	EVAL204	EVAL205	EVAL208	EVAL209	EVAL210	EVAL211	III.1	III.2	III.3	III.4	III.5	III
10		B206										
9	B205					B202	B205 B206	B205 B202	B202			
8	B202						B202	B202				
7	B203 B206		B202	B205	B203 B205 B206	B204	B203	B203	B205 B206			
6		B203										
5	B204	B205	B205	B206	B202	B203 B205	B201	B206 B204	B203			
4			B203	B201	B201 B204	B206		B201				
3			B206 B204 B201	B202 B203 B204		B201	B204		B201 B204			
2												
1		B202										

FIGURE V.35 EXAMPLE OF DEALING WITH DIFFERENCES IN VARIABILITY AMONG BIDDERS

Response to Panel Question 6 on Weakest Aspect of the Process

- o Needs to have more spelled out during the evaluation about what the sub-factors mean to assure that everyone is using the same standards (PM1).

FIGURE V.36 RESPONSE TO OPEN ENDED QUESTIONS WHICH RELATES TO EXTREME SCORES OR GREATER VARIABILITY

within each factor if this decision was left up to each team. It was also thought that doing this could create impropriety if the weighting were not agreed to until after the sub-factor scores were known, or that the appearance of impropriety would be present even if the sub-factor ratings were agreed to at the start of the factor team meeting.

This issue did not present any time delay problems during the evaluation. In all cases, the weightings were agreed to after the sub-factors were rated and in no case did the scoring take more than six minutes. The process for arriving at the factor scores was for the most part one of taking an eyeball average of the sub-factor scores. If the bidders fell between two factor scores, there was discussion of whether some of the factors should be weighted more heavily than others. For example, one panel member felt that sub-factors dealing with Phases II and III of the project should be given less weight. Where the panel felt there was justification for weighting a sub-factor more heavily, that was taken into account in the final scores.

If not, a visual average of the scores would be assigned. Figures V.37A and V.37B display the differences between the numerical averages of the sub-factor scores and the agreed upon factor scores. The differences are generally fairly small.

Commercial Impact Contract Evaluation

		Bidder 101	Bidder 201	Bidder 301
Factor I	Factor score	8	5	4
	Average sub-factor score	7.62	4.62	4.0
Factor II	Factor score	7	4	7
	Average sub-factor score	7.0	4.37	4.0
Factor III	Factor score	8	4	4
	Average sub-factor score	7.6	4.2	3.6
Factor IV	Factor score	8	4	3
	Average sub-factor score	8.0	4.0	3.0
Factor V	Factor score	8	4	3
	Average sub-factor score	7.1	3.8	3.3
Factor VI	Factor score	8	5	3
	Average sub-factor score	8.0	5.0	3.0
Factor VII	Factor score	5	4	4
	Average sub-factor score	5.75	4.5	3.75

FIGURE V.37A COMPARISON BETWEEN THE NUMERICAL AVERAGES OF THE SUB-FACTOR SCORES AND THE AGREED UPON FACTOR SCORES

Agency Impact Contract Evaluation

		Bidder 201	Bidder 202	Bidder 203	Bidder 204	Bidder 205	Bidder 206
Factor I	Factor scores	6	6	7	4	7	6
	Average sub-factor score	5.75	5.75	6.75	4.5	6.75	6.12
Factor II	Factor score	6	6	8	4	7	5
	Average sub-factor score	6.5	6.0	7.75	3.75	7.0	5.0
Factor III	Factor score	4	8	7	5	8	7
	Average sub-factor score	4.4	7.9	6.8	4.7	7.8	6.6
Factor IV	Factor score	4	8	6	5	9	5
	Average sub-factor score	4.7	8.0	6.2	5.2	8.4	4.8
Factor V	Factor score	4	7	6	4	7	5
	Average sub-factor score	4.17	7.0	6.67	4.17	7.42	5.58
Factor VI	Factor score	4	6	7	4	8	5
	Average sub-factor score	4.4	6.8	6.8	5.3	7.7	5.2
Factor VII	Factor score	5	7	8	4	7	7
	Average sub-factor score	5.5	7.0	7.25	4.5	7.0	6.75

FIGURE V.37B COMPARISON BETWEEN THE NUMERICAL AVERAGES OF THE SUB-FACTOR SCORES AND THE AGREED UPON FACTOR SCORES

The question of whether the process of agreeing on the factor scores presented the appearance of impropriety is investigated in section V.3.10.4.

V.3.6.6 Input by junior panel members. The final issue to be considered in this category is whether "junior" panel members were able to affect the panel's score if their bosses were in the room and their initial scores differed (e.g., see Torrance, 1957).

It is unclear how effective PFE was in dealing with this issue. There were several cases where junior panel members and their bosses differed and the panel took the position of the junior panel member. However, frequently the junior member was already in agreement with the majority of the panel.

PFE has a mechanism for dealing with the tendency of junior panel members to agree with their bosses. By having the initial ratings posted and put into the formal record, an incentive is created for each panel member to make both the reasons for his initial score and his changes in the score known to the others. This may cause the junior panel member to defend his position more actively. However, the author feels that the evidence available from the data is inconclusive on this issue.

V.3.7 Equity of Treatment Across Bidders

The category of Equity of Treatment Across Bidders is concerned with whether the panel applied any undue differ-

ential evaluation for or against any of the bidders. Of concern are issues of how bias was dealt with, whether the criteria were applied consistently, and whether the lack of restriction on admissible information (including knowledge of the identity of the bidders) created any inequity.

Three issue discussions are included under this category. They are:

1. Did the panel deal effectively with the biases of its members?
2. Did the criteria used in evaluation provide for a consistent evaluation across proposals? Were the criteria applied consistently across proposals?
- 3.a) Did the lack of restriction on admissible information lead to any inequity in the process?
- b) Did evaluation of the proposals while knowing the identity of the bidders create any problems - biases in the final ratings, protests?

V.3.7.1 Treatment of bias. The issue of bias is not whether or not there was bias among the panel members. There was. It is a matter of whether the panel incorporated this bias into the evaluation process in a manner which did not improperly advantage or disadvantage any of the bidders.

PFE provided a process for revealing and exploring the biases of its panel members. First, factor team members were required to sign and turn in their initial independent ratings of the bidders prior to discussion on the sub-factors.

Those ratings became part of the record of the process. Next, panel members were required to discuss the basis for their ratings. This was true for low as well as high ratings. Those team members rating each sub-factor were required to continue the discussion until they reached agreement on a score. They could not resolve their disagreements by voting or merely averaging their scores. They were required to explore the bases for their differences and discuss the evidence they were using. A taped record was made of this discussion. As others on the factor team would participate in the arguments, the team members would generally be drawn toward a position. If one or more members of the team persisted in having a strong disagreement with the score which most of the team wanted, there was a mechanism for assigning this score and recording the signed dissenting opinion. This mechanism was never used. The closest the teams came to this was assigning a score and noting in the record that clarification was required on the points of uncertainty. The signed rating sheets and the tape recordings created a record of all biases. The process of requiring team members to reach agreement required an evaluation of the merits of these biases.

One special situation of dealing with bias is the case of being biased for or against specific bidders because of prior experience with them as contractors. For example,

with one of the bidders who had been an ETIP contractor, one panel member claimed that there was no reason to rate this bidder since he had worked with him and knew that he was totally unacceptable. The panel understood how this person felt about this bidder but realized it was still necessary to rate this bidder on his merits on each separate sub-factor.

Some calculations were run on the data in order to examine the biases and the extent of influence of the various members of the evaluation panel. As a first step, each panel member's ratings of the bidders were changed to rankings in order to eliminate the problems of differential variability among the raters (see section V.3.6.4).⁷ Patterns of orderings of the bidders seemed more important in computing bias than the actual numbers assigned. To obtain a measurement of each member's bias, the difference between that member's rating of each bidder on a given sub-factor and the average rating of other panel members evaluating the same bidders on the sub-factor was computed. A summation of these differences was then computed across all sub-factors which the panel member participated on. I.e., bias of panel member I for bidder J is computed as:

⁷A correction factor was included for panel members who failed to rate all of the bidders on a sub-factor. Where there were six bidders and the panel member only rated five of them the ordering was shifted from 1, 2, 3, 4, 5 to 1.5, 2.5, 3.5, 4.5, 5.5, where 1 is the lowest rating and six is the highest.

$$\text{BIAS}_{IJ} = \frac{\sum_k \left[\text{RANK}_{IJk} - \sum_i \text{RANK}_{iJk} / (n-1) \right]}{N}$$

k = sub-factors on which I participated
 i = all other panel members on sub-factor k

where,

n = total number of panel members rating bidder J on sub-factor K, and

N = total number of sub-factors on which panel member I rated bidder J.

The assumption underlying this computation is that if a panel member is unbiased toward bidder J, relative to the other panel members, BIAS_{IJ} should be close to zero, i.e., his ranking of bidder J should be higher than the other panel members' rankings about as often as it is lower. A large positive or large negative value for BIAS_{IJ} would indicate a relative bias for or against bidder J.

The next step was to compute a measurement of each member's influence over the final rankings of the panel. This was done by determining the degree to which the direction of the difference between the final rankings and the average initial rankings tended to follow each panel member's rankings. The differences were computed for each sub-factor as follows:

$$\text{PANEL DIFFERENCE}_{jk} = \text{FINAL RANK}_{jk} - \sum_{\substack{i=\text{all panel} \\ \text{members on} \\ \text{sub-factor } k}} \text{RANK}_{ijk} / (n-1)$$

where,

n = total number of panel members rating bidder J on sub-factor K.

These numbers were then compared to the values of individual differences of each panel member, I, where:

$$\text{INDIVIDUAL DIFFERENCE}_{Ijk} = \text{RANK}_{Ijk} - \sum_{\substack{i=\text{all other} \\ \text{panel members} \\ \text{on sub-factor} \\ k}} \text{RANK}_{ijk} / (n-1)$$

A table was constructed for each panel member where, if the sign of PANEL DIFFERENCE_{jk} was the same as the sign of INDIVIDUAL DIFFERENCE_{jk} a "+" was entered. If the signs were different a "-" was entered. If both were equal to zero a "Ø" was entered. Figures V.38 through V.58 display the values and tables for the four most active participants on the agency impact contract evaluation and the three most active participants on the commercial impact contract. Figure V.59 displays the sum of ratios of +/- for each of the evaluators, a measure of overall influence.

Evaluator 205's difference scores show both a large number of extreme rankings and overall bias for bidders 201 and 206 and against bidder 202. Examination of the

EVAL S.	SUB-FACTOR								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
BIDDER 201.	3.00	2.75	3.50	3.50	3.00	2.75	3.33	.67	.00
202.	-1.83	-.75	-2.50	-1.75	-1.70	.63	-2.50	-1.50	-.63
203.	-2.00	-2.75	-.67	.25	-1.20	-.38	-.33	-.17	.50
204.	-.67	-2.50	.50	1.00	-1.60	-1.12	-.50	-.17	-.25
205.	-.67	-.50	-1.17	-2.50	-1.30	-2.25	-1.67	.00	-1.00
206.	2.17	3.75	.33	-.50	2.80	.38	1.67	2.50	2.25
10.	11.	12.	13.	19.	20.	21.	22.	23.	24.
.00	.00	.00	.00	.50	-.13	1.20	-.83	2.33	1.50
-.83	-2.80	.13	.13	-2.00	-2.75	-3.50	-2.17	-2.83	-4.17
.83	1.00	-1.12	-1.50	-.25	1.88	-1.50	-.17	-1.50	1.50
-1.00	.10	-1.37	-1.00	-.63	.25	1.00	1.50	.67	2.17
-3.33	-1.50	-2.62	-1.62	.38	.13	.30	1.00	.83	1.33
3.67	1.90	3.25	2.87	2.00	.63	2.50	.67	.50	-.67
25.	26.	27.	30.	31.	32.	33.	Σ	N	
.00	.00	.00	2.83	3.17	3.33	3.33	2.21	18.00	
-2.83	-3.00	-.67	-2.50	-3.50	-1.00	-2.83	-1.91	26.00	
.17	.83	-1.00	-1.50	.00	-1.67	-1.83	-.48	26.00	
-.67	-.17	-2.00	.83	-1.67	-1.33	-.83	-.36	26.00	
.17	.17	.83	-1.17	-1.67	-1.67	.00	-.78	26.00	
2.00	2.50	1.17	1.50	3.67	2.33	2.17	1.85	26.00	

FIGURE V.38 INDIVIDUAL DIFFERENCE SCORES FOR PANEL MEMBER 205

EVAL 5. BIDDER	SUB-FACTOR								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
201.	4.00	2.00	3.00	3.00	3.50	2.00	2.50	.00	.00
202.	-2.00	.50	-1.50	-1.00	-1.50	1.00	-3.50	.50	-1.00
203.	-2.50	-1.50	-2.50	-1.00	-3.00	.00	-1.00	-1.50	.00
204.	.00	-2.50	.50	1.00	.00	.00	.50	.50	.50
205.	-1.50	-.50	-1.50	-2.00	-1.00	-3.50	.00	.00	-1.50
206.	2.00	2.00	2.00	.00	2.00	.50	1.50	1.00	.50
10.	11.	12.	13.	19.	20.	21.	22.	23.	24.
.00	.00	.00	.00	1.50	1.00	2.50	.50	3.50	1.50
-1.00	-4.50	-1.00	-1.00	-3.00	-3.50	-4.00	-3.00	-4.00	-5.00
.00	1.50	-2.00	-1.00	-1.00	2.00	-2.50	-.50	-2.00	1.50
-.50	1.00	-.50	-.50	.50	.50	1.00	2.50	1.50	2.00
-3.50	-1.00	-1.50	-2.00	.00	.00	.50	.50	1.00	2.00
2.50	1.00	2.50	2.00	2.00	.00	2.50	.00	.00	-2.00
25.	26.	27.	30.	31.	32.	33.	Σ	N	
.00	.00	.00	2.50	3.00	2.00	3.00	2.28	18.00	
-3.50	-3.50	.00	-1.50	-3.50	-1.50	-3.00	-2.12	26.00	
.00	-.50	-1.50	-2.00	-1.50	-1.00	-2.00	-.98	26.00	
2.00	1.00	-1.00	1.00	.00	.00	.00	.42	26.00	
-.50	-.50	.00	-1.00	-1.00	.00	-1.00	-.78	25.00	
1.50	1.50	.50	1.00	3.00	.50	3.00	1.27	26.00	

FIGURE V.39 DIFFERENCE SCORES FOR SUB-FACTORS ON WHICH
PANEL MEMBER 205 PARTICIPATED

EVAL S.	BIAS															
BIDDER																
201.	+	+	+	+	+	+	+	+								
202.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
203.	-	-	-	+	-	-	-	-	+	+	+	-	-	-	+	+
204.	-	-	+	+	-	-	-	-	-	-	-	+	+	+	+	-
205.	-	-	-	-	-	-	-	-	-	-	+	+	+	+	+	-
206.	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+

EVAL S.	INFLUENCE															
BIDDER																
201.	+	+	+	+	+	+	+	-								
202.	+	-	+	+	+	+	+	-	+	+	+	+	+	+	+	-
203.	+	+	+	-	+	+	+	-	+	+	+	+	+	+	+	-
204.	-	+	+	+	-	-	-	-	+	+	+	+	-	+	+	-
205.	+	+	+	+	+	-			+	+	+	+	-	-	+	-
206.	+	+	+	-	+	+	+	+	+	+	+	+	-	+	+	+

FIGURE V.40 BIAS AND INFLUENCE DISPLAYS FOR PANEL MEMBER 205

EVAL BIDDER	SUB-FACTORS								
	1.	3.	5.	6.	9.	10.	11.	12.	13.
201.	-2.33	-.50	.60	-2.25	-.25	3.00	-1.17	.50	2.25
202.	.83	.83	.10	1.98	1.25	.50	2.60	.75	.75
203.	.67	2.00	-.60	.25	-.75	-1.83	.40	-1.12	-.25
204.	2.00	-.17	1.40	.13	1.62	1.00	-.50	1.12	-1.00
205.	2.00	1.50	1.10	.25	.88	1.33	.30	1.75	1.50
206.	-3.17	-3.67	-2.60	-.25	-3.37	-2.33	-1.10	-1.75	-2.12

14.	15.	16.	17.	18.	25.	26.	27.	28.	29.
-.25	.50	-3.00	-.50	-1.00	2.50	-1.25	.00	-.25	.75
-.83	-.50	-.33	.25	-.25	2.50	1.00	1.33	1.00	.75
.00	1.33	1.33	-.75	.25	-1.17	-1.17	1.67	-.50	.00
2.17	-.33	.83	1.50	1.25	-2.00	2.50	.00	-1.75	-1.50
1.83	1.50	.67	.25	.75	.17	.83	.17	2.00	2.00
-2.17	-1.83	.33	-.25	-.75	-1.33	-2.17	-1.50	-.25	-1.50

Σ	N
-.14	19.00
.76	19.00
-.01	19.00
.44	19.00
1.09	19.00
-1.67	19.00

FIGURE V.41 INDIVIDUAL DIFFERENCE SCORES FOR PANEL MEMBER
208

EVAL 8. BIDDER	SUB-FACTORS								
	1.	3.	5.	6.	9.	10.	11.	12.	13.
201.	.00	.00	1.50	-2.00	2.50	3.00	-.50	.50	2.50
202.	.00	1.00	.00	2.00	.50	.00	.00	-.50	-.50
203.	-.50	-.50	-2.50	.50	-1.00	-2.00	1.00	-2.00	.00
204.	2.00	.00	2.50	1.00	2.00	1.00	.50	1.50	-.50
205.	.50	.50	1.00	-1.50	.00	.00	-.50	2.00	.50
206.	-2.00	-1.00	-2.50	.00	-4.00	-2.00	-1.50	-1.50	-2.00
14.	15.	16.	17.	18.	25.	26.	27.	28.	29.
.00	1.00	-3.00	.50	.00	1.00	1.50	-.50	.50	1.00
.00	-.50	.00	.00	-1.00	.50	-.50	1.50	.00	-.50
.00	.50	1.00	-1.00	.00	-1.00	-2.00	.50	-1.00	.00
2.00	-.50	1.00	1.00	1.00	1.00	3.00	.50	-1.00	.00
.00	.50	.00	.00	1.00	-.50	.00	-.50	1.00	.50
-2.00	-1.00	1.00	-.50	-1.00	-1.00	-2.00	-1.50	.50	-1.00
Σ	N								
.50	19.00								
.11	19.00								
-.53	19.00								
.95	19.00								
.29	19.00								
-1.32	19.00								

FIGURE V.42 DIFFERENCE SCORES FOR SUB-FACTORS ON WHICH
PANEL MEMBER 208 PARTICIPATED

EVAL 8. BIDDER	BIAS																		
201.	-	-	+	-	-	+	-	+	+	-	+	-	-	-	+	-	0	-	+
202.	+	+	+	+	+	+	+	+	+	-	-	-	+	-	+	+	+	+	+
203.	+	+	-	+	-	-	+	-	-	0	+	+	-	+	-	-	+	-	0
204.	+	-	+	+	+	+	-	+	-	+	-	+	+	+	-	+	0	-	-
205.	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
206.	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-

EVAL 8. BIDDER	INFLUENCE																		
201.	-	-	+	+	-	+	+	+	+	-	+	+	-	-	+	-	-	-	+
202.	-	+	-	+	+	-	-	-	-	-	+	-	-	+	+	-	+	-	-
203.	-	-	+	+	+	+	+	+	-	0	+	+	+	-	+	+	+	+	0
204.	+	-	+	+	+	+	-	+	+	+	+	+	+	+	-	+	-	+	-
205.	+	+	+	-	-	-	+	+	+	-	+	-	-	+	-	-	-	+	+
206.	+	+	+	-	+	+	+	+	+	+	+	+	+	+	+	+	+	+	-

FIGURE V.43 BIAS AND INFLUENCE DISPLAYS FOR PANEL MEMBER 208

EVAL 10. BIDDER	SUB-FACTORS								
	5.	11.	12.	13.	19.	20.	21.	22.	23.
201.	-2.40	-.50	-.25	-.75	-.13	-.13	1.20	3.17	2.33
202.	-1.70	-1.00	-2.37	-1.75	-.13	-.88	-1.10	-.17	-.17
203.	.60	1.60	2.00	2.25	1.62	1.88	.90	-.17	1.17
204.	2.60	-1.10	1.75	2.12	-1.25	-.38	-2.00	-2.50	-1.33
205.	-.70	.30	.50	.68	.38	.13	.30	-.33	-.50
206.	1.60	1.30	-.50	-2.12	-.50	-.63	.70	.00	-1.50
24.	25.	26.	27.	28.	29.	30.	31.	32.	33.
.00	-.50	1.00	.00	1.25	.00	-1.83	-1.50	-2.00	-2.00
1.17	-.83	-1.00	-.67	-2.75	-2.25	.17	.50	-1.67	2.50
.17	2.17	2.17	-2.33	.25	-.75	1.17	-1.33	.33	-.50
-.50	1.33	-.63	.67	-.25	.00	.17	3.67	2.00	1.17
-.67	.63	.83	.83	.00	1.25	-1.17	1.00	-1.00	-2.00
-1.33	-2.67	-2.17	-.17	2.00	.00	1.50	-2.33	2.33	.83
Σ	N								
-.18	17.00								
-.74	19.00								
.65	19.00								
.28	19.00								
.05	18.00								
-.20	18.00								

FIGURE V.44 INDIVIDUAL DIFFERENCE SCORES FOR PANEL MEMBER
210

EVAL 10. BIDDER	SUB-FACTOR									
	5.	11.	12.	13.	19.	20.	21.	22.	23.	
201.	-1.00	.00	.00	.50	1.00	1.00	2.50	3.50	3.50	
202.	-1.50	-3.00	-3.00	-2.50	-1.50	-2.00	-2.00	-1.50	-2.00	
203.	-1.50	2.00	.50	2.00	.50	2.00	-.50	-.50	.00	
204.	3.50	.00	2.00	2.00	.00	.00	-1.50	-.50	.00	
205.	-.50	.50	1.00	.00	.00	.00	.50	-.50	.00	
206.	1.00	.50	-.50	-2.00	.00	-1.00	1.00	-.50	-1.50	
	24.	25.	26.	27.	28.	29.	30.	31.	32.	33.
	.00	-1.00	3.00	.00	1.50	.50	-1.00	-.50	-2.00	-1.00
	-1.00	-2.00	-2.00	.00	-2.50	-2.50	.50	-.50	-2.00	1.00
	.50	1.50	.50	-2.50	-.50	-.50	.00	-2.50	.50	-1.00
	.00	3.50	.50	1.00	.00	1.00	.50	4.00	2.50	1.50
	.50	.00	.00	.00	.00	.00	-1.00	1.00	.50	-2.50
	-2.50	-2.00	-2.00	-.50	2.00	.00	1.00	-1.50	.50	2.00
Σ		N								
	.62	17.00								
	-1.58	19.00								
	.03	19.00								
	1.05	19.00								
	-.03	18.00								
	-.33	18.00								

FIGURE V.45 DIFFERENCE SCORES FOR SUB-FACTORS ON WHICH
PANEL MEMBER 210 PARTICIPATED

EVAL	BIAS																		
10.																			
BIDDER																			
201.	-	-	-	-	-	-	+	+	+	-	+	+	0	-	-	-	-		
202.	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	+	-	+	
203.	+	+	+	+	+	+	+	-	+	+	+	+	-	+	-	+	-	+	-
204.	+	-	+	+	-	-	-	-	-	+	-	+	-	0	+	+	+	+	
205.	-	+	+	+	+	+	+	-	-	-	+	+	+	+	-	+	-	-	
206.	+	+	-	-	-	-	+	0	-	-	-	-	-	+	+	-	+	+	

EVAL	INFLUENCE																		
10.																			
BIDDER																			
201.	+	-	-	-	-	-	+	+	+	+	+	+	+	-	+	+	+	+	
202.	+	+	+	+	+	+	+	+	+	-	+	+	-	+	+	+	-	+	+
203.	-	+	+	+	+	+	-	+	-	+	+	+	+	-	+	-	+	+	+
204.	+	-	+	+	-	-	+	+	-	-	+	-	+	-	-	+	+	+	+
205.	+	+	+	-	-	-	+	+	-	-	-	-	-	-	-	+	+	-	+
206.	+	+	+	+	-	+	+	-	+	+	+	+	+	+	+	+	+	+	+

FIGURE V.46 BIAS AND INFLUENCE DISPLAYS FOR PANEL MEMBER 210

EVAL 11. BIDDER	SUB-FACTOR								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
201.	1.67	1.25	-1.83	-2.50	-.60	-2.25	-.67	.00	.50
202.	-1.17	.00	.17	2.00	.70	-.63	.83	-.17	1.88
203.	.67	1.00	.00	-.50	2.40	1.50	.33	1.17	-.13
204.	-.67	2.75	-.17	-.50	-1.60	-1.12	-1.17	-1.50	-.88
205.	.67	-2.00	.17	1.25	-.10	1.50	1.00	.25	-.38
206.	-1.17	-3.00	1.67	.25	-.80	1.00	-.33	-.17	-1.50
10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
-3.00	-1.17	-.25	-1.50	-.25	-1.00	1.50	.50	1.00	-2.62
.50	2.60	1.37	.75	-.83	.17	.33	.25	1.25	-.75
.83	-.20	1.37	-.25	2.67	-1.33	-.67	.75	.25	2.87
.33	3.10	-.75	-.38	-.50	.33	.17	-.75	-1.00	.63
1.33	-1.50	-.75	-1.62	-.83	-1.83	.00	.25	-.75	-.88
-.33	-2.30	.13	3.50	.50	4.17	-1.00	-.25	.00	.75
20.	21.	22.	23.	24.	25.	26.	27.	28.	29.
-2.00	-1.80	-2.17	-3.00	-1.50	-2.00	.25	.00	-1.00	-.75
-.25	1.30	.50	1.83	2.50	1.17	3.00	.00	1.75	1.50
.00	.90	.50	.50	-1.17	-1.17	-1.83	1.67	.25	.75
.25	-.80	3.50	2.67	-.50	1.33	-1.50	1.33	2.00	1.50
.13	-.30	-1.67	-1.17	-1.33	-1.17	-1.83	-1.83	-2.00	-3.25
1.88	.70	-.67	-.83	2.67	2.00	1.83	.50	-1.75	1.50

FIGURE V.47 INDIVIDUAL DIFFERENCE SCORES FOR PANEL MEMBER
211

30.	31.	32.	33.	Σ	N
-1.17	-2.17	-2.00	-.67	-.95	33.00
3.50	1.83	1.00	-.17	.87	33.00
-.83	1.33	.33	2.17	.49	33.00
-.50	-.33	.00	.50	.18	33.00
.83	-1.00	1.67	1.33	-.48	33.00
-1.83	.33	-1.00	-3.17	.10	33.00

FIGURE V.47 Continued

EVAL 11. BIDDER	SUB-FACTOR								
	1.	2.	3.	4.	5.	6.	7.	8.	9.
201.	3.00	1.00	-1.00	-1.00	.50	-2.00	-.50	-.50	3.00
202.	-1.50	1.00	.50	1.50	.50	.00	-1.00	1.50	1.00
203.	-.50	1.00	-2.00	-1.50	.00	1.50	-.50	-.50	-.50
204.	.00	1.00	.00	.00	.00	.00	.00	-.50	.00
205.	-.50	-1.50	-.50	.50	.00	-.50	2.00	1.00	-1.00
206.	-.50	-2.50	3.00	.50	-1.00	1.00	.00	-1.00	-2.50
10.	11.	12.	13.	14.	15.	16.	17.	18.	19.
.00	-.50	.00	.00	.00	.00	.00	1.00	1.00	-1.00
.00	.00	.00	-.50	.00	.00	.50	.00	.00	-2.00
.00	.50	.00	.00	2.00	-1.50	-.50	.00	.00	1.50
.50	3.50	.00	.00	.00	.00	.50	-.50	-.50	1.50
.00	-1.00	.00	-2.00	-2.00	-2.00	-.50	.00	.00	-1.00
-.50	-2.50	.00	2.50	.00	3.50	.00	-.50	-.50	1.00
20.	21.	22.	23.	24.	25.	26.	27.	28.	29.
-.50	.00	-.50	-.50	.00	-2.00	2.50	-.50	.00	.00
-1.50	.00	-1.00	-.50	.00	-.50	1.00	.50	.50	.00
.50	-.50	.00	-.50	-.50	-1.00	-2.50	.50	-.50	.50
.50	-.50	4.00	3.00	.00	3.50	.00	1.50	1.50	2.00
.00	.00	-1.50	-.50	.00	-1.50	-2.00	-2.00	-1.00	-3.00
1.00	1.00	-1.00	-1.00	.50	1.50	1.00	.00	-.50	.50

FIGURE V.48 DIFFERENCE SCORES FOR SUB-FACTORS ON WHICH
PANEL MEMBER 211 PARTICIPATED

30.	31.	32.	33.	Σ	N
-0.50	-1.00	-2.00	.00	-.06	33.00
3.00	.50	.00	-1.00	.08	33.00
-1.50	-.50	.50	1.00	-.17	33.00
.00	1.00	1.00	1.00	.73	33.00
.50	-.50	2.50	.00	-.55	33.00
-1.50	.50	-2.00	-1.00	-.03	33.00

FIGURE V.48 Continued

EVAL 2.	SUB-FACTOR								
	1.	2.	3.	4.	9.	10.	11.	14.	15.
BIDDER									
101.	-1.50	-1.17	-.50	-.50	-.50	-.67	-.30	-.50	-.50
102.	.67	.67	-.17	-.33	.00	.00	-.50	-.13	-.38
103.	.00	.00	.00	.00	.00	.00	.00	.00	.00
16.	17.	18.	19.	20.	26.	30.	31.	32.	33.
-1.50	-.50	-.50	-.50	-.50	-.50	.25	.00	.25	-.75
.50	-.50	-.50	-.25	-.38	-.40	-.75	-1.00	-1.00	.00
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Σ	N								
-.55	19.00								
-.26	17.00								
.00	.00								

FIGURE V.50 INDIVIDUAL DIFFERENCE SCORES FOR PANEL MEMBER
102

EVAL 2. BIDDER	SUB-FACTOR									
	1.	2.	3.	4.	9.	10.	11.	14.	15.	
101.	.38	.63	.13	.13	.10	.50	.25	.10	.10	
102.	.00	-1.00	.38	.25	.00	.00	-.42	-.10	.20	
103.	.00	.00	.00	.00	.00	.00	.00	.00	.00	
	16.	17.	18.	19.	20.	26.	30.	31.	32.	33.
	.50	.25	.25	.10	.10	.08	.67	.50	.67	.50
	-.17	.25	.25	-.20	-.20	.17	-1.00	-.17	-1.17	.00
	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
	Σ	N								
	.31	19.00								
	-.21	17.00								
	.00	.00								

FIGURE V.51 DIFFERENCE SCORES FOR SUB-FACTORS ON WHICH
PANEL MEMBER 102 PARTICIPATED

EVAL
2.
BIDDER

BIAS

101. - - - - - + 0 + -

102. + + - - - - - + - - - - - 0

103.

EVAL
2.
BIDDER

INFLUENCE

101. - - - - - + - + -

102. - - - - - + + - - - - + + - + + 0

103.

FIGURE V.52 BIAS AND INFLUENCE DISPLAYS FOR PANEL MEMBER 102

| EVAL
5.
BIDDER | SUB-FACTOR | | | | | | | | |
|----------------------|------------|------|------|------|------|------|------|------|------|
| | 5. | 11. | 12. | 13. | 19. | 20. | 21. | 22. | 23. |
| 101. | .83 | .30 | .33 | .33 | .13 | .13 | .00 | -.50 | -.50 |
| 102. | -1.50 | .10 | .00 | .00 | -.88 | -.38 | .17 | .83 | .67 |
| 103. | .67 | -.25 | -.33 | -.33 | 1.00 | .50 | -.17 | -.33 | -.17 |
| 24. | 25. | 26. | 27. | 28. | 29. | 30. | 31. | 32. | 33. |
| .00 | .00 | .10 | .00 | .00 | .00 | 1.00 | .75 | 1.00 | 1.50 |
| .17 | .25 | .20 | .38 | .17 | .17 | -.75 | -.25 | -.25 | -.75 |
| -.17 | -.25 | -.13 | -.38 | -.17 | -.17 | .00 | .00 | -.50 | -.50 |
| Σ | N | | | | | | | | |
| .28 | 19.00 | | | | | | | | |
| -.09 | 19.00 | | | | | | | | |
| -.09 | 19.00 | | | | | | | | |

FIGURE V.53 INDIVIDUAL DIFFERENCE SCORES FOR PANEL MEMBER
105

| EVAL
5. | SUB-FACTOR | | | | | | | | |
|----------------|------------|------|-------|-------|------|-------|------|-------|------|
| | 5. | 11. | 12. | 13. | 19. | 20. | 21. | 22. | 23. |
| BIDDER
101. | .63 | .25 | .25 | .25 | .10 | .10 | .00 | .13 | .13 |
| 102. | -.13 | -.42 | -1.00 | -1.00 | -.20 | -.80 | .13 | .13 | .00 |
| 103. | -.50 | .30 | .75 | .75 | .25 | .88 | -.13 | -.25 | -.13 |
| 24. | 25. | 26. | 27. | 28. | 29. | 30. | 31. | 32. | 33. |
| .00 | .00 | .08 | .00 | .00 | .00 | .67 | .50 | .67 | .50 |
| -.38 | .20 | .17 | .30 | .13 | .13 | -1.00 | -.17 | -1.17 | .00 |
| .38 | -.20 | -.10 | -.30 | -.13 | -.13 | .50 | .00 | .75 | -.25 |
| Σ | N | | | | | | | | |
| .22 | 19.00 | | | | | | | | |
| -.27 | 19.00 | | | | | | | | |
| .13 | 19.00 | | | | | | | | |

FIGURE V.54 DIFFERENCE SCORES FOR SUB-FACTORS ON WHICH
PANEL MEMBER 105 PARTICIPATED

| EVAL | BIAS | | | | | | | | | | | | | | | | | | |
|--------|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S. | | | | | | | | | | | | | | | | | | | |
| BIDDER | | | | | | | | | | | | | | | | | | | |
| 101. | + | + | + | + | + | + | 0 | - | - | 0 | 0 | + | 0 | 0 | 0 | + | + | + | + |
| 102. | - | + | 0 | 0 | - | - | + | + | + | + | + | + | + | + | + | - | - | - | - |
| 103. | + | - | - | - | + | + | - | - | - | - | - | - | - | - | - | 0 | 0 | - | - |

| EVAL | INFLUENCE | | | | | | | | | | | | | | | | | | |
|--------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| S. | | | | | | | | | | | | | | | | | | | |
| BIDDER | | | | | | | | | | | | | | | | | | | |
| 101. | + | + | + | + | + | + | 0 | - | - | 0 | 0 | + | 0 | 0 | 0 | + | + | + | + |
| 102. | + | - | - | - | + | + | + | + | - | - | + | + | + | + | + | + | + | + | - |
| 103. | - | - | - | - | + | + | + | + | + | - | + | + | + | + | + | - | 0 | - | + |

FIGURE V.55 BIAS AND INFLUENCE DISPLAYS FOR PANEL MEMBER 105

| EVAL
8. | SUB-FACTOR | | | | | | | | |
|----------------|------------|-------|-------|------|------|-------|-------|-------|-------|
| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
| BIDDER
101. | .50 | .83 | .17 | .17 | .83 | .50 | 1.00 | .75 | -1.12 |
| 102. | -.67 | -.67 | -.17 | -.33 | -.83 | -1.33 | -1.75 | -1.75 | .63 |
| 103. | .50 | .00 | .25 | .50 | .00 | .63 | .75 | 1.00 | .50 |
| 10. | 11. | 12. | 13. | 14. | 15. | 19. | 20. | 21. | 22. |
| -.67 | -.90 | -1.00 | -1.00 | .13 | .13 | .13 | .13 | .00 | .17 |
| 1.25 | 1.30 | 1.33 | 1.33 | -.13 | .25 | .38 | .25 | .17 | .17 |
| -.25 | -.25 | -.33 | -.33 | .17 | -.17 | -.33 | -.17 | -.17 | -.33 |
| 23. | 24. | 25. | 26. | 27. | 28. | 29. | 30. | 31. | 32. |
| .17 | .00 | .00 | .10 | .00 | .00 | .00 | -1.25 | -.75 | -1.25 |
| -.67 | .17 | -1.00 | -.40 | -.25 | -.50 | -.50 | 1.50 | 1.25 | 1.25 |
| .50 | -.17 | 1.00 | .50 | .25 | .50 | .50 | .00 | .00 | .50 |
| 33. | Σ | N | | | | | | | |
| -.75 | -.10 | 30.00 | | | | | | | |
| .75 | .04 | 30.00 | | | | | | | |
| .50 | .21 | 30.00 | | | | | | | |

FIGURE V.56 INDIVIDUAL DIFFERENCE SCORES FOR PANEL MEMBER
108

| EVAL
8.
BIDDER | SUB-FACTOR | | | | | | | | |
|----------------------|------------|-------|-------|------|------|------|-------|------|-------|
| | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
| 101. | .38 | .63 | .13 | .13 | .63 | .38 | .67 | .50 | .10 |
| 102. | .00 | -1.00 | .38 | .25 | -.13 | -.50 | -.67 | -.17 | .13 |
| 103. | -.17 | .50 | -.33 | -.17 | -.50 | .13 | .00 | -.33 | -.13 |
| 10. | 11. | 12. | 13. | 14. | 15. | 19. | 20. | 21. | 22. |
| .50 | .25 | .25 | .25 | .10 | .10 | .10 | .10 | .00 | .13 |
| -.17 | -.42 | -1.00 | -1.00 | -.10 | .20 | -.20 | -.80 | .13 | .13 |
| -.17 | .30 | .75 | .75 | .13 | -.13 | .25 | .28 | -.13 | -.25 |
| 23. | 24. | 25. | 26. | 27. | 28. | 29. | 30. | 31. | 32. |
| .13 | .00 | .00 | .08 | .00 | .00 | .00 | .67 | .50 | .67 |
| .30 | -.38 | .20 | .17 | .30 | .13 | .13 | -1.00 | -.17 | -1.17 |
| -.13 | .38 | -.20 | -.10 | -.30 | -.13 | -.13 | .50 | .00 | .75 |
| 33. | Σ | N | | | | | | | |
| .50 | .26 | 30.00 | | | | | | | |
| .00 | -.22 | 30.00 | | | | | | | |
| -.25 | .06 | 30.00 | | | | | | | |

FIGURE V.57 DIFFERENCE SCORES FOR SUB-FACTORS ON WHICH
PANEL MEMBER 108 PARTICIPATED

| EVAL
8. | BIAS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101. | + | + | + | + | + | + | + | + | - | - | - | - | - | + | + | + | + | 0 | + | + | 0 | 0 | + | 0 | 0 | 0 | - | - | - | - | |
| 102. | - | - | - | - | - | - | - | - | + | + | + | + | + | - | + | + | + | + | - | + | - | - | - | - | - | - | - | + | + | + | + |
| 103. | + | 0 | + | + | 0 | + | + | + | + | - | - | - | - | + | - | - | - | - | - | + | - | + | + | + | + | + | 0 | 0 | + | + | |

| EVAL
8. | INFLUENCE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------|-----------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BIDDER
101. | + | + | + | + | + | + | + | + | - | - | - | - | - | + | + | + | + | 0 | + | + | 0 | 0 | + | 0 | 0 | 0 | - | - | - | - |
| 102. | - | + | - | - | + | + | + | + | + | - | - | - | - | + | + | - | - | + | + | - | - | - | - | - | - | - | - | - | - | - |
| 103. | - | - | - | - | + | - | - | - | + | - | - | - | + | + | - | - | + | + | - | - | - | - | - | - | - | - | - | - | - | - |

FIGURE V.58 BIAS AND INFLUENCE DISPLAYS FOR PANEL MEMBER 108

| Evaluator | +/- | Ratio | Evaluator | +/- | Ratio |
|-----------|---------|-------|-----------|-------|-------|
| 201 | 20/30 | .67 | 101 | 18/26 | .69 |
| 202 | 27/48 | .56 | 102 | 9/35 | .26 |
| 203 | 4/11 | .36 | 103 | 26/32 | .81 |
| 204 | 24/50 | .48 | 104 | 18/26 | .69 |
| 205 | 66/147 | .45 | 105 | 35/50 | .70 |
| 206 | 12/24 | .50 | 106 | 3/4 | .75 |
| 207 | 6/24 | .25 | 107 | 14/26 | .54 |
| 208 | 55/112 | .49 | 108 | 33/83 | .40 |
| 209 | 8/12 | .67 | 109 | 2/11 | .18 |
| 210 | 48/110 | .44 | 110 | 14/15 | .93 |
| 211 | 112/198 | .56 | 111 | 2/6 | .34 |
| 212 | 22/35 | .63 | 112 | 14/23 | .61 |

FIGURE V.59 RATIO OF PANEL MOVEMENT TOWARD/AWAY FROM RANKINGS OF EACH PANEL MEMBER

influence indicators show that he was unable to sway the other panel members. For bidders 201 and 202 the teams' final rankings tended to move away from their average rankings in a direction opposite evaluator 205's initial scores. For bidder 206 they moved slightly toward 205's initial scores. On the average, across bidders, the panel rankings tended to move toward bidder 205's rankings 44% of the time. For bidders 201, 202, and 206, these percentages were 28%, 31% and 62% respectively.

Evaluator 208's scores show bias toward bidder 205 and against bidder 206. For bidder 205 the teams' rankings moved somewhat toward evaluator 208's while for bidder 206 they moved slightly away from 208's. Across sub-factors the panel moved toward bidder 208's rankings 49% of the time. For bidders 205 and 206 the percentages were 74% and 26%.

The scores of evaluators 210 and 211 do not show any strong bias for or against any of the bidders. For evaluator 210 the percentage of +/- across bidders is 44%. For evaluator 211 it is 56.6%.

The percentage scores from the agency impact contract data indicate that panel members had varying degrees of influence over the final rankings. Comparison of the difference scores shows that panel members who were biased toward specific bidders were not able to sway the results.

In fact, the panel often tended to move away from those who were biased.

The data for commercial impact is more difficult to interpret. The computations for bias and influence are sensitive to missing data, the number of bidders, and the degree of initial agreement in the rankings.⁸ Since there were only three bidders, since evaluator 102 failed to rate bidder 103 on any of the nineteen sub-factors on which he was a participant, and since there was a high degree of initial agreement in the scores, it is difficult to say much about this data, other than that with the exception of bidder 102, there does not seem to be any bias in it.

Figure V.60 presents two responses to open ended questions which relate to the treatment of bias.

Other issues related to this one include: how the panel dealt with differences in uncertainty among bidders during the evaluation (discussed in section V.3.2.4); and whether evaluation while knowing the identity of bidders created any problems (discussed in section V.3.7.3).

⁸Where a panel member rates only bidder 101 and 102 the rankings come out 1.5 for the lowest and 2.5 for the highest. If there is a great deal of initial agreement that 101 is highest (i.e., those rating all three bidders rank him 3), the panel member will always appear biased against bidder 101. If the team agrees that bidder 101 is highest, the final team score will always appear to move away the panel members with missing data and toward the other panel members.

Response From Panel Question 5 on Strongest Aspect of the Process

- o The system was superb. I wouldn't want to do it any other way. Its strength is that you don't have to pretend that you have no biases. It brings a very professional way to channel personal opinion and judgment and feeling in an honest, constructive fashion. It makes subjective objective (PM12).

Response From Bidder Question 11 on Weakest Aspect of the Process

- o It gave people at ETIP an opportunity to try to take subjective things and make them objective in the sense that they were using the same rigor as a serious qualified proposal team would use in laying out how they were going to respond. I'm not saying it worked (BR4).

FIGURE V.60 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO THE TREATMENT OF BIAS

V.3.7.2 Consistency of evaluation across bidders.

The next issue concerns the criteria for rating sub-factors and whether they provided a consistent evaluation across all proposals. When broad categories of evaluation criteria are used and the evaluation is made against separate designs proposed by each bidder, there may be considerable difficulty in achieving a comparable basis for evaluation. Each proposal will surface different issues and there may be little basis for comparability. For example, in a prior ETIP RFP for evaluation services, the broad categories of Methodology and Qualifications of Offeror were used. There were five sub-categories within the first category and two within the second. The RFP indicated that the panel would complete its evaluation on the Methodology category before

beginning its evaluation on the Qualifications category. In an evaluation like this, the panel must read through the methodology section and decide on criteria within each of the sub-categories. Since issues which the bidders choose to discuss will vary, it may be difficult to get a strong basis for comparison. Also since qualifications are evaluated later, the scores on methodology are awarded with no consideration given to the capability for carrying out the approaches proposed. When qualifications are considered, the structure provides no basis for relating them back to the specific approach proposed by each bidder. The result may be that the qualifications points are awarded merely on the reputations of the various people whose resumes are included in the proposal. Consideration to whether they have a capability to work together as a team to manage and carry out the approach proposed may be neglected.

The PFE process was successful at dealing with this issue. The sub-factors provided the categories for consistent response by bidders and the three criteria of understanding, approach and present or potential capability provided for consistent evaluation. All bidders were required to not only demonstrate methods or approaches but they were required to link the evidence for capability to each method or approach. Every bidder was evaluated against the same issues.

Sometimes during a team meeting a panel member would argue for a high score for a bidder based upon his proposed approach for dealing with a sub-factor. Another panel member might agree that the approach looked good but point out that he could find no evidence that the bidder was capable of carrying it out. The evidence on all three criteria would be examined until agreement was reached.

V.3.7.3 Admissible information. The final issue in this category of equity of treatment is the impact of the lack of restriction on admissible information. There was a strong concern over both potential inequities and appearances of inequities which might be caused by a "non-blind" evaluation of proposals (see section IV.3).

The ability to use all available information was a strength of the evaluation. There is some inconclusiveness about whether any inequities were created. A question with two sub-items was included in the panel questionnaire to obtain reaction to this issue the items and responses to them are presented in Figures V.61 and V.62. The panel

Did being able to use all available information about bidders in the evaluation improve the accuracy of the scores?

Yes - 15

No - 1

Remark by a person answering Yes

- o I don't really remember. My feeling is that this is generally more useful (PM6).

Remark by person answering No

- o I think it's better not to know who the bidders are (PM1).

FIGURE V.61 PANEL MEMBER'S RESPONSES TO QUESTION 4a WHICH
RELATES TO ADMISSIBLE INFORMATION

Did being able to use all available information about bidders in the evaluation introduce unfair bias into the scores?

Yes - 3

No - 13

Remarks by those answering Yes

- o For those that you know, you start reading into the proposals things that they don't mean or haven't said because you are biased (PM1).
- o The additional information improves accuracy, as would any relevant increment of information. However, the person supplying the information often exhibits a bias (i.e., it is easier and more comfortable to consider working with people you know) (PM2).
- o If one individual knew the firm and had problems with it, that convinced the rest of the group. Whether they really did poor work, or he just thought it was, I don't know. It did carry a lot of weight. If only one of the team knew of the company the team tended to accept it. If more than one knew it there would be discussion and I think it would come out fair (PM16).

Remarks by those answering No

- o Obviously there is a value judgment as to what is unfair. Information on past performance is relevant and not at all unfair (PM5).
- o If a panelist has had any unusual or direct experience you ought to be aware of that so you can interpret any bias (PM9).
- o If a bidder never completes their work on time and therefore you don't select him, I don't think it's unfair bias. I think it's a smart way of doing business (PM4).

- o One proposal had been submitted by a contractor who had not done a good job for ETIP in the past. The parts of the proposal that I read would lead you to believe that he had done a superlative job. The fact that we could discuss his past performance and bring that to bear, I think, was a good idea (PM15).

FIGURE V.62 PANEL MEMBERS' RESPONSES TO QUESTION 4b WHICH RELATES TO ADMISSIBLE INFORMATION

members generally felt that being able to use all available information about bidders in the evaluation:

- o improved the accuracy of the scores (Yes -15; No - 1); and
- o introduced unfair bias into the scores (Yes it did - 3; No it did not - 13).

The remarks by the three people who answered Yes to question 4b (see Figure V.62) indicate how they feel unfair bias may have entered into the scores. PM1 and PM2 indicate why they feel that people evaluating proposals may be biased but do not indicate how this bias may have affected the final sub-factor/factor scores (as compared to the panel members' initial scores). PM3 indicates that if only one person knew of a bidder's prior performance, this tended to carry a lot of weight. Possibly too much weight.

Remarks by some of the people who answered No to question 4b indicate why they feel that the use of outside information led to proper use of justifiable biases. They indicate that outside information allows the panel to evaluate the information in the proposals better and to interpret

the biases of panel members. The panel does not have to rely only on what the proposal writers say (e.g., see response of PM15, Figure V.62).

"Blind" proposal evaluation may frequently not be "blind" at all. Panel members will recognize bidders they are familiar with through the approaches proposed, writing style or the way the proposals are bound. In this case panel members do not have to justify their biases (since they are not able to admit that they know whose proposal they are evaluating). Also the panel is not able to differentially score a bidder who has not worked for the program before and makes an error of interpretation and a bidder who has worked for the program before and makes an error because he is unable to learn. This relates to the discussion under section V.3.2.4 on differences in uncertainty among bidders. This issue also relates to the issue of treatment of bias (section V.3.7.1) and those on traceability of the process (section V.3.10).

V.3.8 Risk Associated with the Statement of Work

The next category of issues concerns whether ETIP was able to accomplish the writing of a flexible statement of work and deal with the added risk associated with this. It covers issues of writing and getting the Statement of Work accepted, having bidders understand it, and being able

to make the assessment of bidders' objectives necessary to assuming the added risk associated with it.

The three specific issues covered in this section are:

1. Was ETIP able to write a statement of work which would spell out deliverables and yet avoid numerous contract changes which generally occur in situations where requirements, policies, and the state of the art are changing?
Did ETIP management accept it?
Did the contracting officer accept it?
2. Did the flexible statement of work scare off bidders?
3. Was ETIP able to assess the commitment of the bidders' top management to devote the necessary resources to the project?
Was ETIP able to determine whether it was within the longer term interest of management to develop the desired systems?

V.3.8.1 Flexible statement of work. The first issue under this category is whether ETIP was able to write an acceptable statement of work which would spell out deliverables and yet avoid numerous contract changes which generally occur in situations where requirements, policies, and the state-of-the-art are changing. Acceptable is taken in the proximal sense of whether a flexible statement of work would be approved by both the program and the contracting office.

ETIP's results on this issue were mixed. Thompson was able to write a short flexible statement of work which followed the format of the factors and would not require modifications as changes occurred. It indicated that both progress and final reports would be expected on both techni-

cal and management aspects of the project. However, it left the dates and specific subject matter of these reports undefined. ETIP management felt that the statement of work needed to be more specific. Therefore, Thompson also included another version of the same statement of work to which he added illustrative sub-items which included specific activities and reports and dates for the reports. These items were intended only as examples to the prospective bidders of the types of things which could be furnished under the statement of work. This second illustrative statement of work caused problems for ETIP and the successful bidders during the early parts of Phase I (see section V.3.14)

The contracting officer had no problems with the statement of work. He had previously contracted for ships for the Maritime Administration and recognized the usefulness of having flexibility in a complex, uncertain contract.

V.3.8.2 Effect of statement of work on bid decisions.

An issue which was raised by some of the ETIP staff and PAA staff was that the flexible statement of work would scare off bidders. The point was that they would not understand what was expected of them and would therefore not bid.

The answer to whether this happened is unclear. It is quite possible that some of the bidders were confused

by the statement of work. However, whether this was good or bad is related to the issue on selectivity of the process (section V.3.3.2). It may be that bidders who were scared off by the statement of work and the uncertainty of what was expected of them would have failed rapidly under the uncertainty which was present in the project environment. Whether some potentially acceptable bidders were also scared off is not known.

V.3.8.3 Ability to assess risk. The final issue here is whether ETIP was able to make the assessment of the bidders' long term objectives which was felt to be important to accepting the added risk of using a flexible statement of work. This included assessing the commitment of the bidder's top management to devote the necessary resources to the project and assessing whether it was within the longer term interest of the management of the firms to develop the desired systems.

ETIP's results here were reported under the first and third issues of section V.3.4. In sum, the management factor team for the agency impact evaluation system contract found it was not able to differentiate among bidders. The clarifications sessions enabled ETIP to assess differences among bidders in terms of which objectives they would devote resources to and to assign unique scores to each bidder. However, it was noted that the level of commitment of a

successful bidder could change over time and that this issue would have to be worked at under the contract. This sub-factor was probably the most difficult of all to assess.

V.3.9 Basis for Award

This category discusses the outcome of the process of moving from the results of the deliberations of the evaluation panel to the selection of specific bidders. It covers such issues as whether the level of aggregation of ratings enabled differentiation among the bidders on technical bases and whether both the technical and cost issues were considered in making the final award decisions.

The four issues reported in this category are:

1. Did PFE provide for overall technical discrimination among bidders?
Was there a sufficient distribution in the final scores to determine a competitive range?
2. Did PFE provide a basis for discriminating among bidders on specific technical issues?
Did the specific issues get washed out by the overall technical score?
3. Was technical leveling a problem?
Was technical transfusion a problem?
4. How much of a factor was bid price in the final decision?
Did the procurement turn out to be a price competition?
Did the process provide a capability for dealing with potential buy-ins?

V.3.9.1 Overall technical discrimination. One issue of aggregation is whether PFE provided for overall technical discrimination among bidders. That is, whether there was a sufficient distribution in the final scores to determine a competitive range. The literature on source selection indicates the overall scores are frequently close (e.g., Fox, 1974, p. 269).

The distribution in the final scores was fairly wide, though there were no bidders at the extremes of the scale. Figure V.63 illustrates the distributions which resulted after multiplying the factor scores by the preassigned weights. On the Commercial Impact contract, there is a marked difference between the overall score of bidder 101 and the other two bidders. Bidder 101 was the only one considered competitive. The results of agency impact contract were less strikingly demarcated but still provided a strong basis for overall discrimination. Bidders 205, 202, and 203 were all considered to be in the competitive range, with 65 points separating bidder 205 from the other two. Bidder 575 was 120 points below 202 and 203 and was considered unacceptable overall, as were 201 and 204 which were further down the scale.

V.3.9.2 Technical discrimination on specific issues. The other issue of aggregation is whether PFE provided a basis for discriminating among the competitive bidders on

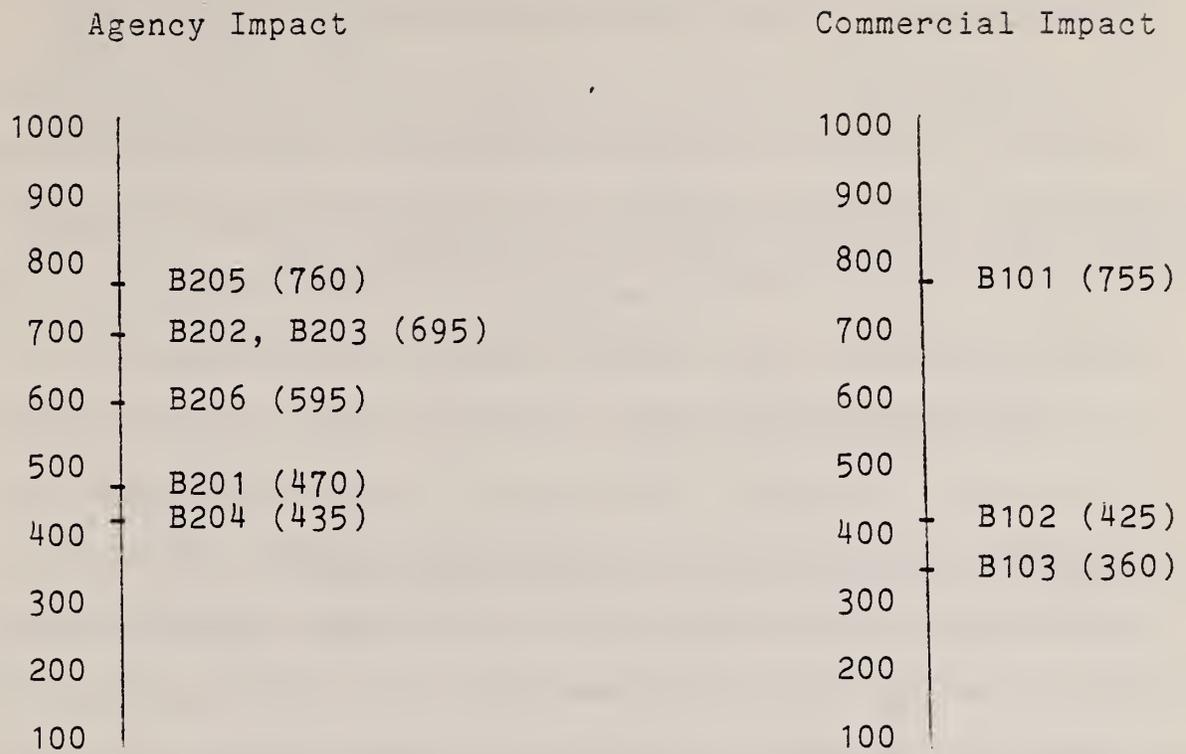


FIGURE V.63 DISTRIBUTION OF FINAL OVERALL SCORES

specific technical issues, or whether these got washed out in the overall score. This is identified as a problem in the literature (e.g., Blue Ribbon Defense Panel, 1970). It is important for clarifications, negotiation and final selection that the relative strengths of the various bidders are evident. It would be undesirable to select a bidder who had a high overall score due to great strengths in some areas yet had critical weaknesses in other areas.

PFE was very strong at dealing with this issue. The individual sub-factor scores made it easy to prepare for clarifications with the competitive bidders. The notes in the record indicated the specific questionable aspects of the sub-factors which the panel felt clarifications were needed on. ETIP was able to probe the bidders for more information on these specific issues and develop a more confident evaluation of the bidders' ratings. A bidder with an unresolved extremely low score on one sub-factor could have been removed from the competitive range even though his overall score was high. However, this case did not occur.

Two of the panel members felt that the scoring on the specific sub-factors was the weakest aspect of the process (see Figure V.64). One person felt that the factor/sub-factor rating scale did not provide for enough differentia-

Responses From Panel Question 6 on Weakest Aspect of the Process

- o The overall scoring aspect (the scale). I don't think the sheets allowed for enough division if the proposals were close (PM7).
- o It went on too long and there were too many numbers when they were really unnecessary (PM4).

FIGURE V.64 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO TECHNICAL DISCRIMINATION OF SPECIFIC ISSUES

tion among bidders who were close. The other felt that there were too many ratings (i.e., sub-factors) involved in the process.

V.3.9.3 Technical leveling and technical transfusion.

An important issue for the clarification and negotiations is how to handle the requirement to allow bidders to improve their proposals without creating problems of technical transfusion and technical leveling. Technical transfusion arises when, during clarifications or negotiation, an approach proposed by one bidder is suggested to another as a method for dealing with their technical problem. Though this is illegal the literature indicates that it occurs frequently (e.g., Babione, 1978). If used across all competitive bidders, it results in technical leveling. That is, all bidders eventually propose the same technical design in order to give the government what they feel it wants to hear.

PFE enabled ETIP to deal with clarification and negotiation without problems of technical transfusion. Since

clarifications were in terms of the sub-factor issues and not in terms of a system design, there was no opportunity for transfusion to occur.

During a discussion with the ETIP's contract negotiator the author raised the issue of technical transfusion. The contract negotiator indicated that it something which a contracting person always watches for but that he did not remember it being a concern in this source selection (Contract negotiator, Note 4).

V.3.9.4 Weight given to bid price. An issue which relates closely to technical leveling is whether the source selection turns into a price competition. If there is no basis for discriminating among competitive bidders on technical acceptability, the sole remaining criteria is price. That means the lowest competitive bidder always wins. This encourages the practice of "buying-in." "Buying-in" occurs when a bidder submits a proposal which is competitive at the lowest cost and requests modifications once under contract when it becomes clear to the government that the performance characteristics or schedule cannot be met with the available resources. If all that is available for the technical evaluation is a final score, and the final scores are close, the contracting office is at risk by awarding to anyone other than the low bidder.

This issue received a strong test in the ETIP case and was dealt with quite successfully. On the agency impact contract, there were two bidders who were called in for clarifications (see section IV.11). After oral and written clarifications, it was quite easy to differentiate the relative strengths and weaknesses of these bidders on the various sub-factors and overall. Had it not been able to obtain clarifications on the issues which the panel was concerned with, the contract would probably have been awarded to the other bidder, since they came in with a lower cost estimate.

V.3.10 Traceability of the Process

This category is concerned with whether the evaluation can be reconstructed from the records. As part of this, it is also concerned with whether the bidders perceive that the process could be easily traced and therefore difficult to fix. This category is quite closely related to the issues in section V.3.11 on relationship with the contracting office.

The four issues covered here are:

1. Did the process communicate that there was no sole source position?
Can the process be fixed?
Did bidders understand how the decisions on who wins actually get made?
2. Can changes in scores be traced between the initial ratings of panel members and final panel ratings and between final panel ratings and the award decision?

3. Did the panel follow the written procedure?
4. Did leaving the relative weightings of the sub-factors up to the teams lead to any problems (e.g., appearance of inequities)?

V.3.10.1 Bidder's understanding of the evaluation process. The issue of whether the RFP communicated that the process could not be successfully fixed and that there was no sole source position was important to ETIP. It was thought to be critical to obtaining bids (section IV.7). Since ETIP did not have an established record with evaluation contractors and was a fairly small program, it was thought that there might be problems attracting bids on these projects with their associated complexity and uncertainty.

ETIP generally did not communicate that PFE provided any more or less integrity to the evaluation than any other process. Three items were included on the bidder questionnaire to obtain perceptions about both understanding of the evaluation process and whether it was capable of corruption.

Did the information provided enable you to understand the process which ETIP would use to assign scores on each sub-factor?

Yes - 5

No - 1

Remark by a person answering Yes

- o The amount of study and cross referencing was very costly for a small firm (BR3).

Remark by person answering No

- o There was not sufficient detail (BR1).

FIGURE V.65 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION
5a ON BIDDERS' UNDERSTANDING OF THE EVALUATION
PROCESS

Did the information provided enable you to understand how the ratings on the various sub-factors would be combined to arrive at final scores?

Yes - 5

No - 1

FIGURE V.66 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION
5b ON BIDDERS' UNDERSTANDING OF THE EVALUATION
PROCESS

Did you feel that the process would be a) ___ difficult or b) ___ easy to corrupt? i.e., For one person, or a group of people, who favored a specific bidder to exercise sufficient control over the process to sway the award decision.

Easy - 3

Difficult - 2

Other - 1

Remarks by those answering Easy

- o There are some people who are domineering and since the subjective judgments are altered in discussion, it's very simple to corrupt, but no more so than anything else (BR4).
- o By who you select for you panel. A sophisticated proposal team is going to try to meet each of the factors. If your teams have had good experience with a company, that enters in. I think there should be more emphasis on the selection of the panel than on the structure of the process. No matter what quantitative system you have, 'it can be corrupted by the people who are in there (BR2).
- o Any subjective review is corruptible. That did not bother us. Maybe corrupt is too strong a word. Influence may be better (BR1).

Remarks by those answering Difficult

- o I really wanted a choice of c) no different than any others. People who are determined to corrupt are going to corrupt anything. If someone has made up his mind about a particular company, there is always a way to corrupt it (BR4).
- o It would be difficult unless the entire review team favored a specific bidder (BR6).

Other

- o It worked out that way. We were low bidder and had a solid proposal, but the award was made to a non-profit. I believe the award was obviously slanted. I don't know whether they didn't want this company. I believe personally that they wanted an academic non-profit (BR3).

FIGURE V.67 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 7 ON ABILITY OF THE PANEL TO CORRUPT THE PROCESS

The bidders generally felt that:

- o the information provided by ETIP enabled them to understand the process for assigning scores to each sub-factor (Yes - 5; No - 1);
- o the information provided enabled them to understand how the sub-factor ratings would be combined into a final score (Yes - 5; No - 1);
and
- o the process could be corrupted (Easy - 3; Difficult - 2; Other - 1).

The remarks of four of the six respondents to question 7 indicate that they believe the process was subject to corruption to the same degree as any other evaluation process (see Figure V.67). One of these people felt that the rigor applied to the evaluation did not match that which the bidder was required to apply in responding (see Figure V.68). One of the remaining two respondents felt that the

process, as applied, actually was corrupt. He felt the oral clarification session was prejudicial (see Figure V.68). The final respondent felt the process would be difficult to corrupt. Whether some firms not bidding felt that there was a sole source position is not known. As to whether the process could in fact be easily fixed, the reader is referred to the next issue (V.3.10.2) and the discussion on how the process actually worked in sections IV.10, V.3.6 and V.3.7.

V.3.10.2 Ability to trace scores through the process.

This issue addresses whether changes can be traced from the initial individual scores through to the award decision. This was thought to be important for keeping the process honest and for conveying to bidders that it was honest. A panel member would probably be less likely to try to influence others improperly if a record is kept of whether this happened.

The records which are kept by the PFE process make it quite easy to trace the changes in scores between initial individual ratings and the final panel ratings. The changes in scores between the final panel ratings and the award decision are traceable but less easily so.

The records of the panel process include the signed rating sheets submitted by each panel member for each sub-factor which they rated, tapes of the discussions by the

factor teams, and the signed final factor rating form. To reconstruct the process, one only needs to listen to the tapes while having copies of the rating forms. The tapes contain a record of both the biases of the panel members and the team discussions which explored these biases in order to work toward agreement upon final scores.

The documentation which is available for the later portions of the process includes the memorandums submitted to the contract negotiator, the tapes of the oral clarification sessions, and the written responses of the bidders to the questions for clarifications. From the memos and tapes it is possible to trace how the issues which the panel raised were followed up in the clarification process. The one part of the process on which there is not a strong record is the deliberations involved in re-evaluating sub-factor ratings based on the new information obtained during clarifications. The actual new ratings are available but there is not a taped record of the discussions as there is with earlier parts of the process. In order to recreate this part of the process, it would be necessary to find the changes between the final sub-factor scores and the scores assigned by the panels and compare these with the new information which was made available during the clarifications.

V.3.10.3 Degree to which the rules were followed.

An issue related to traceability is whether the panel mem-

bers actually followed the evaluation procedure which the RFP said would be followed or whether they changed the process or criteria in mid-evaluation. There are two ways in which the panel might alter the rules. One is that during the evaluation process the panel might find that one or more of the bidders have raised issues and proposed approaches which the government did not include in the RFP. The panel might then proceed to include these issues in their evaluation of all of the other proposals. The other problem arises if the panel finds that it cannot work with the evaluation criteria which were included in the RFP. They may be either too specific or not specific enough. The panel might then make up new criteria as it goes along.

ETIP had no problems with this issue. The sub-factors provided the issues for the bidders to respond to and were the units where measurements of acceptability were taken. The criteria of understanding, approach, and capability were used throughout the evaluation. Had the panel discovered that a sub-factor was missing it could have been sent to all bidders as an amendment to the RFP. However, this did not arise.

One point which should be noted is that the sub-factor rating process as described in RFP sounds more sequential than it worked in practice. The RFP stated:

Members of the proposal evaluation team concerned with each factor will meet and perform a joint

evaluation. They will follow an established procedure entitled, "Factor Team Guidelines," to assure an orderly and efficient process. Briefly, they will first compare notes informally to assure common standards and information; second, they will arrange the bidders in descending order; third, they will establish the relative spread among the bidders; and finally, their result will be permanently recorded and signed by all team members present... (Thompson, 1976).

As can be seen from the anecdotes in section IV.10, all of these "steps" occurred during more or less in the same time frame and were also somewhat iterative. The team meetings would begin with a review of the evaluation procedure, for the benefit of new team members. Next the individual scores for the first set of sub-factors would be posted. In general, the panel would then discuss the bidders, one at a time, and work to find an appropriate score. The order and spread would both be discussed at the same time. In some cases the panel would discuss whether they should revise the ranking of a bidder covered early in the discussion, to reflect the panel's improved level of certainty with respect to the spread.

Another illustration of the panel holding to the procedure was given in section IV.10.8. At one of the later factor team meetings of the agency impact evaluation system contract, a relatively senior panel member (from outside of ETIP) suggested that time could be saved by determining which bidders were already outside of the competitive range and excluding them from further discussion. Another panel

member pointed out that the rules of the procedure did not allow for this. The panel continued rating all of the bidders. This has some significance for evaluating this issue since it points to how people who are experienced in proposal evaluation may quite casually suggest alterations in the procedures once the evaluation is under way.

V.3.10.4 Weighting of the sub-factors. The last issue covered under this category concerns whether leaving the relative weightings of the sub-factors up to the teams led to any inequities or appearances of inequities. This was a major issue raised by some ETIP and PAA staff prior to the evaluation (see section IV.8). It was feared that leaving the decision on the relative weightings up to the individual teams would present the ability to improperly bias the evaluation for or against specific bidders.

The process of weighting sub-factors did not seem to create any inequities. This is discussed in V.3.6.5, under the issue on time required to agree on sub-factor weights. Also, the process of weighting generally did not present the appearance of inequities. An item was included in the bidder questionnaire which asked whether the respondent was concerned that not specifying relative weightings of the sub-factors might lead to inequities. The response was: Yes - 1; No - 5 (see Figure V.69). The one person answering yes thought that the entire process would lead

to inequities since there were no predetermined criteria for each scale score.

Were you concerned that not specifying the relative weightings of the sub-factors might lead to inequities in the process?

Yes - 1

No - 5

Remark by person answering Yes

- o The whole process would lead to inequities. You're taking nonparametric data and trying to make it parametric. There were no boundary conditions for scoring so that someone could say that an A contains the following five items or, here is an example of an A vs. an F (BR5).

Remarks by those answering No

- o Inequities was not the issue. We were concerned about accuracy (BR4).
- o The teams probably had too much instruction as it was. I didn't see that as a problem (BR2).

FIGURE V.69 BIDDER REPRESENTATIVES' RESPONSES TO QUESTION 6 ON WEIGHTING OF SUB-FACTORS

V.3.11 Relationship with the Contracting Office

A category of issues which is perhaps most important to achieving timely award of contracts is the relationship between the technical program staff and the contracting office. Since the contracting officer is the one whose name goes on the contract and is legally responsible, it is in the interest of contracting office personnel to proceed cautiously and not allow themselves to be rushed by program people who are anxious to meet their deadlines.

In ETIP's case, the use of PFE was a departure from more conventional source selection techniques. As such, it had the potential of leaving the contracting office open to protests from losing bidders. People at ETIP were concerned that the process, with its flexible statement of work, was not legal or that the contracting officer would not allow ETIP to use it for fear of protests.

The issues covered under this category are:

1. Is PFE legal under the Federal Procurement Regulations?
2. Did the contracting officer feel that the selections made by using the process would be defensible if there were a GAO investigation?
3. Did the contract negotiator accept the evaluation of the panel?
Did he want the panel to revise their report?
Did he want another level of technical review of the panel's evaluation?
- 4.a) Did using PFE result in timely award?
b) Were there any protests of the award?
c) Were any debriefings requested?

V.3.11.1 PFE and the Federal Procurement Regulations.

A key issue to resolve was whether PFE was legal under the Federal Procurement Regulations (FPR). This was established early in a January 27 meeting at the contracting office. The contracting officer had a background in systems procurement and recognized immediately that there would be no legal problems.

The FPR allows for a great deal of flexibility in the source selection process as long as its minimal requirements are met. PFE did not go against the grain of the FPR (Contract negotiator, Note 5).

V.3.11.2 Ability to defend under investigation. The next issue was whether the contracting officer felt that the selections made by using the PFE process would both appear honest and be defensible under a GAO investigation. It was important that the RFP convey sufficient detail about the evaluation process and the documentation produced that bidders would realize that it was not only a fair process but that ETIP would have no difficulty proving this under a protest investigation.

During a discussion about this source selection with the contract negotiator he indicated that the major concern of contracting people is whether there are any protests. To have a protest means that you have done something so that people feel that they have an opening to justify a protest. One measure of how well you've done is whether you get a protest (Contract negotiator, Note 6). The contract negotiator indicated that he was very pleased about the results of this source selection since there were no protests. This was especially true since one bidder, who was thoroughly versed in procurement law and practice, could not find a basis for protest, even though he seemed very angry about losing (Contract negotiator, Note 7).

In discussion, the contract negotiator indicated that he was initially skeptical about whether or not the process would produce protests. It was novel and of greater magnitude than other processes (Contract negotiator, Note 8). A key reason he was willing to use the method was because he had faith in the technical people at ETIP whom he had previously worked with. He knew that they had a sensitivity to the areas where the contracting office might be vulnerable (Contract negotiator, Note 9). Also, he realized that the RFP let the company know what they had to respond to and that the bidder would know that the information would reach the evaluators. If there were an oversight it would be the bidder's and not ETIP's (Contract negotiator, Note 10).

Another thing which helped to establish his confidence in the process was the response from firms which received the RFP. He indicated that:

A contracting officer can't anticipate all of the problems, especially when they are of a technical nature. So, you rely a lot on the private sector to come back and ask questions and raise concerns. You get a feeling at that point in time on how well you've done your homework and how well the technical people you've relied on have done their homework (Contract negotiator, Note 11).

Also, he felt that it was clear that it would be difficult for one person to influence the panel and that this was well expressed in the RFP. Everyone would have to be in collusion for that to work (Contract negotiator, Note 12).

The contract negotiator's final skepticism about whether the process would work disappeared after the panel report came in. At that point it was clear to him that it would stand up under any investigation if it went to the GAO (Contract negotiator, Note 13). He felt that the strongest aspect of the process was that, from a technical evaluation standpoint, "when you get down to the bottom line, there is no doubt that it is going to stick" (Contract negotiator, Note 14).

V.3.11.3 Revisions of panel results. Another issue which came up prior to the proposals being received was the NBS administration's suggestion that a committee be set up to review the findings of the panel. This might have negated some of the work of the panel.

ETIP had no problems in having the report of the panel's findings accepted. When the COTR told the contract negotiator of the NBS request for a review panel, the contract negotiator indicated that he did not wish to have this intermediate step put into the process. When the COTR submitted his memorandum to the contract negotiator, there were no requests for revisions.

During subsequent discussions, the contract negotiator indicated his reasons for not wanting a review panel. He said that he felt that the evaluation process which was established was clear and thorough. To have another level

of review, which could negate the panel's recommendations, would open the process to criticism and probably couldn't be supported (Contract negotiator, Note 15).

He felt that the report from the COTR was very thorough and documented with respect to specific points. He added that bidders normally aren't told what they are going to be evaluated on beyond the specific factors. This provided the capability to get down to sub-factors (Contract negotiator, Note 16).

In elaborating on his reaction to the COTR's report, the contract negotiator said:

Sometimes [programs] don't support their recommendations sufficiently. You have to ask them why they want to negotiate with these two but not this one who is only five points lower. They don't have specific reasons documented. When you came back and said that these guys are acceptable or unacceptable on this sub-factor, I believed it. A lot of times when you're told that a guy is technically acceptable you are not sure they can support it or whether they have [just worked up the score] (Contract negotiator, Note 17).

V.3.11.4 Timeliness of award. The final issue in this category concerns the timeliness of the award and whether there were any protests which delayed the start of the work.

ETIP was successful in meeting its deadline of the end of the fiscal year and there were no protests. There was a request for one debriefing. The bidder making the request was clearly upset at having lost, since he consi-

dered himself most qualified. He let it be known that he felt that ETIP made the wrong choice. However, he did not choose to file a formal protest. The contract negotiator felt good about the debriefing process since the COTR was able to tell the bidder what his strong and weak points were (Contract negotiator, Note 18).

V.3.12 Resource Requirements

The category of resource requirements deals with issues of the costs of the source selection to the government and the bidders. These costs are considered in terms of the total amounts of time required by various personnel, the dollar costs of responding to the RFP, and the length of time over which these resources were spent.

There are four issues covered in this section. They are:

1. How much time was required to do system or evaluation design work prior to issuing the RFP?
 - o elapsed
 - o total
2. How much time did it take for bidders to respond to the RFP?
3. How much time did it take for the panel to evaluate proposals?
 - How much time did it take to read proposals?
 - How much time did the panel meetings (and preliminary meetings) take?
 - How much time would oral presentations have taken?

- 4.a) How long did it take to make an award once the panel's evaluations were complete?
How much time did it take to write up the results of the panel meetings?
How long did it take to prepare for oral clarifications?
How long did it take to request written confirmations or oral clarifications?
How long did it take to reach a decision once the written clarifications were received?

- b) How long did it take to prepare for the debriefing?

V.3.12.1 Resource required prior to issuing the RFP.

The first issue under this category concerns the resources required by ETIP to write and issue the RFP. The total elapsed time between the time when the COTR asked Thompson to write the RFP until the time when the draft RFP was ready for distribution was four months. Most of the actual time required in writing the RFP was Thompson's, though he held some discussions with other ETIP staff to help him define the issues. The time to write the RFP probably shortened somewhat since Thompson used the Wright Field RFP as a base for the management sub-factors, the Proposal Preparation Procedure, Introductory Notes, and the Scope of Effort Documents. Had the process of getting program participants involved in formulating the sub-factors been used, the amount of time contributed by others, and probably the overall elapsed time, would have been greater.

V.3.12.2 Resources required for bidders to respond.

The issue of the cost to bidders of responding is important in two respects. First, some qualified bidders may decide

that the expected value of bidding (cost of bidding weighed against subjective probability of winning and value of winning) is not great enough, causing the government to not get the bids it desires. Second, much of the cost of responding is eventually paid for by the government through reimbursable overhead on other contracts. Though this does not show up as a direct cost on the source selection, it does increase the costs of government procurements. This problem is related to the issue of having bidders be able to self-select effectively on whether or not to bid (section V.3.3.2) so that large numbers of unqualified firms do not invest in responding.

Some people felt that the process was quite costly for bidders to respond to. The author has heard estimates of cost to respond ranging from \$10,000 to \$20,000. This can be quite a burden for a small firm (see Figure V.11 and V.70). However, with clear criteria for the evaluation, the firms should be better able to assess the risk.

Response From Bidder Question 11 on the Weakest Aspect of the Process

- o For small profit making firms it was just too much of a good thing. The same thing could have been done without all of the tasks and sub-tasks. It could have been made simpler and less costly for small firms.

FIGURE V.70 RESPONSES TO OPEN ENDED QUESTIONS WHICH RELATE TO RESOURCES REQUIRED FOR BIDDERS TO RESPOND

The cost required must be weighed against dollar value of the contract and the risk of making a selection by using a less comprehensive (and less costly) procedure. ETIP felt that the risk justified using the procedures.

V.3.12.3 Resources required for panel to evaluate proposals. A major portion of the government resources devoted to source selection is in the evaluation of the proposals by the panel. This includes the time to learn the evaluation process, the time to read the proposals and assign initial ratings, and the time for the evaluation panel meetings. One of the major concerns of some of the ETIP and PAA staff was that the time required for this would be on the order of months (section IV.6).

This was one of the areas where there was a clear advantage by using PFE. The time to learn the evaluation process was minimal (see section V.3.13). No extra reading period was required in the schedule. The proposals were distributed on a Friday and the first factor team was prepared to meet on Monday. The panel members were able to accomplish all of their reading over the weekend, at night, or during the meetings of teams on which they were not members.. All fourteen factor team meetings (seven for each contract) were completed over a one week period. The meeting times ranged from one hour to two hours and 35 minutes, with the average meeting lasting one and a half hours (see

Figure V.31). In all, approximately 100 hours of total time of various people was taken for meetings to evaluate the proposals for both contracts ($\sum_{i=1}^{14} n_i l_i$ where n_i is the number of people on the i^{th} team and l_i is the approximate length of the i^{th} team meeting). Specialists who participated on only one team were able to limit their time in factor team meetings to one or two hours.

The time of people to read appropriate parts of the proposals (which is not known) must be added this to actually determine the total amount of time required.

The amount of time required by the government to evaluate the proposals seemed minimal given the significance and magnitude of the contracts.

If the original plan for having bidders make oral presentations to the panels had been followed, the total amount of meeting time required by the panel would probably have at least tripled.

V.3.12.4 Resources required following the panel's evaluation. One of the issues in source selection is that it frequently takes a considerable amount of time to reach an award decision and sign a contract once the panel's evaluation is complete. This can be taken up reviewing cost proposals, obtaining clarifications, preparing and revising written justifications for decisions reached, and negotiating with bidders considered competitive. In some instances this can go on for many months.

In ETIP's case the award was made a little over two months following the completion of the last panel meeting. The memorandum summarizing the panel's ratings was sent to the contracting office 11 days after the last meeting (May 4, 1976). The oral clarification sessions were held three weeks later (May 25-26, 1976). Questions for written clarification were sent out on June 4 with responses due on June 11. The COTR's recommendations were sent to the contracting office on June 17. The contracting office's negotiations took two additional weeks and the contracts were signed.

A debriefing was held with one of the unsuccessful bidders a month after the signing of the contracts. It was given by the contract negotiator with the assistance of the COTR and the author. The preparation by the COTR and the author consisted of reviewing their notes and the records from the evaluation on the afternoon before the meeting.

V.3.13 Education of Government Personnel

The category of the Education of Government Personnel is concerned with whether the PFE process provided training and education to government personnel which would help them in both the evaluation of proposals and in the management of the subsequent contracts.

The two issues covered here are:

1. Did use of PFE result in education of government personnel so that they would be able to effectively evaluate the bidders' proposals?
2. Did use of PFE result in education of government personnel so that they would be better able to work with or manage the resulting contractors?
Were program participants willing to be involved in the procurements?

V.3.13.1 Education provided for evaluating proposals.

The issue of providing education in source selection to government personnel prior to proposal evaluation is one of enabling them to have a sufficient knowledge of the project, the RFP, and the evaluation process so that they will be able to perform effectively when the proposals arrive. They must understand which sections of the proposals to read and how to apply the criteria for evaluation to the sections for which they are responsible.

The panel seemed to be well prepared for the evaluation given small amount of prior preparation which occurred. Most of the information concerning the project and the evaluation process was conveyed to panel members through the copies of the RFP documents which were distributed during the month before the proposals were due and through the short briefing the day after the proposals were received. Some of the panel members also attended a meeting a month before the proposals were due during which the evaluation process was reviewed (see section IV.8).

At each factor team meeting where new panel members were present, a couple of minutes was taken to review the ground rules for the evaluation. All of the panel members were able to hand in their signed initial rating sheets prior to discussion of the sub-factors. Since the proposals were organized by factors and sub-factors, finding those sections of the proposals which they were responsible for was not a problem.

V.3.13.2 Education provided for working with winning bidders. The issue of whether training, learning, and education was provided for the government personnel who would work on the contract was thought to be critical to ensure a progressive and successful accomplishment of the objectives of the procurement (Thompson, 1976a). It was equally important for the government people to understand the issues involved in achieving the objectives as it was for the successful bidder.

The author believes that ETIP was only minimally successful in dealing with this issue. One reason was that only one PAA staff member participated in the evaluation and two key ETIP staff did not join the program until immediately after the signing of the contracts. Perhaps of even greater significance was that the government personnel who would work on the project were not involved in the process

of selecting and writing the sub-factors. This is a part of the PFE process which was foregone due to time constraints. It is likely that significantly more education would have occurred had this process been followed.

V.3.14 Education of Bidders

The category of education of bidders is concerned with whether the process of responding to the RFP provided information to bidders which was useful in their future interactions with ETIP. In the case of the successful bidders the issue is whether education was provided which would enable them to perform more effectively on the contract. In the case of the unsuccessful bidders, the issue is whether education was provided which would help them in responding or deciding not to respond on future ETIP RFPs. Only the former issue is covered here.

The issue of whether training, learning, and education was provided for the successful bidders during the source selection process was thought to be critical to the accomplishment of the objectives of the procurement (Thompson, 1976a). It was important for the successful bidders to be aware of what was known about the procurement, to understand what the government felt the important issues were, and to have some approaches for dealing with these issues (including how to improve their capabilities in areas where they realized that they were weak). It was also important

for the successful bidders to have a good understanding of the Statement of Work and how it would be satisfied through the successive approvals and acceptances process.

The two successful bidders were asked, in the bidder questionnaire, whether responding to the RFP gave an early understanding of how to deal with the issues which were important to successful performance on the contract. One answered yes and the other no. The bidder answering no remarked that:

We were not prepared for the preoccupation of ETIP management with the evaluation of experiments, where the initial problem of design, initiation and execution of experiments were not adequately addressed by ETIP management.

One of the failures of this application of PFE was the understanding of the statement of work and how it would be satisfied. The RFP contained both the brief statement of work which specified only that periodic and final reports would be delivered (with no schedule) and a longer statement of work containing lists of illustrative reports and an accompanying proposed schedule. From the early performance of the contractors and the ETIP staff, it was clear that everyone was trying to comply with the illustrative reporting schedule. This created unintended emphasis on the reports as opposed to developing the systems.

V.3.15 Additional Comments from the Questionnaires

Some of the remarks which were made by respondents to the open ended questions do not fit properly under any

of the specific issues covered in the preceeding sections. They are of a more general nature. These remarks are listed in Figure V.71.

Some of these comments provide additional perspective for understanding answers given by the respondents to the other questions. For example, in BR5's answer to the question about the strongest aspect of the process he said that, "I didn't think there were any." In response to the question which asked whether there was any other aspect of the process which he wished to mention he said, "I think it was theoretically unsound and without basis." The author followed up and asked why he bid if he felt that way. His answer was: "Because its money and my boss said to do it. If I had free choice I wouldn't have bid."

V.4 Summary

This section presents a summary of the results of ETIP's use of the Parametric Factor Evaluation process for its source selection. The section is divided into a summary for those issues for which the evaluation indicates that ETIP's use of PFE:

- o proved successful,
- o proved unsuccessful, and
- o are equivocal.

Responses to Panel Question 5 on the Strongest Aspect of the Process

- o The confidence it gave in knowing we had made the best choice from the proposals we received due to the maximum interchange of information between the panel and the bidders (PM11).
- o The evaluation process itself. The thorough way in which it was laid out. I thought it was excellent (PM1).
- o The confidence that we were doing a good job, and others knew it (PM13).
- o The fact that we got a good contractor and that we were able to get an experimental procurement through the bureaucracy (PM15).

Responses to Panel Question 6 on the Weakest Aspect of the Process

- o The panel was not involved up front in developing the RFP (PM11).
- o The relative lack of early input (and commitment from stakeholders, e.g., PAA's and NBS) (PM13).

Responses to Panel Question 10 on Any Other Aspects of the Process Which You Wish to Get Out

- o Not having a really solid conception of what we were looking for and where we were going and why Phases II and III were important and other things influenced the process. It probably didn't affect the outcome in the sense of which offer we selected. It may have caused us to probe on certain issues and get certain commitments up front (PM11).
- o I felt the evaluation procedures were theoretically excellent. It was a little difficult operationally (PM1).
- o There might have been a little too much detail, but I didn't know the issues. That was for you to say (PM6).

Responses to Bidder Question 10 on the Strongest Aspect of the Process

- o I didn't think there were any (BR5).

FIGURE V.71 MISCELLANEOUS RESPONSES TO OPEN ENDED QUESTIONS

- o The evaluation procedure which ETIP used was the strongest aspect. No particular aspect (BR6).

Responses to Bidder Question 11 on the Weakest Aspect of the Process

- o I didn't see the basis for doing it. I think it failed to look at the theory they were espousing at the time. I fail to see where the notions that they espoused in terms of Campbell and Stanley were used to design this process (BR5).
- o I have no problem with your evaluation process. The problem is that the ETIP program had flaws and there was nothing coming up to evaluate. The RFP did not reflect the shortcomings of ETIP management. The information was voluminous and provided us with a good array of information up to that point. I don't think we would have felt we were treated unfairly if we had lost. Under the work you were too preoccupied with evaluation (BR6).
- o Absence of a substantive and policy understanding of the problem they were approaching in relationships with multiple agencies and the use of softer designs. There was a greater emphasis on quasi-experimental designs where the issue was, how were you going to do some good case studies and descriptive materials (BR2).

Responses to Bidder Question 13 on Any Other Aspects of the Process Which You Wish to Get Out

- o I think it was theoretically unsound and without basis (BR5).
- o There was a kind of euphoria and a kind of pride in the RFP, by the people who prepared it, that I don't think would have been equally shared by old crusty government contractors (BR4).
- o ETIP didn't seem to be as much in control as Charlie Thompson. I think most of the people who were bidding got the feeling that he was handling his graduate students and he reflected a lack of knowledge of government (BR2).

Chapter VI presents summary findings from the evaluation which go beyond the scope of evaluating the results of this source selection against the specific issues.

V.4.1 Summary of Issues for Which ETIP's Use of PFE Proved Successful

Overall ETIP's use of Parametric Factor Evaluation for its source selection for the two contracts was successful. It provided for a timely award without protests and it was able to deal effectively with many of the issues which were raised by participants or described in the literature on source selection. ETIP was successful in taking a process which had been developed and used in a different organization, for the procurement of a different type of system, and adapting it for its own use.

The following is a listing of the specific issues for which ETIP's use of PFE proved successful (with the section numbers where these issues were discussed):

- o The structure enabled bidders to demonstrate their ability to deal with the critical aspects of the projects (V.3.2.1).
- o The structure did not create critical gaps in evaluating bidders' capabilities (V.3.2.1).
- o Information in the proposals was readily located by the panel when it was needed (V.3.2.1).
- o The interrelated documents eliminated contradictions in the RFP (V.3.2.1).
- o Goldplating of proposals was not a problem, the proposals were not too large (V.3.2.2).

- o Bidders were confident that they had communicated their qualifications to the evaluation panel (V.3.2.3).
- o ETIP was able to deal with differences in uncertainty among bidders (V.3.2.4).
- o Bidders were confident that they had related sub-factor issues to the objectives of the projects (V.3.2.5).
- o The basis for competitive evaluation matched with the subsequent work requirements of the projects (V.3.2.5 and V.3.4.3).
- o The sub-factors encompassed most of the issues which would be critical for developing the systems (V.3.2.6).
- o The sub-factors did not deal with unimportant issues (V.3.2.6).
- o Parroting back of information from the RFP to the exclusion of other information required for evaluation was not a problem (V.3.2.7).
- o Enough proposals were received so that the panel was confident in the scores it assigned (V.3.3.1).
- o Trivial bids were not received (V.3.3.2).
- o The process enabled a strong capability for evaluating management issues (V.3.4.1).
- o The process enabled a strong basis for evaluating technical information (V.3.4.1).
- o ETIP was able to obtain the participation of experts on the evaluation panel (V.3.5.1).
- o Members of factor teams were able to arrive at initial ratings of bidders prior to the team meetings (V.3.6.1).
- o Factor teams were able to reach agreement on sub-factor scores for each bidder without voting (V.3.6.2).

- o Members of the factor teams were able to see how their participation affected the ratings (V.3.6.3).
- o Members of the factor teams were informed of how the ratings and other information would be used to select contractors (V.3.6.3).
- o The factor teams were able to deal effectively with members who used different standards for their initial ratings (V.3.6.4).
- o The time to agree on weightings for sub-factors within the factors was minimal (V.3.6.5).
- o The panel was able to evaluate the biases of its members and use them in making its ratings (V.3.7.1).
- o The process kept records of the biases of its members (V.3.7.1).
- o Panel members who were biased for or against specific bidders were not able to sway the rest of the team (V.3.7.1).
- o All proposals were evaluated on the same issues using the same criteria (V.3.7.2).
- o The ability to use all outside information increased the accuracy of the scores (V.3.7.3).
- o The flexible statement of work which ETIP wrote was acceptable to the contracting office (V.3.8.1).
- o The final scores provided for a range of overall technical discrimination among bidders (V.3.9.1).
- o The sub-factor scores provided for technical discrimination among bidders on specific issues (V.3.9.2).
- o Technical leveling and technical transfusion were not problems (V.3.9.3).
- o Undue weight was not given to bid price in the final evaluation (V.3.9.4).

- o Bidders were able to understand the process which was used to evaluate their proposals (V.3.10.1).
- o It was possible to trace the results from the initial individual ratings of the team members to the final award decision (V.3.10.2).
- o The panel followed the rules which were described to the bidders (V.3.10.3).
- o The weightings of sub-factors after the scores were known did not produce inequities (V.3.10.4).
- o The process is legal under the Federal Procurement Regulations (V.3.11.1).
- o The contract negotiator was confident in being able to defend the results (V.3.11.2).
- o The contract negotiator accepted the contracting officer's technical representative's report on the panel's recommendations without requesting revisions (V.3.11.3).
- o The contracts were awarded in a timely manner which met ETIP's fiscal year deadline and brought no protests (V.3.11.4).
- o The resources required by ETIP to prepare the RFP and evaluate the proposals were not excessive (V.3.12.1).
- o The resources required by ETIP to follow-up after the panel meetings were not excessive (V.3.12.4).
- o The process provided for sufficient education of the panel members to enable them to understand their role (V.3.13.1).

V.4.2 Summary of Issues for Which ETIP's Use of PFE Proved Unsuccessful

There were several issues which ETIP's use of PFE did not deal with successfully. These were:

- o ETIP was not able to make measurements which would predict the bidder's future capabilities on some issues. This was particularly true for trying to assess future commitment of management to the projects (V.3.4.3).
- o The RFP was not successful in communicating that the process would be more difficult to corrupt than most other processes (V.3.10.1).
- o ETIP's use of PFE did not provide sufficient education about the projects to government personnel who would be working with the contractors (V.3.13.2).

V.4.3 Summary of Issues for Which the Results of ETIP's Use of PFE are Equivocal

The results of ETIP's use of PFE for some of the issues are uncertain, given the information used in this evaluation. These issues are:

- o Whether the structure was too expensive to respond to given the size and requirements of the project (V.3.2.1 and V.3.12.2);
- o Whether the objectives of the projects and of ETIP were communicated effectively (V.3.2.5);
- o Whether any better qualified firms did not bid because of the use of the PFE process (V.3.3.1);
- o Whether the source selection process did, in fact, anticipate the problems which actually occurred during the projects (V.3.4.3);
- o Whether experts made a significant contribution to the evaluation (V.3.5.2);
- o Whether junior panel members made a significant contribution to the evaluation (V.3.6.6);
- o Whether the use of the statement of work with illustrative sub-items in addition to the actual statement of work was confusing (V.3.8.1);

- o Whether the use of a flexible statement of work caused any better qualified firms to not bid (V.3.8.2); and
- o Whether responding to the RFP provided education for the bidders which was useful in their future interactions with ETIP (V.3.14.2).

CHAPTER VI
BROADER IMPLICATIONS

VI.1 Introduction

This chapter presents a discussion of the implications of this research which go beyond the specific case studied.

Four topics which are reviewed are

- o the methodology used for this research;
- o comparison of ETIP's results to prior and subsequent uses of the PFE process;
- o adaptability of the PFE process to other types of problems; and
- o possible topics for additional research on PFE.

VI.2 The Case Study Method for Exploratory Research

The form of this research was exploratory. It was the initial evaluation of the use of a process for which no prior research had been published. As such, it was important that a thorough description of the process be developed and that a relatively comprehensive set of criteria for the evaluation be generated. In addition, the author wished to represent the criteria in a structure which would enable a point of departure for future research on PFE and for future comparisons of PFE to other source selection

techniques. The case study method which was used was felt to provide a credible means for doing this.

When little prior information is available about a program or process, a complete description of how it really works (as contrasted with descriptions of how it should work) is an important antecedent to later evaluation. It provides a context (model) for exploring the nature of the relationships among important variables. In this research the description was based upon:

- o background on the PFE process from both historical documents and personal communications with its primary developer;
- o participation in the process at ETIP by the author and direct access to records of the source selection of the two contractors; and
- o interview and questionnaire information from other participants in the source selection.

Background on PFE was studied to insure an accurate context for describing the process. Interviews and questionnaires were used to obtain information on undocumented events. Extensive documentation of sources was provided with the chronology.

The criteria for the evaluation were generated by examining the critical issues which ETIP faced during its source selection. A list of issues was drawn by two methods. One was by examining the records of ETIP's use of the PFE process for questions which were raised before, during, and after the source selection by the people who were in-

volved. The other was by writing down issues which seemed applicable to ETIP's situation, which were identified from the literature on source selection, discussions with others, or reflection on the problem. Comprehensiveness in covering the major issues, rather than independence among them, was the objective. The issues were then sorted into groupings of related issues to provide a structure for discussion.

A subset of these issues were selected for examination based upon the two criteria of: 1) the relative importance of the issue to the problem of source selection; and 2) the availability of data to support an evaluation of the issue. The issues treated most extensively were those which were considered most important and for which data were available or obtainable. Where additional data required to evaluate an important issue could be obtained from other participants in the process they were requested through questionnaires.

For each selected issue, a conclusion was reached about whether PFE did or did not present an effective solution or whether the results appeared inconclusive given the data available. In each case the data used to reach the conclusion were described.

The unique structure of issues developed for this research provides a basis for departure and comparison for further research. For several issues which were identified,

the data available here were not sufficient to enable confident conclusions about the effectiveness of PFE in dealing with the problems. During future uses of PFE, data collection schemes which are instrumented in advance may enable such conclusions.

Comparisons between PFE and other system source selection methods may be made by using the issue structure. Effectiveness of various source selection methods may be compared if evaluations are accomplished by using largely the same set of issues. Case study designs which facilitate departures and comparisons add to both the research and administrative value of the results. This case study is felt to be an important contribution to research methods on source selection and good example of a credible approach to exploratory research in general.

VI.3 Comparison of ETIP's Results to Other Uses of the PFE Process

VI.3.1 Other Experiences

There have been both prior and later experiences with using PFE. The prior experiences were the original uses of PFE by the Air Force to procure hardware subsystems. The later experiences were the subsequent uses of PFE by

ETIP (in 1977 and 1978) to develop an evaluation capability for its regulatory program.

VI.3.2 Lessons Learned by Comparison to the Wright Field Experiences

VI.3.2.1 Departures. ETIP made several departures from the original Wright Field applications of the PFE process. These were:

- o The ETIP RFP was largely prepared by one person. Others with a stake in the outcome of the procurement were not involved in selecting the sub-factors.
- o Some of the experts who participated on ETIP's factor teams had no expected direct relationship to the future projects.
- o The use of a written question form (Figure IV.4) was substituted for holding oral clarifications prior to the factor team meetings.
- o A statement of work with illustrative sub-items for the first phase of the contract and a corresponding illustrative schedule were added to the ETIP RFP.

VI.3.2.2 Importance of early involvement. A major lesson which is demonstrated by this experience is the importance of getting key people on the project involved early in the preparation for the source selection. This participation is critical to the development of support and understanding which will be required during the future project.

Time considerations precluded the active involvement of others in the preparation of the ETIP RFP. This did not effect ETIP's ability to select contractors. However,

it probably did affect the course of the projects after the successful bidders were under contract. Commitment of many key people toward the development of the systems seemed low. The level of understanding or agreement on the importance of many of the sub-factor issues was also low.

Early involvement of key people (those who have a stake in the process or outcome of the project) in selection of the sub-factors would have provided an important two-way education process between those most directly responsible for managing the contracts and others who were less directly involved. This early involvement would also have helped demonstrate to people that their concerns regarding the contracts would be dealt with in a direct manner, by including them as sub-factors in the source selection. Commitment would probably have been greatly enhanced if people had realized that they could be full participants in the decision-making process. The author believes that the background provided and added commitment obtained through early involvement by people who will later be involved in the project is critical to future development. This step should not be compromised in future uses of the process.

VI.3.2.3 Selection of experts. Some of the experts who participated on the factor teams were people who were not expected to have any involvement in the development

of the systems. The discussion under section V.3.5 indicates that, though ETIP was quite successful in obtaining the participation of experts in the evaluation, reactions were mixed over the usefulness of their contribution. The key question was whether the people had enough knowledge about the projects to make their inputs worthwhile. Also, because they would not be involved later, there was no incentive for them to treat the evaluation as anything more than an academic exercise. The author believes that the evaluation was not harmed by the involvement of these people, and often they did provide additional useful perspective. However, he also believes that, where available, experts should be drawn from the set of people who will have to work with the resulting contractors.

VI.3.2.4 Benefit of orals prior to factor team meetings. In section V.3.2.4 the author indicated that the question form was only of minimum usefulness. The burden of the clarification process fell upon the meetings with the bidders who remained competitive following the factor team meetings. Though this process was effective for obtaining clarifications, it seems as though it also caused the addition of the appearance of some potential impropriety or "subjectiveness" in the process. The author believes that this problem would have been reduced had oral clarifications been held before the factor team meetings.

VI.3.2.5 Problem from adding an illustrative statement of work. The addition of the statement of work with illustrative sub-items for the first phase of the contract seemed to cause confusion after the contract was signed. Both ETIP and contractor personnel began the projects by treating the illustrative sub-items as though they were contractually required. This was a source of problems since it diverted effort from the major objective of developing the evaluation systems.

VI.3.2.6 Transferability of the process to a "software" problem. A major lesson, which was documented by this case study, is that the PFE process may be adapted for use from the procurement of "hardware" systems to the procurement of "software" systems. Use of the process by ETIP was initiated on the premise that the underlying problems were sufficiently similar (Thompson, 1976a, p. 170). The adaptation was clearly successful.

Two points which stand out from the experience of using PFE for both "hardware" and "software" applications are that: 1) the technical evaluators are able to retain responsibility for the technical recommendations; and 2) the resultant selection is not subject to successful attack. Those in the chain of command are unable to exercise political control over the selection. The thoroughness and trace-

ability of the process prevent this. These same attributes of the process make it clear that the selection will withstand any protest investigation.

VI.3.3 Modifications Made in Later Uses of PFE by ETIP

The factors and sub-factors which were used for the later ETIP source selections were essentially the same as those used in RFP for the procurement evaluation systems. They were considered to be both the essential issues and relatively complete. However, there were some additions to the illustrative questions under the sub-factors.

Some changes were made in the way the process was implemented. There was earlier and more extensive involvement by those who would be working on the projects (both within and outside of ETIP). The schedules of factor team meetings were distributed a week or two in advance of the closing date for proposals, enabling panel members to adjust their appointments to the factor team meeting times rather than vice versa. Finally, references which bidders listed in their proposals were called in advance of the management factor team meetings, so that this information could be considered in assigning ratings. All of these modifications from ETIP's initial use of PFE seemed to be improvements. Others contemplating use of the PFE process in the procurement of evaluation systems may wish to consider additional modifications.

VI.4 Adaptability of the PFE Process to Other Types of Problems

Parts of the process of PFE may be useful for problems other than government source selection. Though the information required for portability to other problems has not been provided here, it is worth mentioning what some other possible applications may be. Thompson (1976a) has speculated about types of problems for which the PFE technique might prove useful. He has written that:

A number of possible applications might be suggested, and the categories which follow, and the illustrations, represent only one way in which they might be organized. First, the case of multiple candidates (bidders or projects) which must be compared against an uncertain or complex set of requirements, including:

- a) competitive procurement based on a complex set of design requirements or of a system, e.g., the present case;
- b) rank ordering of a series of competing projects (which may not be directly comparable) against the twin standards of likelihood of success and probable payoff (future value), i.e., the "project selection" process;
- c) comparison of alternative techniques, solutions, or (assumed) resources and constraints against a set of "independent" and/or differentially affected requirements, e.g., cost-benefit analysis.

Second, the case of a single candidate (bidder or project) which must be compared against a complex or uncertain set of requirements, including:

- a) a project or proposal submitted for "acceptance" under a complex statutory requirement, e.g., application for qualification

as a health maintenance organization (HMO), submission of an "impact statement" for a power plant or other facility;

- b) comparison of a proposed project against a set of "independent" requirements, e.g., cost-benefit analysis.

Third, the case where one (or more) candidates are to be compared against one (or more) uncertain or complex requirements by a set of raters who may differ not only in the kind of information they will accept but also in their value structure; in at least some cases where group decision processes are used (e.g., arbitration, negotiation, the Delphi Method, and perhaps, some political processes) it may be desirable to initially separate out those areas which are "value-free," i.e., facts or agreed statements of facts, to allow a more narrow concentration on those remaining areas in which there are value-based differences (Thompson, 1976a, pp. 179-180).

These types of problems occur regularly in both government and industry and are often resolved in a less than successful manner. Where current practice is not expected to produce satisfactory results, experimentation with alternative techniques, such as PFE, seems desirable.

VI.5 Possible Additional Research

Several areas of further research may produce additional useful information about the effectiveness of the PFE process or may suggest modifications for improving the process.

This case study focused primarily on evaluating the effectiveness of PFE in solving problems during source selection. It did not follow the projects past the signing of

the contracts to try to determine the match between ratings on sub-factors and subsequent performance. In the future, where it can be instrumented in advance, it may be possible to try to obtain time series measurements on the performance of successful bidders on each sub-factor. It may also be possible to keep track of problems which occur during the projects and check to see whether or not they were anticipated by the source selection process.

Research directed toward improving PFE may focus on determining the sensitivity of the group decision-making process to changes in various independent variables. Such things as influence structures, order of discussion of bidders, use of oral clarifications prior to factor team meetings, and variations in group size all seem to be fruitful areas for further investigation.

VI.6 Summary

This chapter reviewed implications of this case study which go beyond the evaluation of the specific use of PFE for the selection of contractors for ETIP's procurement evaluation systems. It reviewed the methodology which was used for the study, the increases in knowledge about the PFE technique gained from comparison to prior and subsequent uses of the process, and the potential portability of the PFE process to other problems. Finally, suggestions were made for areas for future related research on the process.

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APPENDIX A

Documents from the RFP

NBSIR 76-1124

EVALUATION SYSTEM PROPOSAL
PREPARATION AND
EVALUATION PROCEDURE

Charles W. N. Thompson

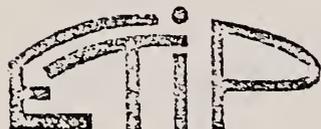
Office of Experimental Technology Incentives Program
National Bureau of Standards
Washington, D. C. 20234

February 1976

Final Report

Prepared by

EXPERIMENTAL TECHNOLOGY INCENTIVES PROGRAM



U.S. DEPARTMENT OF COMMERCE, Elliot L. Richardson, *Secretary*
James A. Baker, III, *Under Secretary*
Dr. Betsy Ancker-Johnson, *Assistant Secretary for Science and Technology*
NATIONAL BUREAU OF STANDARDS, Ernest Amblar, *Acting Director*

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I. INTRODUCTION

The objective of the research which culminated in this set of documents was to develop a process for the procurement of two evaluation systems. Within the context of applicable procurement regulations and program plans, the set provides a complete and integrated framework for both the preparation of proposals by prospective bidders and the evaluation of proposals by the evaluation team.

The document entitled Proposal Preparation Procedure provides both an overall description of the process and specific guidance to prospective bidders. All of the salient or significant characteristics of the system to be procured, the program under which it will be developed, and supporting elements are included in a set of elements called sub-factors which are grouped, for convenience, into a set of factors. Each of the key documents--the Statement of Work, Schedule, Scope of Effort, and Evaluation Factors--follows a parallel organization of the set of sub-factors. It is this integration of all of the central documents which provides both proposer and evaluator with a single, common structure.

The initiation of the development of this process arose out of the recognition that the "evaluation systems" to be procured required the services of a systems contractor and that it appeared that neither ETIP nor the "evaluation industry" had any significant present capability to design or manage such a system. A review of available proposal preparation and evaluation procedures suggested that some further development was required.

The process described herein was used to procure the two systems, and, as of the initial getting started period under the two contracts, appears to have worked out reasonably well in terms of our confidence that we have chosen not only the best but also reasonably competent contractors.

While this set of documents was specifically designed for the procurement of these two evaluation systems, the process, with modifications in the set of sub-factors, is applicable to comparable systems problems involving complex or uncertain requirements. One of the purposes of this report is to make these documents available on the basis that others may be interested in further applications.

Introductory Notes

The purpose of these two proposed procurements is to obtain contractor assistance in planning, designing, and carrying out the evaluation of a series of procurement experiments which are being undertaken by ETIP in cooperation with several governmental procurement agencies.

The set of objectives of the evaluation program includes the following:

- a. an overall description of the experiments as well as selected detailed descriptions
- b. an overall assessment of both the immediate and the subsequent effects (impacts) of the experiments, as well as selected detailed assessments
- c. An evaluation system or process which can be used by the appropriate government agency(ies) to obtain evaluations on a continuing basis of these as well as future, similar experiments.

There are a number of choices which could be made in obtaining contractor assistance, ranging from a single overall contractor to individual contractors for each experiment, or combinations in between. The choice which has been made is to divide the overall evaluation program into two procurements, as follows:

- a. an evaluation of "agency impact" which will direct its attention to a description of the experiments, an assessment of the effects on the several government agencies, and the design of the related evaluation system. "Agency impact" includes both immediate and subsequent effects on the program administrative agency but also other affected or related government agencies
- b. an evaluation of "commercial impact" which will direct its attention to the immediate and subsequent effects upon the commercial (or industrial) sector, and, as appropriate, consumers or users of the products, and the design of the related evaluation system.

The set of "experiments" includes the following:

- a. specific procurement experiments - including "completed," on-going, and planned
- b. specific related or supportive experiments - including procedures for selecting experiments, training of agency personnel, processes for obtaining from or providing to the industrial sector information required for carrying out procurement experiments, and other administrative changes
- c. general "experimental" changes - related to or in support of the above.

The set of experiments may be conveniently grouped into broad categories according to these dimensions:

- a. by program administrative agency - (1) Federal Supply Services (FSS); (2) state and local procurement agencies (S&L); and (3) Veterans Administration (VA)
- b. by type of procurement experiment (1) life cycle costing (LCC); (2) value incentive contracting (VIC); (3) performance specifications; (4) multi-year awards; etc.
- c. by the kind of effect intended - (1) economic or performance advantage to the using government agency; (2) related or derivative improvement in procurement capabilities of the program administrative agency; (3) increased or improved technological innovation in the industrial sector; and (4) economic or performance advantage to civilian sector users.

To obtain the evaluation desired we propose to let two contracts, each for a three-year period, divided into three phases, as follows:

Phase One - to include, generally, three activities

- (a) preliminary systems analysis
- (b) evaluation of specific, selected procurement or other experiments
- (c) design and pilot test of the related evaluation system

Phase Two - to include, generally:

- (a) refinement of (a) above
- (b) evaluation of additional specific procurement or other experiments
- (c) refinement and prototype test of the related evaluation system

Phase Three - to include, generally, "turn key" implementation of the related evaluation system by the appropriate government agency

The complete procurement package has been designed to assure the fullest possible interchange of information between prospective bidders and those responsible for the evaluation of proposals. Because of this it will be necessary to examine the complete set; particular attention is directed to the fact that the Statement of Work and the Schedule must be read in conjunction with the accompanying documents.

Some Definitions

Note: In most cases, the context, or reference to other parts of the bid set and associated documents, should resolve ambiguities or otherwise clarify definitions of terms. These "definitions" are provided as a convenience in reference.

ETIP - Refers to the Experimental Technology Incentives Program. In context, the reference may be to the objectives or content of the program, to the office or organization itself (e.g., as contracting agency), or to individual staff members.

PAA - Refers to the Program Administrative Agency (or Agencies). There are, for these procurements (agency impact and commercial impact), three PAA, as follows: 1) Federal Supply Service (FSS); 2) state and local procurement agencies (S&L); 3) Veterans' Administration (VA). In context, the reference will usually be to the specific procurement office(s) and/or responsible personnel in the agency which have the direct authority and/or responsibility for the decision to introduce the specific experimental intervention and, usually, for the conduct of the program and/or function to which the experimental condition is applied. For FSS, this may include both central and regional procurement functions or offices. For S&L, this may include NASPO, NIGP, and/or specific state and local procurement agencies. For VA this may include both central and regional or local procurement agencies.

AGENCY IMPACT - Refers to effects or impacts on or in the PAA and, where applicable, closely related governmental agencies, and, particularly, agencies which are the users of the products procured. These impacts or effects include not only those which are the specific objectives of a specific or general experiment, but also significant other effects, such as changes in administrative policies and procedures.

COMMERCIAL IMPACT - Refers to effects upon the commercial sector and/or civilian sector users. These impacts or effects include not only those which are the specific objectives of a specific or general experiment, but also significant other effects, such as increased or earlier use of new technology.

EXPERIMENT - Refers, generically, to any combination of intervention and desired (or hypothesized) effect. In a complex of interventions and effects, there may be a number of "experiments," including experiments which are combinations of other experiments, and experiments where the effect of one is the intervention of another.

SPECIFIC EXPERIMENT - Refers, usually, to a specific, identified intervention and desired (or hypothesized) effect. The major, and most significant, cases are the specific procurement experiments (e.g., use of LCC to procure air conditioners). There may be other (related) specific experiments (e.g., the FSS training program).

VARIABLE - Refers, generically, to any object, event, state, value, function, etc. In the context of a specific experiment (or study), the independent variable is, usually, the intervention, and the dependent variable the desired (or hypothesized) effect.

PARAMETER - Refers to those variables which, whether controllable (directly or indirectly) or not, affect (or are hypothesized to affect) plausibly and/or significantly the interpretability and/or credibility of the observed (or hypothesized) relationship between the variables in a specific experiment.

A PRIORI PROPOSITION TESTING - Refers to those specific experiments for which one of, if not the primary, purposes is to establish, with a relatively high degree of credibility, the relationship between the intervention and the effect observed. In practice, this will be largely limited to relatively well defined interventions and proximal effects, and where reasonable control of parameters can be achieved.

EXPLORATORY (AND/OR DESCRIPTIVE) - Refers to experiments (and/or studies) where it is either not feasible or not required to meet the requirements of a priori proposition testing. In practice, this will apply to requirements to describe and/or measure sets of variables where either the description is sufficient itself or provides a basis for identifying hypotheses, variables, and/or parameters.

EVALUATION SYSTEM - Refers to the set of policies and procedures which provides the basis for evaluating the (agency and/or commercial) impacts of a set of specific procurement or related experiments. The form, detail and completeness of the system will progressively change. In Phase One, it may begin as a preliminary outline within which detailed "single thread" designs are developed for the early evaluation of specific procurement experiments; later, the results of the preliminary systems analysis and the "pilot test" will provide the basis for a preliminary evaluation systems design. In Phase Two, progressive refinement should result in a relatively complete evaluation system which can be tested as a prototype, in part, through the evaluation of specific experiments. In Phase Three, the evaluation system should be in the form of a stable and complete system.

BASIC (OR BASE-LINE) EVALUATION PROCESS - Refers to that part of the evaluation system which includes those evaluation activities which deal with key, predictable, identifiable, continuing, common objectives for which the process can be institutionalized.

SPECIAL EVALUATION PROCESS - Refers to those evaluation activities which do not meet the above requirements because of specialized, one-time or changing objectives.

FRAMEWORK OR MODEL - Refers to graphical or other conceptual representation of the set of interrelations among objectives, organizations, experiments, and/or programs, and the evaluation system.

PROPOSAL PREPARATION PROCEDURE

A. Purpose

The purpose of this document is to provide a guide for bidders in the preparation of their proposals.

B. Basis for Preparation of This Document

B.1 Historical Note

A wide variety of methods have been used for the procurement of the services of evaluation contractors, including the following: 1) adding evaluation as an express or implied requirement to the basic contract for the program or experiment; 2) contracting separately with a contractor or consultant for the evaluation; 3) obtaining an evaluation, usually post hoc, as part of the study phase of a contract for a new or different program. The description of the services desired may take many forms, including the following: 1) a brief, general requirement "to perform an evaluation"; 2) statements or descriptions of various lengths and with various degrees of detail and completeness which outline the objectives of the program and/or the specific questions to be answered; 3) relatively detailed and complete "specifications" of the services required, including instruments to be used, sampling plans, and the form of the analysis required. In some cases, and for some purposes, these methods provide a satisfactory base for defining the services required, which, in turn, may provide a satisfactory basis for determining the qualifications of prospective contractors.

None of the above appear appropriate as a basis for determining the qualifications of prospective contractors on this procurement. For this reason this document was prepared, using a "parametric factor analytic approach" which was developed for and used on a number of subsystem procurements by another agency of the government.

B.2 Basis for Evaluation (of Bidders)

Generally, evaluation (including proposals) requires three things: first, a standard or base for comparing; second, information to be compared against the standard; and, third, an effective method for doing the comparing. These are discussed in the three paragraphs below.

B.2.1 The first requirement of the evaluation of competitive proposals is a standard or base for comparing, and this is, obviously "who can do the job best." but this is a matter of predicting because it is a future matter, and there is uncertainty in specifying the job. The choice of standard for selection includes:

- a. The whole program, either as it is or as it should be stated to obtain the selection base.
- b. The "significant independent variable" - if one part will determine, either by its absence or presence, the one bidder who can do it, then this is the basis.
- c. Some sample of parameters (variables or "factors") which on a presence or absence basis, or qualitative scale, is the determinant.

The choice is between b) and c) because of the inability to precisely define the skills and content of the future completely; and because agreement on b) presumes considerable confidence in past experience, the basis must be c). The development of c) is summarized in the paragraph below in terms of a brief statement of the program.

The nature of the item to be procured determines the program. The evaluation here is not limited to fully designed evaluations of specific experiments, nor is the alternative of a broad, overall descriptive case study sufficient. It is proposed to obtain not only preliminary systems study which will include both of the above, but also both kinds of evaluations; in subsequent phases, it is proposed to develop and test an ongoing capability to carry out such evaluations in such form and detail as will allow the government to implement subsequent phases. Direct description of such a program must necessarily be accomplished by selecting and tabulating the significant parts of the program; and these parts may then be further defined and amplified by supporting data. These parts, identified as "factors," are the bases for the establishment of the standard; and, in turn, the information to be furnished and the evaluation procedures.

B.2.2 The information to be compared against the standard is that furnished by, or about, the bidders. This requires cooperation, varying from a little to a lot. Too little occurs when the bidder's data is absent or cannot be translated into a common dimension or is irrelevant. Too much occurs when the bidder essentially repeats back the guidelines furnished. The problem of "too much" has not been experienced in prior evaluations, and those few cases of "parroting" were obvious. The concern is to assure that the bidder has thorough guidance in preparing the necessary information, and by this means the bidder will be aided in directing his efforts more efficiently.

B.2.3 Because of the large number of factors to be evaluated, the large volume of data to be considered, and the size of the evaluation team, the process needs to be well organized and supported with efficient and clear procedures. Forms and instructions must be prepared, and arrangements for scheduling meetings and for carrying out the evaluation have to be thought out in advance. A corollary benefit is an increase in the assurance of impartiality through avoidance of the confusion of setting rules and judging at the same time.

B.3 Preparation

This document, and the associated statement of work, was prepared upon the above basis. As source material, procedures similar to this, as well as a number of other evaluation procedures, were reviewed.

C. General Comments on Proposal Evaluation Procedure

To provide bidders with a general background and perspective, a brief outline of the overall procedure is furnished below. (It should be noted that these comments are intended only as a general description, and some changes may be made.)

C.1 Preparation for Proposal Evaluation

C.1.1 To assure continuity, personnel responsible for setting up and administering the program for which proposals are being solicited, will conduct the proposal evaluation, with the advice and assistance of others who are less directly concerned. Direct management responsibility is centered in ETIP in the Contracting Officer's Technical Representative (COTR). He, together with other members of the ETIP staff, will be working closely with key members of the staff of the program administrative agency in the type of close relationship which is characteristic of "administrative experimentation." As a minimum, it is intended that at least two members of the proposal evaluation team will be assigned primary responsibility for each subfactor, with backup assistance in review by other team members. These evaluation team members are responsible for preparing and/or reviewing the bases for the evaluation and for briefing the bidders.

C.1.2 The results of the preparation are incorporated, primarily, in the RFP. In addition to the Form 33 and accompanying provisions, the RFP includes a series of related documents prepared for the primary purpose of furnishing a base for the preparation of proposals. The necessary clarification and revision to provide a contractual basis will be accomplished by negotiation with the selected contractor. Briefly, these documents are grouped as follows:

Statement of Work - tabulates the significant parts of the program with clarification limited primarily to a brief summary. This will include those separately identifiable "deliverables" and a schedule.

Proposal Preparation Procedure (this document) - provides an explanation of the basis for proposal preparation.

Proposal Evaluation Factors - provides the basis for proposal preparation.

Scope of Effort - cost proposal requirements

Other Documents - development plans, reports, references etc., to assist the bidders in preparing their proposals.

C.1.2.1 To the extent possible, all of these documents follow the same order. The Statement of Work includes items of required work divided into three phases. The Proposal Preparation Procedure is designed to match the organization of the Statement of Work. It is intended to provide, where necessary, cross-reference to the other documents.

C.1.2.2 To assure that all bidders have complete sets of the related documents, and especially those included under "Others" which may be furnished at the briefing, a complete index of all documents will also be furnished during the briefings, as required.

C.1.3 It is planned to brief the bidders twice. At the initial briefing, a summary presentation on the program will be given, including a presentation by the program administrative agency on the administrative objectives for the program. (To assure the continuity specified above, representatives of the program administrative agency will participate in the evaluation.) Following the presentation, an extensive question period will be scheduled. The second briefing will follow a few weeks later after the bidders have had an opportunity to study the program; this is primarily to allow for further questioning by the bidders to correct oversights and resolve ambiguities. No information will be available during the proposal preparation period on an individual basis.

C.2 Proposed Evaluation Procedure

C.2.1 After receipt of the written proposals, the proposal evaluation team will have a period of a few days to familiarize themselves generally with the proposals; and, specifically, the parts within their responsibility. This is primarily to furnish a basis for the next stage.

C.2.2 According to a schedule to be established at the second of the two briefings noted above, each bidder will be invited to make an oral presentation, approximately one hour in length, following which the evaluation team will have two to four hours for questioning. Purpose of the questioning is to assure that the evaluation team understands the proposals, and has an adequate basis for evaluation on each sub-factor. Both weak and strong points will be explored, and check lists will be recorded to assure that team members may have available to them both the written and oral presentations.

C.2.3 Following the above will come a further period of review, during which individual team members will complete their individual evaluations of sub-factors for which they are responsible or concerned. These individual evaluations will be noted with the assistance of a check list based on a value rating scale to avoid the confusion caused by numerical rating.

C.2.4 Members of the proposal evaluation team concerned with each factor will meet and perform a joint evaluation. They will follow an established procedure entitled, "Factor Team Guidelines," to assure an orderly and efficient process. Briefly, they will first compare notes informally to assure common standards and information; second, they will arrange the bidders in descending order; third, they will establish the relative spread among the bidders; and, finally, their result will be permanently recorded and signed by all team members present. This record becomes part of the permanent evaluation files. Generally, they will rate on each sub-factor, as applicable, three central points:

- a. Comprehension or understanding of the problem presented
- b. Proposed approach (or, in the alternative, the means for establishing the approach)
- c. Present or potential capability to accomplish this

Evaluation team members may use information obtained from the RFP and associated documents, the bidders' written and oral proposals and independent or prior information. However, in the latter case, any significant or critical information must be considered by all members of the factor team. Emphasis will be placed on the sub-factor being rated, but the impact of other factors will not be ignored. Comparative weighting of individual sub-factors and the weight of each factor team members' views will be within the responsibility of the factor team.

C.2.5 The results of the factor team evaluations will be summarized and reviewed.

C.2.5.1 The summary process will include the necessary combining of the individual factor ratings to achieve an overall rating, with consideration of the interaction of factors, their individual significance (acceptability), and the "summation" according to previously established weights.

C.2.5.2 In general, the range of weights among the factors will be no more than 2:1.

C.2.5.3 The review process will necessarily provide for latitude in reflecting the results of the review, such as reassessing of weights or reexamination of specific areas of the evaluation; and, such changes will be incorporated, with the supporting basis in the record of the evaluation.

C.3 Comment on Factor and Sub-factor Structure

All of the factors in the evaluation are set out in the Proposal Evaluation Factors documents, and are largely self-explanatory. The rationale of this particular organization of the sample is based, primarily, on the sub-factors, the factors being administrative groupings for convenience in organization of the various documents and the evaluation. Generally, the factor/sub-factor organization is based on significant identifiable effort/capability areas. The intent is to select comprehensive exclusive/inclusive samples of the total program. In total, the factor/sub-factors are intended to include samples of all significant parts of the program. An effort has been made to minimize duplication; and, with a few intentional exceptions, no sub-factor samples an area covered by another factor. Similarly, with certain intentional exceptions, each sub-factor samples on the basis of understanding, approach, and capability; as a result, those aspects, which include "effective experience," are incorporated into specific substantive areas rather than amorphous generalized categories. It is important to understand that the distinction among the factors is primarily an administrative distinction to reflect the differences in perspective required in presentation and evaluation.

D. Use of this Document

D.1 General Considerations

D.1.1 As noted above, the Proposal Evaluation Factors document covers all of the factors to be considered in the evaluation and are intended to provide a substantially complete framework for the preparation of the proposal. Because the background and perspective against which they were prepared is set out in this part, the other related documents, and the briefings for the bidders, it is extremely important that this interpolation be understood and preserved during the preparation period by assuring that substantive contributors have sufficient access to the overall framework. As a general guide, cross reference should be made to the applicable points included in the document on Scope of Effort.

D.2 Content Considerations

D.2.1 Because the evaluation is organized on a factor/sub-factor basis, it is important that the treatment of each factor be substantially complete as possible. The several factors are necessarily interrelated and interacting, but repetition is not required; however, where significant material considered necessary to assure understanding of a factor is contained in another factor, specific (and annotated) cross-references should be furnished. All members of the evaluation team will have access to the complete proposal, and it is expected that certain factors will be reviewed jointly.

D.2.2 Each factor and sub-factor is defined by a specific descriptive sentence setting out the standard against which each bidder will be measured. Because the factor statements reflect the fact that the factor is primarily an administrative convenience, no specific presentation with regard to the overall factor is required. Each sub-factor, however, will be the subject of a specific rating, and the proposal content should reflect the necessity for furnishing the evaluation team with sufficient information to establish a comparative position on each sub-factor. THE BASIC ORGANIZATION OF THE PROPOSAL MUST BE ON A SUB-FACTOR BASIS.

D.2.2.1 It should be specifically noted that the sub-paragraphs under each sub-factor are provided for the purpose of amplifying and defining the standard, that is, to present the types of questions which need to be answered to establish the rating on the sub-factor. It is not required to answer each and all of these subsidiary questions. Nor is it required that the presentation be limited to these particular subsidiary questions. In some cases, a subsidiary question will be a critical determinant; in other cases, an effective presentation may be accomplished by partial treatment. It was not intended to specify the proposal content through these subsidiary questions.

D.2.2.2 These subsidiary questions are presented in three forms. One form is that of a question, such as, "Do you consider the proposed schedule realistic? too tight? If not, what do you propose and why?" The second general form is that of a statement calling for comment or the furnishing of certain information, such as, "Testing facilities (floor space, equipment, personnel)." The third general form is that of a statement commenting on a problem area or outlining a proposed solution which furnishes a basis for comment, such as, "The Advisory Committee may raise a technical question which requires investigation in order to allow the committee to make a decision at the next meeting. The contractor will furnish the necessary personnel to develop each of the conflicting points of view independently."

D.2.2.3 As noted elsewhere, the relative weighting, or significance, of each sub-factor within a factor is within discretion of the factor team performing that part of the evaluation. In most cases, the sub-factors represent approximately equivalent areas of significance. The amount of subsidiary questions furnished does not necessarily reflect an unusually high or low weight.

D.2.3 Latitude is encouraged in the treatment of the content presented with respect to the sub-factors. Where alternate assumptions or conclusions to clarify ambiguities or fully establish the position is considered advisable, no arbitrary limitation is imposed. The substantive objective is to provide information as a basis for evaluation, and this procedure is intended only as a minimum framework to increase the efficiency and effectiveness of the proposing and evaluating process.

D.3 Physical Considerations

D.3.1 Primary concern with regard to the physical format and organization should be to facilitate the work of the evaluation team, recognizing the circumstances and procedures which will be used.

D.3.2 It is suggested that the proposal use the same major numerical and subject headings of the Proposal Evaluation Factors document to avoid the confusion of an additional numbering system. This should be extended only to the factors and sub-factors, and no requirement to follow the numerical order of the subsidiary questions within a sub-factor is intended. Where it is considered desirable to include additional material within the framework of Sections I through VII, an expanded numbering sequence should be used, i.e., to include material after I.1, but before I.1.1, use a new number, I.1.0, with subsidiary numbers, I.1.0.1, I.1.0.2, etc.

D.3.3 To facilitate the physical handling of the proposal, certain physical divisions are requested.

D.3.3.1 Physically bulky material, such as extensive personnel or facility brochures, or supporting descriptive documents furnished in amplification, should be treated as physically separate appendices, with suitable identification. In this regard, where material which has been prepared in another connection is furnished, a suitable cover sheet noting limitations of application may be used to avoid extensive revision and republication.

D.3.4 Provision should be made for sufficient indexing and cross-reference summaries to facilitate reference to particular parts of the proposal. Unless considered desirable, pagination need not be accomplished. It is recommended that covers of separate documents contain clear reference to the numerical and subject heading.

REVISIONS TO PROPOSAL PREPARATION PROCEDURES

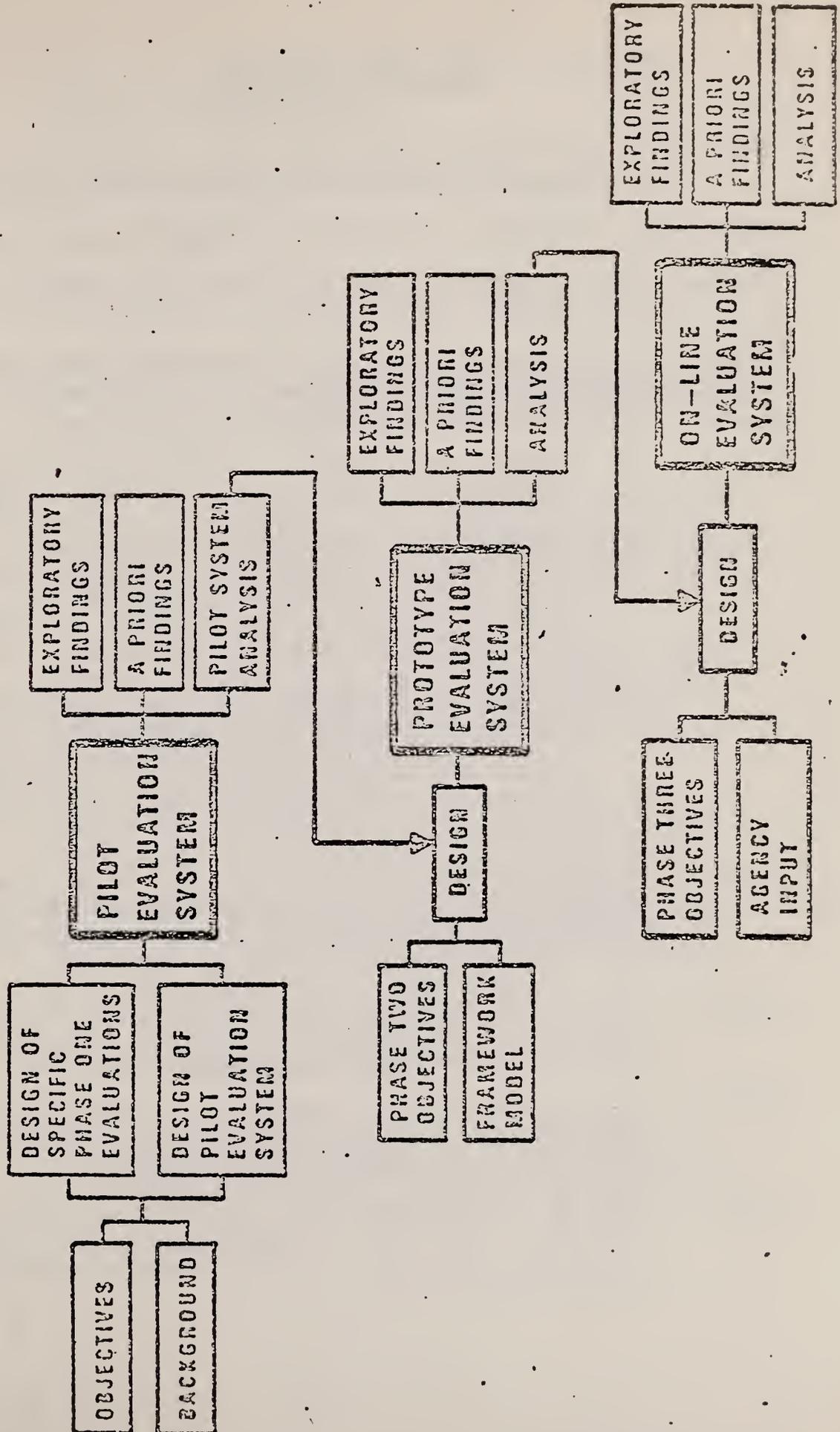
- A. Page 5. Delete C.2.2, and substitute the following:

C.2.2 Where factor team members require specific additional information for their evaluation, specific written questions will be directed to the specific proposer through the contracting officer.

- B. Page 6, C.2.3, lines 6 and 7. Place period (.) after "scales," and delete the remaining material.
- C. Page 6, C.2.4, lines 24 to 27. Delete "Comparative weighting" and add "Comparisons," and delete "weight" and add "efforts."

EVALUATION SYSTEM DESIGN PROCESS

(INCLUDING RELATION TO EVALUATIONS OF SPECIFIC EXPERIMENTS)



Statement of Work

Note: The items listed below provide a categorized summary of the services and materials required on this program.

Phase One: Planning and Design, and preliminary evaluation.

- Item 1. Plan, organize, staff, direct, and control, including both schedule and costs.
- Item 2. Provide reports, liaison, and services for purposes of review, coordination, and approvals and acceptances, including the following:
- a. Periodic and special formal and informal management progress reports, final report.
 - b. Periodic and final scheduling reports, including projected schedule for the next phase.
 - c. Periodic and final cost reports, including projected costs for the next phase.
 - d. Periodic and special formal and informal technical progress reports and final report, including proposed program for the next phase. (Note: the substantive work to be reported here is to be performed under items 3 through 7).
- Item 3. Review and structure the proposed objectives in terms of the experimental setting and related background, and establish an overall plan and set of priorities.
- Item 4. Review and structure the proposed set of experiments, and related background in terms of the proposed objectives, and provide a reference base.
- Item 5. Develop the detailed evaluation requirements (problem definition and experimental or study design), in relation to collection and analysis.
- Item 6. Develop the detailed data collection process, including instruments, identification of, and access to, sources, and managing the process; and collect the data.

Item 7: Develop the detailed data analysis process; carry out the analyses; present findings; present recommendations.

Phase Two: Prototype Evaluation Process Testing

Item 8. Same as Item 1.

Item 9. Same as Item 2, but change reference to Items 10 through 14.

Item 10. Refine and revise the work accomplished under Item 3, as related to the further objective of designing and testing a prototype of the complete evaluation process.

Item 11. Refine and revise the work accomplished under Item 4, as related to the further objective of preparing a formal framework within which the objectives, organizations, and programs may be related to the evaluation process.

Item 12. Refine and revise the work accomplished under Item 5, as related to the further objective to achieve a comprehensive, detailed design to meet both basic data (base line data) and special data requirements.

Item 13. Refine and revise the work accomplished under Item 6, as related to the further objective of collecting both basic and special data.

Item 14. Refine and revise the work accomplished under Item 7, as related to the analysis of both basic and special data; and provide findings and recommendations.

Phase Three: On-line/Turnkey Evaluation

Items 15

thru 21. Revision and refinement of respective prior items in relation to the additional objective of an on-line turnkey evaluation process.

STATEMENT OF WORK
(with illustrative sub-items for Phase One)

Note: The items listed below provide a categorized summary of the services and materials required on this program.

Phase One Planning and Design, and Preliminary Evaluation

- Item 1. Plan, organize, staff, direct, and control, including both schedule and costs.
 - a. Provide the necessary services and materials for management of the overall program, including a management plan.
 - b. Prepare a preliminary detailed schedule, and provide progressive analysis and rescheduling, including proposed schedule for Phase Two.
 - c. Prepare periodic cost analyses and projections, including proposed costs for Phase Two.

- Item 2. Provide reports, liaison, and services for purposes of review, coordination, and approvals and acceptances, including the following:

Provide services and materials necessary for liaison with ETIP, PAA, and relevant other individuals and organizations.

- a. Periodic and special formal and informal management progress reports, final report
 - a(1). Submit program management plan at or before completion of 3d month, and report modifications as required.
 - a(2). Submit final report at or before completion of 15th month.
- b. Periodic and final scheduling reports, including projected schedule for the next phase
 - b(1). Submit projected Phase One schedule at or before completion of 3rd month, and report modifications as required.
 - b(2). Submit projected Phase Two schedule at or before completion of 9th month.
 - b(3). Submit final report at or before completion of 15th month.
- c. Periodic and final cost reports, including projected costs for the next phase.
 - c(1). Submit projected Phase One costs at or before completion of 3rd month, and report modifications as required.
 - c(2). Submit final report at or before completion of 15th month.
- d. Periodic and special formal and informal technical progress reports, final report, including proposed program for the next phase. (Note: The substantive work to be reported here is to be performed under Items 3 through 7.)

Submit reports, including formal reports for the items in the following table on or before completion of the month(s) specified:

| | | | |
|----|--------------|----|------|
| 3a | 3rd and 6th | 6a | 6th |
| b | 3rd | b | - |
| c | 6th | c | 6th |
| d | 9th | d | - |
| 4a | 3rd and 6th | 7a | 6th |
| b | 6th and 12th | b | 12th |
| 5a | 3rd and 6th | c | 12th |
| b | 6th | d | 15th |
| c | 6th | e | 15th |
| d | 12th | | |

- Item 3. Review and structure the proposed objectives in terms of the experimental setting and related background, and establish an overall plan and set of priorities.
- a. Review, through documents and interviews, the objectives of ETIP, PAA, and other relevant individuals and organizations, including professional standards of evaluation, and prepare a description and supporting analysis suitable for providing a basis for planning and setting of priorities for Phase One.
 - b. Based on the above, identify, and prepare preliminary recommendations and supporting detail requirements for, those specific evaluations which should be accomplished during Phase One, including both exploratory (and/or descriptive) evaluations and a priori proposition testing evaluations.
 - c. Based on the above, prepare preliminary statement of requirements for the pilot evaluation system in Phase One.
 - d. Based upon the above and the other activities in Phase One, prepare a preliminary statement of the requirements for the prototype evaluation system in Phase Two, together with supporting analysis.

- Item 4. Review and structure the proposed set of experiments, and related background in terms of the proposed objectives, and provide a reference base.
- a. Review, through documents and interviews, the specific procurement experiments (past, present, and proposed), and the related programs and organizations*, and prepare a description and supporting analysis suitable for planning the activities of Phase One in conjunction with the work in Item 3a.
- *(AGENCY IMPACT ONLY) With primary emphasis on PAA, and not on industry sector.
- (COMMERCIAL IMPACT ONLY) With primary emphasis on industry sector, and not on PAA.
- b. Prepare a preliminary framework model which provides a base for synthesizing objectives, organization, programs, and the evaluation process (system), with supporting analysis.

- Item 5. Develop the detailed evaluation requirements (problem definition and experimental or study design), in relation to collection and analysis.
- a. Prepare a preliminary design of both exploratory (and/or descriptive) and a priori evaluations to be conducted during Phase One, including 1) statement of problem or hypothesis, 2) supporting theories, and 3) definitions of variables and parameters.
 - b. Based on the above, prepare a detailed design of each evaluation, with special emphasis on specific procurement experiments, including 1) choice of experimental design, 2) (where appropriate) sampling strategies, and 3) data collection and analysis methods.
 - c. Prepare a preliminary design of the pilot evaluation system in Phase One, including data collection and analysis.
 - d. Based on the above, prepare a preliminary design of the prototype evaluation system in Phase Two, including both basic and special processes.

- Item 6. Develop the detailed data collection process, including instruments, identification of, and access to, sources, and managing the process; and collect the data.
- a. Design and develop the data collection process required for the specific Phase One evaluations.
 - b. Based upon the work in Items 3, 4, and 5, collect additional data required for specific exploratory and/or descriptive) evaluations.
 - c. Design and pilot test the instruments necessary for specific a priori proposition testing evaluations.
 - d. collect the data required for specific a priori proposition testing evaluations.

- Item 7. Develop the detailed data analysis process; carry out the analyses; present findings; present recommendations.
- a. Design and develop the data analysis process required for the specific Phase One evaluations.
 - b. Carry out the specific Phase One exploratory (and/or descriptive) evaluations, and present findings.
 - c. Carry out the specific Phase One a priori proposition testing evaluations, and present findings.
 - d. Analyse the activities of Phase One which affect the design of the evaluation system, and prepare recommendations.
 - e. Analyse the activities of Phase One, and prepare recommendations for Phase Two.

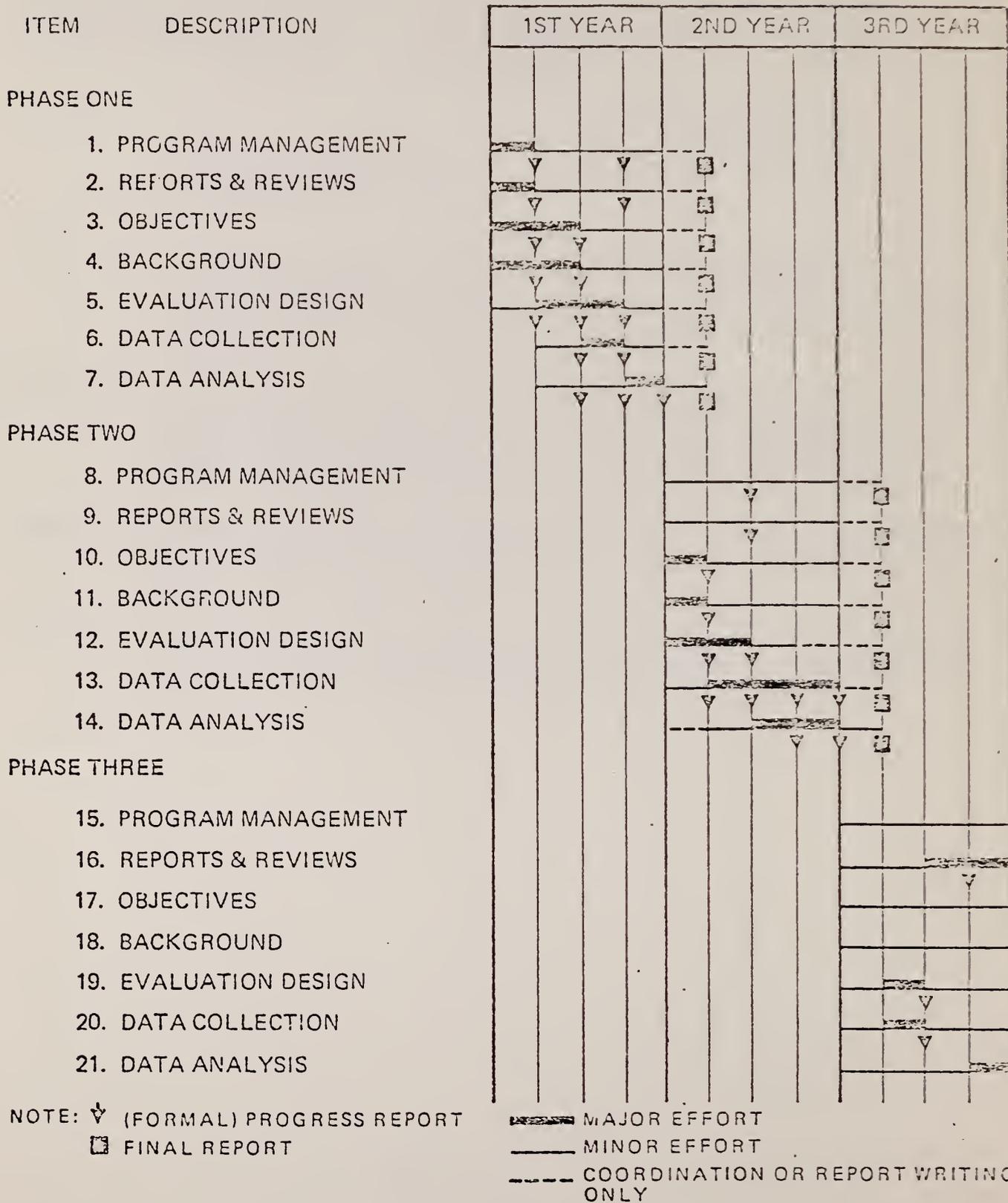
Phase Two: Prototype Evaluation Process Testing

- Item 8. Same as Item 1.
- Item 9. Same as Item 2, but change reference to Items 10 through 14.
- Item 10. Refine and revise the work accomplished under Item 3, as related to the further objective of designing and testing a prototype of the complete evaluation process.
- Item 11. Refine and revise the work accomplished under Item 4, related to the further objective of preparing a formal framework within which the objectives, organizations, and programs may be related to the evaluation process.
- Item 12. Refine and revise the work accomplished under Item 5, as related to the further objective to achieve a comprehensive detailed design to meet both basic data (base line data) and special data requirements.
- Item 13. Refine and revise the work accomplished under Item 6, as related to the further objective of collecting both basic and special data.
- Item 14. Refine and revise the work accomplished under Item 7, as related to the analysis of both basic and special data; and provide findings and recommendations.

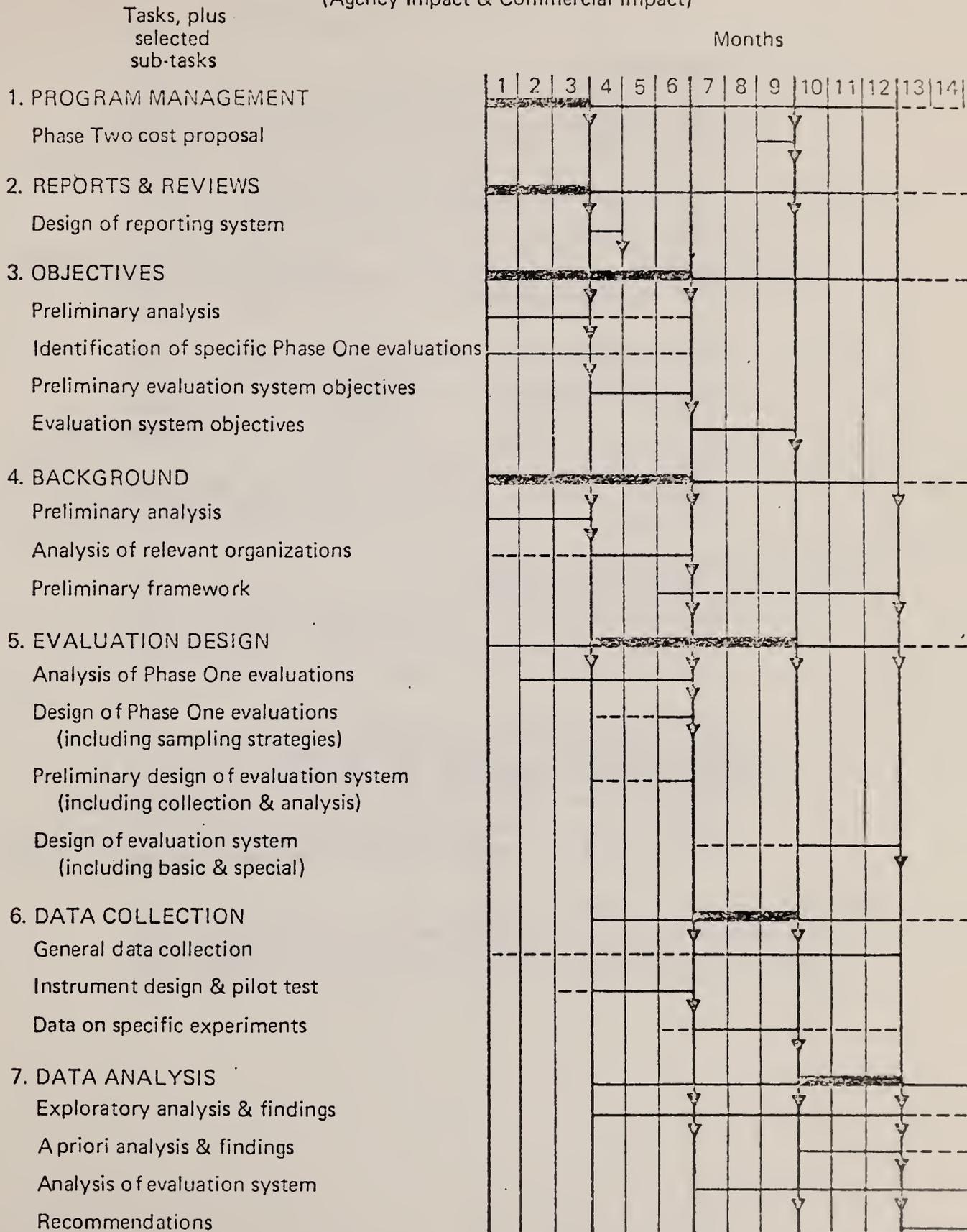
Phase Three: On-Line/Turn-Key Evaluation

Items 15 through 21. Revision and refinement of respective prior items, in relation to the additional objective of an on-line/turn-key evaluation process.

PROPOSED SCHEDULE - OVERALL
(Agency Impact & Commercial Impact)



PROPOSED SCHEDULE – PHASE ONE
(Agency impact & Commercial impact)



PROPOSAL EVALUATION FACTORS

I. Management

This factor is a measure of the background and overall management capability of the bidder.

I.1 Evaluation Management Experience

This sub-factor measures the bidder's experience and/or capability of the personnel he will use on this program.

I.2 Importance of Program to the Bidder

This sub-factor is a measure of the degree to which the proposal represents the approval and direction of the company rather than the efforts of professional proposal writers, and also is a measure of the warranty offered by the company to back the program with the necessary resources.

I.3 Program Management

This sub-factor is the measure of the bidder's own proposed method for planning, organizing, and controlling the program.

I.4 Schedule and Cost Control

This factor measures the bidder's ability to predict the time and cost requirements of his efforts, to plan the interrelation of the several parts, and to exercise the necessary control.

II. Reports and Reviews

This factor is the measure of the bidder's ability to assure that the government is able to effectively and progressively review a very large scale effort with a minimum of people, and of the bidder's ability to coordinate his activities with those of other related individuals and organizations.

II.1 Reports and Liaison with the Experimental Technology Incentives Program (ETIP).

This sub-factor measures that part of the overall factor which relates to the Experimental Technology Incentives Program (ETIP).

II.2 Reports and Liaison with the Program Administrative Agency (PAA)

This sub-factor measures that part of the overall factor which relates to the program administrative agency (and, where appropriate, its subelements or related organizations).

II.3 Liaison with Others

This sub-factor measures that part of the overall factor which relates to individuals and organizations other than those described above.

II.4 Approvals and Acceptances

This sub-factor measures the bidder's understanding and acceptance of the necessity for progressive and substantial approval and acceptance during each phase, as well as at the end of each phase.

III. Objectives

This factor is a measure of the bidder's overall understanding of the objectives of this procurement (and related programs).

III.1 ETTP Evaluation Objectives

This sub-factor is a measure of the bidder's understanding of the specific objectives of this procurement.

III.2 Program Administrative Agency (PAA) Objectives

This sub-factor is a measure of the bidder's understanding of the specific objectives of the program(s) and/or experiment(s) that are to be evaluated.

III.3 Other Relevant Objectives

This sub-factor is a measure of the bidder's understanding of relevant and related objectives, goals, criteria, standards, and the like, including the state of the art in administrative experimentation (and/or evaluation).

III.4 Phase Two Objectives

This sub-factor is a measure of the bidder's ability to anticipate the incorporation of the results of Phase One in the restated objectives for Phase Two.

III.5 Phase Three Objectives

This sub-factor is a measure of the bidder's ability to anticipate the reformulation of objectives in Phase Three.

IV. Background Information

This factor is a measure of the bidder's overall understanding of the background and characteristics of this procurement.

IV.1 ETIP

This sub-factor is a measure of the bidder's understanding of ETIP and the specific program(s) and/or experiment(s), in terms of past history, present status and plans for the future.

IV.2 Program Administrative Agency (PAA)

This sub-factor is a measure of the bidder's understanding of the program administrative agency (and, where appropriate, its subelements or related organizations), its organization, policies and procedures.

IV.3 Other Relevant Background

This sub-factor is a measure of the bidder's understanding of the programs, organization, policies and procedures of other relevant organizations.

IV.4 Phase Two Background

This sub-factor is a measure of the bidder's capability to prepare a comprehensive framework or model of the program(s) and/or experiment(s) and the evaluation process.

IV.5 Phase Three Background

This sub-factor is a measure of the bidder's awareness of possible further refinements in the model necessary for the continuation of the evaluation process.

V. Evaluation Design

This factor is a measure of the bidder's capabilities to carry out the evaluation design requirements.

V.1 Exploratory (Descriptive) and A Priori Proposition Testing Hypotheses, Variables and Parameters

This sub-factor is a measure of the bidder's ability to define the detailed evaluation objectives.

V.2 Experimental and/or Study Designs

This sub-factor is a measure of the bidder's ability to define the overall experimental and/or study design.

V.3 Data Collection Design

This sub-factor is a measure of the bidder's ability to design the overall data collection process, including sources of information, sampling strategies, timing, etc.

V.4 Data Analysis Design

This sub-factor is a measure of the bidder's ability to design the overall data analysis process, including processing and analysis, and presenting results and recommendations.

V.5 Phase Two Evaluation Design

This sub-factor is a measure of the bidder's ability to redefine the detailed experimental and/or study design to reflect the results of Phase One, the several objectives, and model of the process in a comprehensive detailed design to meet both basic data (base line data) and special data requirements.

V.6 Phase Three Evaluation Design

This sub-factor is a measure of the bidder's ability to further redefine the above, to provide for a detailed design, and necessary supporting materials, which would allow an on-going evaluation process.

VI. Data Collection Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the acquisition of data on the variables and parameters of interest.

VI.1 Instrument Design

This sub-factor is a measure of the bidder's ability to develop (and test) the various questionnaires, protocols, schedules, and the like required for data collection.

VI.2 Information Sources

This sub-factor is a measure of the bidder's ability to identify the various information sources, and to gain access.

VI.3 Data Collection

This sub-factor is measure of the bidder's capability to organize, staff, train, direct and control the personnel who obtain the data by survey, interview, observation, or use of records.

VI.4 Phase Two Data Collection

This sub-factor is a measure of the bidder's ability to anticipate the requirements of the Phase Two collection of both basic (base line) and special data.

VI.5 Phase Three Data Collection

This sub-factor is a measure of the bidder's ability to plan against the requirement to design an ongoing collection process.

VII. Data Analysis Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the analysis of the data and to present the results and recommendations.

VII.1 Analysis

This sub-factor is the measure of the bidder's ability to identify and apply the appropriate analytical (including statistical) techniques to the data collected.

VII.2 Exploratory (and/or Descriptive) Findings

This sub-factor is a measure of the bidder's capability to identify and present exploratory findings.

VII.3 A Priori Proposition Testing Findings.

This sub-factor is a measure of the bidder's capability to identify and present a priori findings.

VII.4 Recommendations

This sub-factor is a measure of the bidder's understanding of the relationship between the results of Phase One and the work in Phase Two, in terms of additional, revised, or deleted hypotheses, changes in objectives or background information, and the relative feasibility and/or usefulness of alternative designs for evaluation.

2/1/76

PROPOSAL EVALUATION FACTORS
(With Illustrative Questions)

Note: These factors and sub-factors apply to both agency and commercial impact proposals. Where specific illustrative questions apply primarily to either agency or commercial impact only, they are so identified.

I. Management

This factor is a measure of the background and overall management capability of the bidder.

I.1 Evaluation Management Experience

This sub-factor measures the bidder's experience and/or capability of the personnel he will use on this program.

I.1.1 Discuss, with specific examples, recent experience in the management of field experiments, projects, and/or programs. Indicate size and complexity of program, extent of own responsibility for design of the program (or experiment) and the evaluation. Indicate by tabulation of cross-references other subsections of this proposal where you have referred to any program discussed here. Outline the original contracted-for schedules and costs and requirements, and explain changes. If you have had any "bad" experience here, discuss the reasons and, if appropriate, indicate how you would prevent them from occurring on this program. If appropriate, you should provide the names, addresses, and telephone numbers of cognizant COTR's.

I.1.2 If you do not have the kind of experience discussed above, discuss your basis for believing that you can meet the requirements of this program. Discuss in terms of the personnel you intend to use.

I.1.3 How will you combine and coordinate the efforts of staff members who are familiar with the procurement process, the program administrative agency, or the commercial sector with those staff members who have the technical skills in evaluation?

I.2 Importance of Program to the Bidder

This sub-factor is a measure of the degree to which the proposal represents the approval and direction of the company rather than the efforts of professional proposal writers, and also is a measure of the warranty offered by the company to back the program with the necessary resources.

I.2.1 What is the relative size of this program with respect to the overall sales of the company? If your company has significant decentralization or there are other factors which should be presented for clarity, please furnish this background. If the proportionate size is relatively large, why do you think that the problems associated with the "single product" will not arise? If, on the other hand, the proportionate part is relatively small, what assurance is there that this program will not be downrated by others after the contract is signed?

I.2.2 Discuss, if appropriate, how this program fits in with the long range planning of your company. What is its significance to your future position? If you envisage an increase in programs of this type, what assurance is there that key personnel on this program will not be withdrawn for newer programs?

I.2.3 It should be noted that the extent and nature of your effort in proposing will be considered in the evaluation of this sub-factor.

I.3 Program Management

This sub-factor is the measure of the bidder's own proposed method for planning, organizing, and controlling the program.

I.3.1 It is proposed that the planning and carrying out of the preparation of this proposal provides an opportunity for the bidder to demonstrate his capability in planning a complex effort. Please describe briefly your process and, particularly, the extent to which it is a "pilot" of the process you will use in managing this program.

I.3.2 Detail your proposed organization by time phases, including buildup, division of responsibility; generally describe its operation, how it is organized, and special features not self-explanatory. Can the effectiveness of your proposed organization be projected from its performance in putting together this proposal? If the organization you propose is essentially "new," either in form or in the persons assigned, comment on the extent to which you have been able to "test" it out in preparing this proposal.

I.4 Schedule and Cost Control

This factor measures the bidder's ability to predict the time and cost requirements of his efforts, to plan the interrelation of the several parts, and to exercise the necessary control.

I.4.1 A detailed, thorough schedule provides not only a comprehensive plan but also a powerful method of controlling and reviewing the progress of the program. The proposed schedule does not include a detailed breakdown of all of the interrelated areas but does furnish a broad guide for planning purposes. In general, do you think the schedule is realistic? Is it too tight? What additional assumptions are required? What conditions or events will affect the schedule?

I.4.2 Discuss the method of preparation of the schedule you will use, how you will update it, how you will use it.

I.4.3 Prepare a supporting analysis and summary of any areas which you believe reflect a significant relative cost advantage or disadvantage on your part. Indicate to what extent your in-house or subcontracting plans will take advantage of in-being capabilities and at what potential savings. To what extent have provisions for contingencies been made?

I.4.4 Discuss the form and timing of your detailed cost proposal for the major field data gathering activity in the second and third phases.

I.4.5 While the overall schedule reflects the requirement to design an on-going evaluation system, there is an important requirement to provide during Phase One (and each subsequent phase) specific outputs in the form of evaluations of selected specific experiments. How will you assure this?

I.4.6 The timing of the experiments varies across the several PAA's. What advantages or disadvantages do you see in this?

I.4.7 It is anticipated that another ("agency impact") contractor will be primarily responsible for evaluating the intervention and proximal impacts of the several experiments; it is also anticipated that some, if not all, commercial impacts will substantially lag the experiments. What advantages or disadvantages do you see in this? (COMMERCIAL IMPACT ONLY)

II. Reports and Reviews

This factor is the measure of the bidder's ability to assure that the government is able to effectively and progressively review a very large scale effort with a minimum of people, and of the bidder's ability to coordinate his activities with those of other related individuals and organizations.

II.1 Reports and Liaison with the Experimental Technology Incentives Program (ETIP)

This sub-factor measures that part of the overall factor which relates to the Experimental Technology Incentives Program (ETIP).

II.1.1 Discuss generally the extent and nature of liaison with both the Contracting Officer (CO) and the Contracting Officer's Technical Representative (COTR) that you envision in this program. Discuss generally the information needs of both government and contractor personnel; who will establish what the needs are and how they will be satisfied?

II.1.2 It would be useful if the reporting system were designed in a way that facilitated an ongoing process evaluation of a) the experiments conducted by the program administrative agency, and b) the evaluation effort of the contractor himself. The data provided by such a system could serve as the basis for a descriptive case history of the experiments and their evaluation. Discuss generally how feasible this proposal is, and how it might be accomplished. You may wish to relate it to your discussion in IV.1.2, and comparable discussions.

II.2 Reports and Liaison with the Program Administrative Agency (PAA)

This sub-factor measures that part of the overall factor which relates to the program administrative agency (and, where appropriate, its subelements or related organizations).

II.2.1 Discuss generally the extent and nature of liaison with both management personnel and technical or specialized staff. How will you reconcile the desirability of direct, informal communication with the necessity, in at least some cases, for observing formal clearance and approval "through channels"?

II.2.2 The evaluation effort may sometimes be perceived as threatening by various personnel in the program administrative agency. Discuss how the reporting and liaison arrangements can be developed to reduce the likelihood of this.

II.2.3 Discuss the differences, if any, in how you will relate to the several PAA. To what extent will these be separately identifiable efforts?

II.2.4 It is anticipated that another ("agency impact") contractor will be primarily responsible for coordination with the several PAA. What do you think of this, and how will you deal with it? (COMMERCIAL IMPACT ONLY)

II.3 Liaison with Others

This sub-factor measures that part of the overall factor which relates to individuals and organizations other than those described above.

II.3.1 It is anticipated that there will be related programs and program evaluations being carried out by the government agencies either in-house or through the use of an outside consultant or contractor. Discuss the nature and form of the relationship you see with them. How will you ensure that the necessary coordination, avoidance of duplication, overlap, or gaps, etc., is accomplished?

II.3.2 To some extent, it is expected that individual companies (e.g., manufacturers of products which are the subject of program experiments), industry associations, and others may desire or require a liaison relationship. Comment.

II.3.3 Reporting and liaison relationships may arise with individuals and organizations with professional interests (e.g., professional societies, conferences, professional journals, consumer or public interest groups) in the program or program evaluation. Discuss.

II.3.4 It is anticipated that another ("commercial impact") contractor will be primarily responsible for coordination with individual companies, etc. Comment. (AGENCY IMPACT ONLY)

II.3.5 It is anticipated that the bidder will be primarily responsible for coordination with individual companies, etc. Comment. (COMMERCIAL IMPACT ONLY)

II.4 Approvals and Acceptances

This sub-factor measures the bidder's understanding and acceptance of the necessity for progressive and substantial approval and acceptance during each phase, as well as at the end of each phase.

II.4.1 It is intended that the formal approval and acceptance of the work of the contractor for each phase will be based, primarily, upon the several reports submitted during and at the end of the phase, with final approval at the end of the phase. It is intended, however, that this final approval and acceptance will be largely a formal confirmation of already established acceptable performance and/or results. This is required not only to overcome the substantial delays of tandem or sequential review, but also to avoid rework, redesign and argument under pressure of time and after the fact. You should discuss your understanding of this, the advantages and disadvantages, and your willingness to accept the contractual and schedule implications, that is, that this means that the delivery dates are dates of delivery of approved items, not merely dates for submission of items with an open time term.

III. Objectives

This factor is a measure of the bidder's overall understanding of the objectives of this procurement (and related programs).

III.1 ETIP Evaluation Objectives

This sub-factor is a measure of the bidder's understanding of the specific objectives of this procurement.

III.1.1 The specific objectives for this procurement, and related objectives, including the overall objectives of ETIP, appear in various forms in the several parts of this bid set, and in other sources, and reflect a variety of authors, circumstances and purposes. It is proposed that it is neither necessary nor desirable for ETIP to prepare a single, integrated, fully rationalized, and "authoritative" statement of the objectives for the guidance of the bidders (or the successful bidder). Comment on why you believe this is (or is not) justified?

III.1.2 It is expected that the various stated objectives may not appear (or be) consistent; how will you handle this? For example, a high credibility (a priori proposition testing) evaluation of a specific experiment is desired but it is not possible to achieve this (with reasonable time and money). For example, a complete and candid description of how a particular experiment was carried out may reflect gross incompetence or dereliction on the part of specific ETIP (or program administrative agency) personnel. For example, the results of a particular evaluation may disclose a systematic defect in the past performance of the agency (or a contractor).

III.1.3 It is anticipated that, for a particular experiment, there may be as many as four parallel objectives: a) to describe what happened, what went well, what went wrong; b) to determine whether the result was "caused" by the experimental manipulation; c) to demonstrate the ability to "evaluate" scientifically with credible results; d) to claim credit for the experiment and/or the results. How does one determine the relative importance of these several objectives for a specific experiment over the set of all comparable experiments?

III.1.4 It is anticipated that ETIP evaluation objectives or priorities may shift during the course of the evaluation effort. How does one ensure that he will be sensitive to such shifts and how does one deal with such shifts? How would you go about improving the clarity of ETIP's evaluation objectives?

III.2 Program Administrative Agency (PAA) Objectives

This sub-factor is a measure of the bidder's understanding of the specific objectives of the program(s) and/or experiment(s) that are to be evaluated.

III.2.1 Questions comparable to those suggested under III.1 may appear here. Comment. What special problems, if any, do you anticipate because of the multiple PAA?

III.2.2 How will you reconcile conflicts between ETIP and the program administrative agency objectives for a particular experiment? PAA objectives for the experiment and other PAA objectives? What kinds of problems will come up? How do you plan to deal with them?

III.2.3 It is anticipated that, during the period that the work on this contract is accomplished, there may be changes in policy or procedures or of key personnel of the program administrative agency. How will you deal with this? For example, the "results" of a particular experiment may be sufficiently "obvious" to the agency to no longer make necessary any further evaluation. Will a continuation of the evaluation be undertaken under any circumstances? And, if so, how would you justify it and/or obtain agency cooperation?

III.2.4 Suppose the agency adds new objectives or objectives not presently contemplated are uncovered which represent potentially significant changes in the direction or scope of the present evaluation program? How will you react to this?

III.2.5 It is anticipated that another ("agency impact") contractor will be primarily responsible for examining the objectives of the PAA. Comment. (COMMERCIAL IMPACT ONLY)

III.3 Other Relevant Objectives

This sub-factor is a measure of the bidder's understanding of relevant and related objectives, goals, criteria, standards, and the like, including the state of the art in administrative experimentation (and/or evaluation).

III.3.1 It is proposed that the objectives of ETIP and PAA do not exist in isolation, that both specific and general objectives of a wide variety of other individuals, organizations, and larger communities will necessarily interact with the present program. For example, personal and career objectives of key individuals. For example, political, social, and legal objectives of the federal government. For example, objectives expressed or implied in the state-of-the-art and professional standards in experimental and evaluation research. Of what significance are these, and how do you expect to deal with them?

III.3.2 Your understanding of the state-of-the-art, particularly in administrative experimentation and/or evaluation, will be measured by your discussion of relevant questions raised elsewhere. If you consider it appropriate, you may discuss this here, and you may wish to cross-reference significant material which appears elsewhere.

III.3.3 Are there relevant professional standards in experimentation that you must observe that may conflict with ETIP or PAA objectives? How will you handle this? You may wish to relate your answer to II.3.

III.3.4 It is anticipated that another ("commercial impact") contractor will be primarily responsible for examining the objectives of individual companies and others in the commercial sector. Comment. (AGENCY IMPACT ONLY)

III.3.5 It is anticipated that the objectives of individual companies, associations, etc., may significantly affect not only the experiments and their evaluation but also the activities of the bidder. Comment. (COMMERCIAL IMPACT ONLY)

III.4 Phase Two Objectives

This sub-factor is a measure of the bidder's ability to anticipate the incorporation of the results of Phase One in the restated objectives for Phase Two.

III.4.1 It is proposed that, as a result of the work in Phase One, a reasonable description and integration of the several objectives will have been realized, and that this will be used as a basis for the several other tasks but also as a basis for refinement, revision, and additions during Phase Two. In addition to this continuing interest in the objectives introduced in Phase One, it is proposed that a separate objective of Phase Two is to design and test a prototype of the complete evaluation process necessary to meet the several objectives. It is expected that this may include at least two separately identifiable parts, as follows: a basic evaluation process to include those evaluation activities which deal with key, predictable, identifiable, continuing, common objectives for which the process can be "institutionalized"; and a special evaluation process to include those evaluation activities which do not meet the above requirements because of specialized, one-time, or changing objectives. If you believe your discussion elsewhere does not adequately reflect your understanding of this, you may comment here.

III.4.2 What activities during Phase One will be expected to contribute to the refinement of Phase Two objectives? What other sources may be expected to provide input? You may wish to cross-reference your comments under IV.4, or elsewhere.

III.5 Phase Three Objectives

This sub-factor is a measure of the bidder's ability to anticipate the reformulation of objectives in Phase Three.

III.5.1 In addition to a continuation of the concern with the objectives of the previous two phases, it is proposed that the objective of Phase Three will be to provide a firm basis for any further related evaluation efforts, including any of the following: a) a standby or "how to" capability to design and carry out evaluations for comparable future experiments; b) an on-line, turnkey data gathering and analysis process which might be implemented by the PAA; c) an assessment of the need (or lack of need) for other specific or general future evaluation efforts. How realistic do you think this is, and to what extent will the prior phases prepare you to successfully define and then meet these objectives?

IV. Background Information

This factor is a measure of the bidder's overall understanding of the background and characteristics of this procurement.

IV.1 ETIP

This sub-factor is a measure of the bidder's understanding of ETIP and the specific program(s) and/or experiment(s), in terms of past history, present status and plans for the future.

IV.1.1 Analogous to the comments in III.1.1, it is not proposed to provide a complete and comprehensive description of ETIP and the specific program(s) and/or experiment(s) for the guidance of the bidders (or the successful bidder). Discuss the adequacy of your present understanding of ETIP and the specific programs; if you believe it is not adequate, how do you propose to correct this consistent with the requirements of Phase One?

IV.1.2 It is assumed that a reasonably complete and current description of at least the specific program(s) and/or experiment(s) will be desirable, if not necessary, during Phase One (and, perhaps, on a continuing basis) for use not only by the bidder but also by ETIP. How can this be accomplished? What forms and procedures do you visualize will be used to provide for an up-to-date record? How will inputs (revisions) be made? How will outputs be available?

IV.1.3 The availability of such an information base (and system) would necessarily increase the opportunities to make corrections in ongoing activities (experiments) and may suggest other improvements and changes in the program. To what extent do you see it as your responsibility to facilitate this process? What effect would these additional changes have on your evaluation work?

IV.1.4 Discuss your understanding of the overall set of programs and/or experiments to be evaluated, including at least the following: the set of individual product procurements under life cycle costing (LCC) both planned and implemented; the FSS decision to adopt LCC as a procurement practice; the several workshops and the training program as planned and implemented in all FSS offices around the country, other planned or implemented procurement experiments, such as value incentive contracting. Can these be described or modeled in such a form as to disclose their interactions, or, conversely, can specific experiments or programs be defined in such a way as to allow separate treatment?

IV.2 Program Administrative Agency (PAA)

This sub-factor is a measure of the bidder's understanding of the program administrative agency (and, where appropriate, its subelements or related organizations), its organization, policies and procedures.

IV.2.1 Questions comparable to those suggested under IV.1.1 may appear here. Comment. What special problems, if any, do you anticipate because of the multiple PAA?

IV.2.2 As a further restatement of the above, if you do not have a present acquaintance with the program administrative agency (and its constituent elements), how will you acquire the necessary background?

IV.2.3 At least some parts of the organization, policies, and procedures of the program administrative agency will be critically related to the present program. For example, those elements directly involved in the experiments, and procurement policies and procedure. Discuss your understanding of these areas. If you do not have prior experience, what effect will this have on your capability?

IV.2.4 It is anticipated that another ("agency impact") contractor will be primarily responsible for obtaining information about and access to the PAA. How will you deal with this? (COMMERCIAL IMPACT ONLY)

IV.3 Other Relevant Background

This sub-factor is a measure of the bidder's understanding of the programs, organization, policies and procedures of other relevant organizations.

IV.3.1 It is anticipated that information about and access to organizations other than ETIP and PAA may be important to this program. For example: other government agencies which are the end users of the products procured; other government agencies with legal, financial, policy, or other responsibilities which interact with the program area; specific companies, industry segments, and industry associations; consumer organizations, safety, advertising, news media, and the like; other ETIP or PAA program or evaluation contractors. Discuss your understanding of the potential effects of these interactions and how you will deal with them.

IV.3.2 It is anticipated that another ("commercial impact") contractor will be primarily responsible for obtaining information about and access to individual companies and others in the commercial sector. Comment. (AGENCY IMPACT ONLY)

IV.3.3 It is anticipated that the bidder will be primarily responsible for obtaining information about and access to individual companies and others in the commercial sector. Comment. (COMMERCIAL IMPACT ONLY)

IV.4 Phase Two Background

This sub-factor is a measure of the bidder's capability to prepare a comprehensive framework or model of the program(s) and/or experiment(s) and the evaluation process.

IV.4.1 It is anticipated that, after Phase One, the bidder will be capable of preparing a formal framework within which the objectives, organizations, and programs may be related to the evaluation process. Such a framework would not only integrate the background from Phase One but provide a convenient and efficient capability for revision, additions, and modifications without having to start over again. Comment on the feasibility of this; if you can, suggest how this might be done or how one would determine whether it was successful or not? You may wish to cross-reference your comments on III.4.

IV.4.2 Will the distinction between agency impact and commercial impact require significantly different frameworks? If two separate frameworks are developed, to what extent will it be necessary and/or feasible and/or desirable to relate the frameworks?

IV.4.3 Discuss the same question with respect to the distinction among the several PAA.

IV.5 Phase Three Background

This sub-factor is a measure of the bidder's awareness of possible further refinements in the model necessary for the continuation of the evaluation process.

IV.5.1 It is proposed that the model, and its supporting descriptive material would provide a sufficient basis for a turnkey operation so that PAA personnel could, with modest specialized assistance, carry out on-going evaluations for comparable programmatic extensions. Comment on this.

IV.5.2 It is anticipated that the specific PAA would be primarily interested in, and, be, logically, the appropriate organization to manage, the on-going "agency impact" evaluation system (or that part concerned with the specific agency). Comment. (AGENCY IMPACT ONLY)

IV.5.3 It is anticipated that significant parts of the "commercial impact" evaluation system may already be within the present capability (or future plans) of related organizations (e.g., Department of Commerce, industry associations, etc.). What advantages or disadvantages do you see in this possibility, and how will you react to it? (COMMERCIAL IMPACT ONLY)

V. Evaluation Design

This factor is a measure of the bidder's capabilities to carry out the evaluation design requirements.

V.1 Exploratory (Descriptive) and A Priori Proposition Testing Hypotheses, Variables and Parameters

This sub-factor is a measure of the bidder's ability to define the detailed evaluation objectives.

V1.1.1 It is proposed that the various evaluation design requirements will include problems ranging over several dimensions, and combinations of dimensions, including the following: a) from exploratory and/or descriptive evaluations (e.g., how did a specific experiment get started; what happened; what are the more significant secondary effects) to a priori proposition testing (e.g., did specific intervention X "cause" the observed result Y); b) from very specific, identifiable experiments (manipulations and/or effects) to general, diffuse, overall changes; c) from post hoc evaluations of completed experiments through evaluations of ongoing experiments, to planning and design of future experiments. Comment on your understanding of this.

V.1.2 At least initially, the bidder will be called upon to accomplish a preliminary systems design or study. If your evaluation experience has been primarily in response to detailed evaluation requirements provided in the RFP or RFQ, discuss the relevance of your experience or capability to the requirements of this program.

V.1.3 Discuss your approach to the detailed definition of a research (or experimental or evaluation) problem; comment on theory building, definition of variables and parameters, etc. If considered necessary, distinguish the approach to a priori proposition testing from that used in exploratory and/or descriptive evaluation.

V.2 Experimental and/or Study Designs

This sub-factor is a measure of the bidder's ability to define the overall experimental and/or study design.

V.2.1 Discuss the problem(s) of and approaches to experimental and/or study design. Alternatively, you may wish to demonstrate your capability by reference to the relevant education and experience of your staff. It is suggested that you may wish to distinguish among the several kinds of designs which may be appropriate for meeting the several kinds of objectives which are the outcome of the process discussed in V.1.

V.2.2 Discuss the problem(s) of and approaches to identifying and controlling for the potential effects of parameters.

V.2.3 it is proposed that the bidder can design an overall evaluation system and, in parallel, carry out evaluations of specific selected experiments during Phase One. Discuss the advantages and disadvantages of this. Can you identify specific experiments which can be evaluated during Phase One? Can you identify base-line data which can, or should, be collected during Phase One? which can, or should, be collected during later phases?

V.2.4 To what extent do you see differences among the several PAA which will affect the design of the evaluation system? Will differences in the progress in initiating experiments among the several PAA be an advantage or disadvantage?

V.2.5 It is anticipated that some part or all of the bidder's activity in this area will be dependent upon the activities of another ("agency impact") contractor. How critical is this from a time point of view? from an interface point of view? Will segmentation (by industry, technology, market) provide advantages or disadvantages? to what extent will longitudinal designs be important, and will this be an advantage or disadvantage (COMMERCIAL IMPACT ONLY)

V.3 Data Collection Design

This sub-factor is a measure of the bidder's ability to design the overall data collection process, including sources of information, sampling strategies, timing, etc.

V.3.1 Discuss the various kinds of sources or methods of collecting information (e.g., observations, questionnaires, interviews, records) in terms of your expectations for their use here, and their advantages and disadvantages.

V.3.2 The nature and extent of the information required will, at least in some cases, require the development of sampling strategies. Describe, by reference to relevant experience, if appropriate, your capability to develop sampling strategies for a priori proposition testing evaluations. You may wish to discuss the approaches used for exploratory evaluation. You may wish to comment on some of the sampling strategies provided as illustrations in the several reference documents.

V.3.3 Discuss any special considerations which may be introduced by the differences among the several PAA.

V.3.4 It is anticipated that the evaluation of agency impact and commercial impact will require the obtaining of, in some cases, not only the same data but also separate additional data from common sources. How can this be coordinated to minimize duplication and, particularly, the burdening of sources?

V.4 Data Analysis Design

This sub-factor is a measure of the bidder's ability to design the overall data analysis process, including processing and analysis, and presenting results and recommendations.

V.4.1 It is proposed that this part of the process should be developed concurrently with those discussed in V.2 and V.3 instead of waiting until the data is collected. Comment on the desirability, necessity, and/or feasibility of this.

V.4.2 Specific individual experiments and specific exploratory studies may have not only different, but also severable analytical requirements (and discussion of these may more appropriately appear in VII). It is expected, however, that there may be some degree of overlap or interrelation among the several experiments and studies. To what extent would an overview of the overall process improve the ability to perform the individual analyses?

V.4.3 It is proposed that the quantity and variety of the various data collected (and to be collected in the future) present an opportunity for careful planning with respect to formatting identification, quality control, standardization, etc. To what extent do you think this is necessary and/or feasible? To what extent can compatibility be achieved with related existing data banks?

V.5 Phase Two Evaluation Design

This sub-factor is a measure of the bidder's ability to redefine the detailed experimental and/or study design to reflect the results of Phase One, the several objectives, and model of the process in a comprehensive detailed design to meet both basic data (base line data) and special data requirements.

V.5.1 Discuss, or, if appropriate, cross-reference discussions elsewhere of, your understanding of the problems outlined in V.1 through V.4 as applicable to Phase Two, and with reference to the requirements of Phase Two.

V.5.2 It is anticipated that the bidder will provide a comprehensive and detailed design of an evaluation system which will provide a capability for both basic and special evaluation. Discuss your present understanding of the form and/or extent of the evaluation system. Discuss the advantages and disadvantages of prototype testing the system by evaluating specific procurement or other experiments?

V.6 Phase Three Evaluation Design

This sub-factor is a measure of the bidder's ability to further redefine the above, to provide for a detailed design, and necessary supporting materials, which would allow an on-going evaluation process.

V.6.1 Discuss or, if appropriate, cross-reference discussions elsewhere which demonstrate your ability.

V.6.2 Discuss your understanding of what will be necessary to meet turnkey requirements. What consideration of agency policies and procedures will be required? How will the necessary skills and experience be transferred? How will previously collected data be transferred? What conversion of instruments and software will be required? What will be the effect of on-going evaluations of specific experiments on the transition process? and vice versa?

VI. Data Collection Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the acquisition of data on the variables and parameters of interest.

VI.1 Instrument Design

This sub-factor is a measure of the bidder's ability to develop (and test) the various questionnaires, protocols, schedules, and the like required for data collection.

VI.1.1 Discuss (you may use an example and/or reference to prior experience) the problems and solutions which you consider critical (and/or characteristic) in instrumentation for an a priori proposition testing type of evaluation.

VI.2 Discuss the differences, if any, in the approach to descriptive or exploratory evaluation.

VI.1.3 Under what circumstances, and for what purposes, will you conduct pilot tests? Validation tests?

VI.1.4 It is anticipated that some variables of interest will be of ongoing importance (as key variables or parameters common to a number of experiments, or as key exploratory or descriptive variables) in a sense comparable to "social indicators" and will become part of what will be known as "basic data" in future phases. To what extent can this be anticipated, and what difference will this make during this phase?

VI.1.5 Discuss your understanding of the special requirements, if any, which a government agency (or its contractor) must meet before use of instruments for data collection.

VI.1.6 What advantages or disadvantages are introduced by relevant or related existing data banks in terms of the instruments they use (e.g., various definitions of industry classifications, kinds of technology, etc.)?

VI.2 Information Sources

This sub-factor is a measure of the bidder's ability to identify the various information sources, and to gain access.

VI.2.1 Discuss the important or critical problems you anticipate in this area and your capability to deal with them.

VI.2.2 Discuss the various strategies for identifying sources of information. Distinguish, if appropriate, between sources of information needed for evaluating a specific experiment with those to be used for a broad descriptive (case) study.

VI.2.3 Discuss the issues of confidentiality and privacy with respect to information obtained from individuals. Discuss the issues related to information, in general, with restrictions on dissemination, e.g., proprietary information, certain types of personnel and financial information.

VI.2.4 Discuss the issues involved in access to individuals and to records. A special issue of concern is the demands on the time of individuals in the program administrative agency, and others who may have a considerably less direct interest in the evaluation.

VI.2.5 Much background and parametric information may be available in some form, in existing records which have been collected for some other purpose; how will you identify these and what advantages or disadvantages do they present?

VI.3 Data Collection

This sub-factor is measure of the bidder's capability to organize, staff, train, direct and control the personnel who obtain the data by survey, interview, observation, or use of records.

VI.3.1 It is anticipated that the several requirements for data collection may require different skills, different organization, and different methods of supervision and control. Discuss by example or reference to prior experience your capability in this regard.

VI.3.2 With reference to the question asked in VI.1.4, what difference in approach would be warranted with respect to "basic data"?

VI.3.3 Discuss or describe the process for handling data collection (e.g., flowcharting). Discuss problems of monitoring and evaluating data quality, of privacy and confidentiality, of machine acceptable versus non-machine acceptable data (e.g., unstructured interviews).

VI.4 Phase Two Data Collection

This sub-factor is a measure of the bidder's ability to anticipate the requirements of the Phase Two collection of both basic (base line) and special data.

VI.4.1 It is proposed that the bidder will be able to institutionalize the collection of basic data (i.e., key variables and parameters common to a number of present or expected experiments, or key exploratory or descriptive variables) during this phase; from this, base line data can be obtained and a "test" of the process can be accomplished. Comment on this.

VI.4.2 It is proposed that there will remain other requirements not included within the above (e.g., specific one-time requirements, unusual or specialized requirements; added or revised requirements) which cannot or should not be commingled with the above. Discuss this.

VI.5 Phase Three Data Collection

This sub-factor is a measure of the bidder's ability to plan against the requirement to design an ongoing collection process.

VI.5.1 At least the basic data collection process should be sufficiently stabilized and described to allow an ongoing, turnkey implementation. Discuss the problems and prospects of this.

VI.5.2 To what extent can new or other specialized requirements be anticipated?

VI.5.3 Discuss any special problems with respect to access, privacy, confidentiality, etc., which may be introduced when an agency takes over management and operation of the evaluation system.

VII. Data Analysis Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the analysis of the data and to present the results and recommendations.

VII.1 Analysis

This sub-factor is the measure of the bidder's ability to identify and apply the appropriate analytical (including statistical) techniques to the data collected.

VII.1.1 Discuss, by example or reference to prior experience, your ability to accomplish the various analytical tasks involved.

VII.1.2 For at least some experiments (and/or policy changes), a significant if not primary objective is economic. Discuss your capability in analysing "cost/benefits," including problems introduced by estimating, allocating, and forecasting costs and benefits, both direct and indirect.

VII.1.3 For at least some experiments (and/or policy changes), a significant if not primary objective is to bring about some change in the policies and procedures of either the program administrative agency or of segments of the industry. Discuss your capability in analysing administrative (behavioral) changes.

VII.1.4 For at least some experiments (and/or policy changes), a significant if not primary objective is to bring about some change in the use of technology - change in the rate, application, etc. Discuss your capability in analysing technological change.

VII.2 Exploratory (and/or Descriptive) Findings

This sub-factor is a measure of the bidder's capability to identify and present exploratory findings.

VII.2.1 It is anticipated that in many areas of the evaluation, it will be neither required nor feasible to develop findings which meet the more stringent formal requirements of a priori proposition testing. To what extent do you consider it your responsibility to reexamine cases where there is no requirement, especially where it appears that a priori proposition testing is feasible?

VII.2.2 You may wish to comment on some of the requirements as presently described in the several reference documents.

VII.2.3 You may wish to discuss the various forms of presentation (i.e., case studies, informal reports, status reports, systems studies, etc.)

VII.2.4 In addition to exploratory (and/or descriptive) findings with respect to experiments (and their related parameters and background), it is proposed that the evaluation system design is, itself, an exploratory or descriptive "finding." What differences, if any, will be required in the presentation and related supporting documentation or justification of the evaluation system design?

VII.3 A Priori Proposition Testing Findings.

This sub-factor is a measure of the bidder's capability to identify and present a priori findings.

VII.3.1 It is anticipated that not only specific experiments (at least in terms of their proximal effects or impacts) but also other specific questions which may be subject to study or experiment will require (and it will be feasible to accomplish) a priori proposition testing evaluation. To what extent do you consider it your responsibility to re-examine cases where there is no requirement? Cases where there is a requirement, but it is not feasible?

VII.3.2 You may wish to comment on some of the requirements as presently described in the several reference documents.

VII.3.3 You may wish to discuss the various forms of presentation.

VII.3.4 Do you think it is desirable and/or feasible to develop a procedure or process which can be used to make preliminary assessments of the likelihood that a particular proposed experiment will be capable of a priori proposition testing?

VII.4 Recommendations

This sub-factor is a measure of the bidder's understanding of the relationship between the results of Phase One and the work in Phase Two, in terms of additional, revised, or deleted hypotheses, changes in objectives or background information, and the relative feasibility and/or usefulness of alternative designs for evaluation.

VII.4.1 In addition to the specific findings discussed in VII.2 and VII.3, it is anticipated that the work in each phase will provide a basis for the work in subsequent phases. It is anticipated that this input to the next phase may become available before the completion of all of the work in the current phase. Comment on the feasibility of an overlap, the advantages and disadvantages.

VII.4.2 It is anticipated that a "final report" will be prepared at, or after, the completion of each phase which will describe what the bidder sets out to do, what he did, including relevant activities of others, and the results (VII.2, VII.3, VII.4). Comment on the relation of the final report to the several other forms (and timings) of outputs.

NUMERICAL WEIGHTS FOR PROPOSAL EVALUATION FACTORS

| | <u>Factors</u> | <u>Weights</u> |
|------|---|------------------|
| I. | Management

This factor is a measure of the background and overall management capability of the bidder. | 15 |
| II. | Reports and Reviews

This factor is the measure of the bidder's ability to assure that the Government is able to effectively and progressively review a very large scale effort with a minimum of people, and of the bidder's ability to coordinate his activities with those of other related individuals and organizations. | 15 |
| III. | Objectives

This factor is a measure of the bidder's overall understanding of the objectives of this procurement (and related programs). | 20 |
| IV. | Background Information

This factor is a measure of the bidder's overall understanding of the background and characteristics of this procurement. | 15 |
| V. | Evaluation Design

This factor is a measure of the bidder's capabilities to carry out the evaluation design requirements. | 15 |
| VI. | Data Collection Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the acquisition of data on the variables and parameters of interest. | 10 |
| VII. | Data Analysis Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the analysis of the data and to present the results and recommendations. | 10 |
| | Seven Evaluation Factors | Total <u>100</u> |

SCOPE OF EFFORT

Introduction

A. Purpose

The purpose of this document is to provide a guide to the bidder in the preparation of supporting data on the scope of effort he proposes.

B. Basis for Preparation of This Document

This document is intended to be used in conjunction with the associated Proposal Preparation Procedure, Proposal Evaluation Factors, Schedule, and Statement of Work. The objective is to assist the bidder in presenting his supporting data on scope of effort in an orderly and usable form so that it may be evaluated concurrently with his written (and oral) proposal.

B.1 In order to achieve an orderly and usable form, the supporting data on scope of effort must be, at least substantially, related to the factor (and sub-factor) categories which are the basis for the evaluation. The detailed outline furnished in the next section is for this purpose.

B.2 In addition to the above, it is necessary to assure that the data furnished by the several bidders be on a reasonably comparable basis. To accomplish this the detailed guidance included in this Introductory Section is furnished. It should be understood that the guidance in this respect is necessarily arbitrary in the interests of meeting the specific objective.

B.3 The format requirements reflect the fact that evaluation team members need, and can use, only selected data, primarily in terms of man/months of effort in certain areas and certain materials costs. A summary analysis of the scope of effort against cost data will be accomplished.

C. General Comments

To assist the bidder in understanding more fully the part which these data will have in the evaluation, these general comments are offered.

C.1 This type of program which establishes a broad objective but provides for planning and design to work out with more detail and precision the means for accomplishment cannot be costed with the closeness normally experienced on procurements of items with a stabilized design. For this reason the bidders' respective total cost estimates will not necessarily reflect the actual realized costs to the government, nor do they necessarily reflect the relative costs of the bidders in providing a comparable capability. Therefore, relative total cost, as such, cannot and will not be given any direct weight in the evaluation. Cost, in terms of scope of effort, however, will aid in establishing the kind and extent of effort, and this information will serve to further define the "word-pictures" included in the written (and oral) proposals. The formal evaluation of relative cost and associated areas is included as part of one of the major factors in the evaluation (I.4), and further reference should be directed there.

C.2 While the major impact of these data in the evaluation will be in providing additional perspective to the written (and oral) proposals, certain corollary information will be used.

C.2.1 A measure of how realistically and thoroughly the costing has been done will be established. A too high estimate indicates the obvious disadvantages of "gold plating" or a potentially loose operation. In contrast, however, a too low estimate presents, in the long run, even more serious disadvantages. First, it may indicate a serious misunderstanding of the scope and objective of the program. Second, it may raise a serious question as to the bidder's ability to plan and estimate costs, thus impairing his ability, and that of the government, to review, predict and control costs. Finally, it may indicate something less than complete candor in presenting the cost part of the proposal.

C.2.2 The data presented here will be used to supplement the data furnished with respect to cost as a factor in the overall evaluation.

C.2.3 The data presented here will be used in negotiation with the successful bidder both as a basis for further refining the contractual statement of work and in establishing the contract price.

D. Use of Format

D.1 It is of critical importance that all persons directly or indirectly preparing data on scope of effort be thoroughly familiar with the rules on use of the format. This is especially true because the figures to be included do not, in all cases, follow the accounting distinction between direct and indirect costs. Further, certain types of effort are to be tabulated as separate items. An effort has been made to use format and terminology as close to the general practice as possible. Where this has not been done, the basis has been to assume that useful data for the evaluation can be obtained. Certain distinctions, such as direct and indirect costs, have little significance for this purpose. Similarly, certain areas of effort can only be evaluated if separated from proportionately large associated areas of effort.

D.2 The next section specifies the scope of effort data on a factor by factor basis. To facilitate the evaluation, these data should be collated with the respective factors. Because the procedure for evaluation provides for each factor to be evaluated, substantially, without mandatory recourse to other parts of the proposal, it is critically important that the data on scope of effort and the written proposal on a specific factor, taken together, is complete and self-explanatory. Care must be exercised to assure that the evaluation team does not inadvertently penalize the written proposal because of an inadequate scope of effort.

D.2.1 Under each factor, the scope of effort should be set out separately for the first phase of the program. Where the bidder proposes to begin or complete items in another phase, note should be made to avoid misunderstanding.

D.3 It is expected that in many instances the scope of effort proposed will be, literally, the bidder's present estimate of the approximate level (or scope) of effort he expects will be required to accomplish what he proposes to do in his written (and oral) proposal. A certain latitude is expected, and these data on scope of effort will be used, as stated before, primarily to assist the evaluation team in understanding what the bidder is actually proposing. There are, however, certain areas which may prevent a clear understanding, and some of these are tabulated below.

D.3.1 The breakdown in the next section is a minimum guide in tabulating the scope of effort. Where a particular figure is considered unusually small or large, or for some other reason may be misleading, it should be footnoted with an explanation or further breakdown.

D.3.2 In some cases identification of particular types of effort with a proposed "associate" or subcontractor will be of assistance. This will be particularly true where part or all of an effort is proposed to be accomplished by some specialist group.

D.3.3 The analysis of comparative cost advantage will not be accomplished, as a separate factor, by the overall evaluation team. It is necessary, however, where a bidder is estimating costs which are, on a relative basis, low that the basis for this be included in the scope of effort data to assure that the evaluation team understands that the bidder does intend to accomplish what he has said in his written proposal.

D.3.4 Conversely, where a possible misunderstanding may occur due to a lack of appreciation by the evaluating team of the cost associated with accomplishing a particular part of the proposal, the bidder should make this clear.

D.3.5 Man/month estimates should be divided according to distinct classes to avoid confusion or ambiguity in two respects. First, the bidder's data should distinguish between direct and indirect. Second, the data should distinguish between senior professional personnel and supporting technicians, draftsmen, etc., and between various management personnel and clerical assistance, etc.

D.3.6 Any further analysis considered necessary to assure that the evaluation team properly assesses the relative scope of effort as related to the written proposal is encouraged. This may be particularly true in terms of level of training of personnel, availability of facilities, ability to control design, and the like.

E. Summary Data

E.1 The relationship of the individual scope of effort on the several factors to the bidder's overall cost estimate will be examined. For this purpose, certain summary data will be required. These summary data should be furnished as a separate document which should also include a complete reference set of the scope of effort data sheets.

E.2 Basic summary data will include presentation of sub-total and total cost estimates in standard format - direct costs, burden, materials, G&A, fee, etc.

E.2.1 These summary sheets should be accompanied with notes reconciling the scope of effort data sheets. Any unusual data should be explained.

E.3 If the proposal includes a substantial proposed sub-contracting (or "associate") cost figures, a summary analysis should be prepared and related to the basic summary data.

E.4 Supporting schedules should be prepared detailing the hourly wage rate of personnel and this related to the basic summary data.

E.5 Supporting schedules should be prepared for travel costs and related to the basic summary data. Schedules should include breakdown based on distance (or destination), duration, number of travelers, and number of trips. Similarly, supporting schedules on telephone (and teletype) by number of calls, and average cost per call.

Phase One Scope of Effort

Note: The detailed organization parallels the organization of the Statement of Work, Schedule(s), and Proposal Evaluation Factors, reference to which should be made for clarification.

I. Management

(Note that the scope of work here is limited to administrative or program management, and should be distinguished from effort properly reported under other factors.)

Program Director M/M

Senior Management Advisors M/M
(Include general officers, or other senior corporate personnel, concerned with administrative management policy, if appropriate)

Other (specify) M/M
(Include comparable personnel of associates, subcontractors, consultants, if appropriate; include program director's personal staff, if any)

Scheduling M/M
(Include costs of analysis, preparation, monitoring, etc.)

Costing M/M
(Include costs of analysis, preparation, monitoring, etc.)

Telephone \$
(Include telephone, teletype costs, etc., and breakdown by number of calls, etc., if appropriate)

Travel \$
(Include breakdown by destination, duration, breakdown by number of trips, if appropriate)

II. Reports and Reviews

(Note that you should distinguish efforts properly attributable to other factors.)

Liaison with ETIP M/M
(Include time spent in conferences or visits both at ETIP and contractor's plant, or elsewhere breakdown by number of trips, duration, number of travelers.)

Liaison with PAA M/M
(Include on same basis.)

Liaison with Others M/M
(Include on same basis.)

Reports and Services M/M & \$
 (Include time spent in direct preparation, technical writing, drafting, etc., and costs of reproduction. Breakdown by type of report, etc., if appropriate.)

III. Objectives

Review of objectives M/M
 (Breakdown between documents and interviews, and among ETIP, PAA, industry, and others.)

Preparation of description and analysis M/M
 (Breakdown among ETIP, PAA, industry, and others.)

Preparation of preliminary recommendations M/M

Preliminary requirements for pilot evaluation system M/M

Preliminary requirements for prototype evaluation system M/M

Travel \$

IV. Background

Review of background M/M
 (Breakdown between documents and interviews, and among experiments, programs and organizations.)

Preparation of framework model M/M

Travel \$

V. Evaluation Design

Preliminary Design M/M

Detailed Design M/M

Preliminary design of pilot evaluation system M/M

Preliminary design of prototype evaluation system M/M

VI. Data Collection Process

(Note that you should distinguish data collections which may have been included under prior factors)

Design and development of data collection process M/M

Data collection for exploratory evaluations M/M

| | |
|--|-----|
| Design and pilot test of instruments | M/M |
| Data collection for a priori proposition testing evaluations | M/M |
| Travel
(Breakdown, as appropriate, between exploratory and a priori proposition testing evaluations; provide, as appropriate, basis for estimating in terms of trips, etc.) | \$ |
| Telephone, postage, etc.
(Breakdown, as above.) | \$ |

VII. Data Analysis Process

(Note that you should distinguish from effort included with Factor II.)

| | |
|--|-----|
| Design and development of data analysis process | M/M |
| Exploratory analysis and findings | M/M |
| A priori proposition testing analysis and findings | M/M |
| Analysis of evaluation system, and recommendations | M/M |
| Analysis of Phase One, and recommendations | M/M |

Phase Two and Three Scope of Effort

Phase Two

It is not expected that the bidder will be able to provide a comparable level of detail for Phase Two. However, a rough estimate will be useful in assessing those references to Phase Two in the proposal, and in planning.

The minimum required breakdown is to distinguish between the following:

1. Those costs (labor, travel, etc.) directly a function of data collection and analysis for both basic and special data processes.
2. All of the remainder (management, design, etc.)

Additional information, consistent with these purposes, would be appreciated, but it is not required.

Phase Three

A similar distinction should be observed in providing estimates for Phase Three. It is expected that these may be more speculative, but where there are identifiable assumptions which will largely determine the scope of effort, discussion would be helpful.

APPENDIX B

Description of the PFE process

DESIGN AND PROCUREMENT
OF EVALUATION SYSTEMS

by

Charles W.N. Thompson.

Presented at the 1976 International Conference on Procurement and
Grants Management, Charlottesville, VA

DESIGN AND PROCUREMENT OF EVALUATION SYSTEMS

Charles W. N. Thompson, Associate Professor
Technological Institute, Northwestern University

INTRODUCTION

The subject of this paper is the description of a procurement process developed to meet a specific procurement problem, and which is currently in the process of being used to procure two evaluation systems by the Experimental Technology Incentives Program (ETIP), National Bureau of Standards, Department of Commerce. The two systems (see Figure I which outlines the design process each will go through in parallel) are to provide an on-going capability to evaluate the agency impact and commercial impact, respectively, of a series of procurement experiments initiated in the Procurement Policy Area of ETIP and being carried out in cooperation with, and under the direction of, several governmental procuring agencies. These experiments, which are not the direct subject of this paper, are designed to test specific improvements in the methods used by governmental agencies to procure products, with specific emphasis on methods which will increase the utilization of new and improved technology and achieve economic savings and better performance. The procurement process to be described here was not part of the set of procurement experiments but has become an "unintended experiment" itself.

This paper is the first published report (known to this writer) which describes the process, although it was first developed and used nearly twenty years ago. In the sections which follow, a brief historical background is furnished, followed by two sections describing the process, a discussion of the salient characteristics of the process, applications of the process, and related theory.

The generic reference to the "procurement process" reflects one of the unsolved problems, that of giving it a descriptive name. The earliest references, when a name was required, were a choice among "Project Level Systems Management," "Proposal Preparation Procedure," or the "Golden Fleece," a reference to the system to be procured. More recently the name "Parametric Factor Analysis" was used, but, while technically accurate, it uses terms which have a different, and specialized, technical meaning in a major discipline. Similarly, a number of other potentially descriptive terms (multi-attribute, discrete, independent, ranking, etc.) present problems. Recently a colleague of the writer referred to the process as "Thompson's Method" for want of a more convenient handle, but the problem remains.

BACKGROUND

One of the major periods in the development and application of methods for the procurement of large-scale weapons systems (and, later, space systems) began at Wright Field during the early 1950's with the introduction of the "weapons systems management concept" as an alternative to the parallel development under the direction of functional laboratories of the basic aircraft and its component "black boxes." The preference for "project management" over "functional management" was centered on the need to solve the problems of coordinating the

scheduling of development and achieving technical interface. During this same time there was a growing recognition that the aircraft was, itself, a "black box" part of a "system" designed to carry out a specific function or mission. From this point of view, any specific part ("black box") could be considered part of one or more systems, often overlapping (e.g., weapon system, logistics system, reconnaissance system, tactical or strategic warfare system, etc.), and should be designed (and procured) with consideration of its relation to the several systems of which it would be part. In the Electronic Reconnaissance Section, Aerial Reconnaissance Laboratory, the project engineers responsible for development of airborne equipment to intercept and analyze electronic signals from potential enemy radars and other emitters proposed to design and procure systems (called "subsystems") instead of "black boxes" but were faced with several problems. First, the requirements (or specifications) were constantly changing because of the need to respond to new developments in radar (and other emitters). Second, few laboratory personnel had any significant prior experience in designing or procuring systems. And, finally, equipment suppliers had little relevant experience (except, in some cases, as subcontractors to systems contractors). In this context, the procurement process to be described was developed and applied, initially, to two electronic reconnaissance and one weather reconnaissance subsystems. The original procurement exhibits were subsequently extended and incorporated into a manual for procurement. [14]

The application of this procurement process, developed for military hardware subsystems, to the procurement of an evaluation (software) capability was initiated about six months ago when the apparent similarity of the situations (and the problems) was first recognized. First, the evaluation requirements were not only constantly changing because of the on-going progress in the initiation and carrying out of procurement experiments but also included a wide variety of objectives ranging from very specific to very broad, and from immediate to long-range. Second, ETIP had, with the exception of the writer, little or no experience in systems procurement, and neither the time nor personnel to accomplish a problem or concept definition design. Finally, it did not appear that the "evaluation industry" had any significant present capability to design or manage an "evaluation system" to meet ETIP requirements. Based upon this opportune coincidence, the development of the procurement package and the organization of the procurement was accomplished with the close, and progressive cooperation of personnel of ETIP, the contracting office, the program administrative agencies, and others. In the next two sections, the procurement process is described in outline form in two parts. First, the detail development of the entire procurement process, which is incorporated into the "Proposal Preparation Procedure" [15] and associated documents. Second, a description of the proposal evaluation process itself, which is incorporated into the "Proposal Evaluation Procedure." [15]

PROPOSAL PREPARATION PROCEDURE

The initial step, upon recognition that this procurement process is appropriate, is to review what you "know" about the procurement. This is a kind of preliminary design or concept or problem analysis, and is in the form of the identification or listing of parametric factors (those conditions or limits which help to define what it is you are going to procure). These should include, for

example:

- a) an overall, if rough, schedule of the time available to let the contract, any early, specific outputs desired, beginning and ending of phases (if, for example, the program can be broken down into phases), key milestones, and the expected completion date;
- b) a comparable cost estimate, broken down, if possible, into allocations by phase, by major types of activity (e.g., study and design versus field data collection), or other rough divisions of effort;
- c) a preliminary outline description of what you want, preferably in terms of the kinds of things you believe need to be accomplished throughout the life of the program (process specification) rather than specific end products (or services);
- d) a preliminary identification of reference documents which may be useful to you (and, eventually, to the bidders) in further defining the program; and, finally, and perhaps one of the most important areas,
- e) identification of the key personnel who are presently concerned with the success of the program and who will be actively concerned in the future (and who will provide the basis for the evaluation team).

The next step is to refine the above set of parametric factors in the form of a series of statements describing the characteristics of a prospective bidder/contractor (in terms of understanding of the problem and/or capability to perform) which you believe critical to the successful carrying out of the program. This can begin by identifying major areas of concern or problem areas (e.g., management, program objectives, major technical problems or skill areas) or by listing specific critical problem areas (e.g., schedule and cost control, ETIP objectives, data collection design). In this process reference can be made to the results of the previous stage, or the progressive drawing upon contributions from individuals who will be members of the evaluation team, from program documents (including organizational descriptions of the objectives of the agency or of the specific program), and from other sources, such as prior proposal evaluation procedures. The specific concern is to obtain statements in the form of critical specific characteristics. It is desirable that these statements minimize overlap and gap, but this is not a critical requirement. For convenience of both the bidders and the evaluation team, the number of individual statements (of specific critical problem areas) should range from no less than twenty to no more than seventy. These individual statements (referred to hereafter as sub-factors) should then be grouped into (approximately five to fifteen) major areas of concern (hereafter referred to as factors) which reflect related problems (and related interests and skills on the part of evaluation team members). Because these factors (and sub-factors) will provide the central framework for the preparation of proposals and for the evaluation team, it is important that the focus be clear; for this purpose, additional, specific, illustrative questions can be added to each sub-factor.

An illustration of the results of this process is provided in the three tables at the end of this paper.

Using this framework of factors (and sub-factors), the "Statement of Work" [15] and "Schedule" [15] are prepared; this serves as a double-check on whether all the significant parts of the program are covered. The final key document is called "Scope of Effort" [15], and, in parallel with the above, it provides a framework for the bidder to present his estimate of how he will allocate manpower and dollars to the various parts of the program. If the program is to be divided into time phases, this may be reflected, as required, in the organization of the above documents. To these may be added copies of program descriptions, descriptive or amplifying notes, and any other documents which might be helpful to the bidders.

A summary description of the above, and detailed guidelines for the preparation of proposals, is incorporated in the "Proposal Preparation Procedure" [15], which, together with a description of the sub-factors and factors incorporated in a separate document called the "Proposal Evaluation Factors" [15], and the other documents noted above, makes up the procurement package which is appended to the formal part of the Request for Proposal. Where, as in the present case, the procurement process represents a significant departure from prior practice, it is considered desirable to hold two bidders' briefings, the first to allow prospective bidders to decide whether or not to bid and to prepare questions which can be answered at the second. For the same reason, and for the additional purpose of increasing openness, communication, and confidence, the "Proposal Preparation Procedure" [15] also describes briefly how and why the process was developed (where we are coming from) and how the proposal evaluation will be carried out (where we are going).

PROPOSAL EVALUATION PROCEDURE

The broad outlines of the procedure to be used for proposal evaluation are included in the "Proposal Preparation Procedure" [15] described above and which is provided to the bidders. In addition, members of the evaluation team receive a more detailed set of guidelines incorporated in the "Proposal Evaluation Procedure" [15]. (Note: At the time of this writing, the second bidders' briefing has been completed but proposals have not been received; the description which follows is, therefore, based upon the preparation for evaluation on this procurement, and in the perspective of prior experience.) The members of the evaluation team are drawn, as much as possible, from the set of individuals who will be concerned directly with the successful carrying out of the program which results from the award; where particular background or skills are necessary to the evaluation of a particular factor, others may be included. In all cases, membership is limited to those who accept responsibility for evaluating at least one sub-factor. The steps of the process include the following:

- a) individual preparation, in which members of the team become familiar with the entire RFP, receive copies of all of the key documents (and have access to all of the reference documents), and are invited to participate in the briefings of bidders;

- b) preliminary review, by individual members, of the proposals after receipt, and preparation of preliminary ratings (on at least specific, assigned sub-factors) from "Nothing can stop him..." to "No hope (totally unacceptable)" which will become part of the record;
- c) a series of sequential (factor team) meetings at which individuals responsible for the set of sub-factors within each factor agree on a single, aggregate rating of each bidder for each factor;
- d) the preparation of a summary of all of the factor ratings, together with a summary description, for final review, negotiation with the successful bidder, and award.

There are few restrictions on the judgment process of the individual team member; he may use prior information (but must disclose it to other team members); he must read the parts of the proposals directed to the sub-factors to which he is assigned, but he may read (and use) any or all other parts; he will know the identity of the bidders and, for that matter, will have access to any information any other member of the team has; he is required to put the results of his individual review in the record, but he may change his mind during the review by the factor team; and he may attend meetings of factor teams of which he is not a part.

While individuals are encouraged to do so, the factor team must rate each sub-factor, and the overall factor, by considering the bidder's comprehension or understanding of the problem presented, approach described or outlined, and present or potential capability to perform. They may cross-reference other parts of the proposal, and may draw upon the "Scope of Effort" [15] information as a check on what the bidder expects to do. There is no formal voting procedure, and no prescribed comparative weighting of the sub-factors; they may inquire into the basis for the position of a specialist in his area, they may record strong individual disagreements, and they are encouraged to add specific comments which would be useful in negotiation. Each factor team must continue until it has reached an agreement, which is then recorded on the same form, and with the same scale, that the members used in their individual review. Because these guidelines are critical to the factor team process, they appear not only in written form but are also reviewed (or even read aloud) at the beginning of each factor team meeting.

One of the few significant changes from the procedure as used previously is the substitution of written questions for an oral presentation. In the original procedure, each bidder was invited to make a brief oral presentation and to answer specific questions (both of which were recorded) from the evaluation team in order to assure that the team correctly understood what the bidder proposed and had sufficient information upon which to base a confident rating (whether in favor of or against the bidder). Because of the uncertainty of the number of bidders in the present procurement and insufficient time (if there were a large number), the procedure was changed to provide that members of the team could direct specific, written questions (through the Contracting Officer) to an individual bidder if necessary to clarify an ambiguity or to otherwise

make a confident rating possible.

COMMENTS ON THE PROCESS

The process described in outline form above has a number of features which, taken separately, probably are not novel or unique. The process as a whole, however, is considered a significant departure from present methods of procuring program evaluations (and evaluation systems or capabilities), and, at the time of its initial use for military hardware subsystems procurement, was a significant departure from even the then developing weapons systems procurement methods. In the paragraphs which follow some of the salient characteristics of the process will be identified or described, noting whether they are required or desired characteristics, what the alternatives are, and why this approach was used, as appropriate. Overall characteristics will be discussed first, followed by characteristics of specific parts of the process.

The first overall characteristic is that the process is designed to meet a particular kind (or class) of procurement problem(s), in terms of the procuring agency, the set of prospective suppliers (bidders/contractors), and/or the kind of thing to be procured. No claim is made that the process is applicable everywhere (e.g., advertised procurements), and this characteristic will be discussed further in the next section of this paper on "Applications."

The second overall characteristic is that the process is essentially pragmatic. It proposes that uncertainty be faced and not avoided, that where we know a lot about what we want that we use that knowledge, that where we are not sure or do not know that we disclose the state of our knowledge and try to develop the "best" description (which is likely to be a process rather than end product description) we can. And it proposes that we disclose this to prospective bidders, so that they can concentrate on providing us the "best" information available for the next step in the process--the selection of the contractor who will work with us.

The third general characteristic is that it is an open, explicit, cooperative process, recognizing the crucial importance of improving communication (both the content of the information shared and confidence in that information) among the several parties. Prospective bidders are provided, as much as possible, with all of the information available (with the narrow exception of that barred by law or regulation, and, of course, the evaluation team deliberations while they are going on), and both the bid set and the selection of reference documents are designed to facilitate their ability to prepare proposals (and to have confidence in the process). Similarly, the evaluation team (which, where possible, includes representatives of other agencies, such as "using agencies," with a significant interest in the success of the procurement, and others who may be interested in the process) has access to all of the information available, and each member is assured that his part in the process is preserved in the record and in the selection of the winning bidder.

The most salient specific characteristic of the process is the method of identifying and describing the factors and sub-factors which provide the basis for preparing proposals and for evaluating proposals. The process neither assumes

nor requires that any formal structure or framework exists for the object of the procurement; to the extent there is structure, it can be used, but the process is not dependent upon a complete and balanced description, or a set of inclusive and exclusive parts. Instead, the process treats each sub-factor as a separate "probe," obtaining a measure along a dimension (or viewpoint) of the whole program (or whole capability of the bidder), a measure which may, to some degree, overlap or intersect some other measure (sub-factor), and, when combined with all of the other measures, is intended to provide a set of measures which describe the program (or the capability of the bidder). The several advantages of this include the following:

- a) it is not required that all parts of the system be described or specified to the same degree of detail, each part can be described to the extent its description is known, parts which depend upon the prior definition of some other part can be defined as such, and even inconsistent parts (e.g., statements of objectives prepared at different times for different purposes by different people) can be included;
- b) it is not required that there be a major preoccupation with assuring that each factor (or sub-factor) be completely independent (and non-overlapping) with respect to others, allowing a concentration on "what it measures" rather than trying to avoid duplication;
- c) it is possible to start anywhere, to jump around, to repeat and re-work individual sub-factors (and factors), a process which "builds up" to the whole, and recognizes that the set may not fit neatly into any single, explicit, formal, external framework.

With considerable oversimplification, the above approach may be contrasted with several other approaches. In the procurement of research (and, in some cases, of professional services), there may be a comparably high degree of uncertainty on the part of the procuring agency (and even the prospective supplier), but it may be reasonable to limit the evaluation to a "single" or small set of technical problems, together with an evaluation of the capability of the individual(s) who will work on the project; similarly, but at the other end of the uncertainty spectrum, a production procurement to detailed specifications may reasonably be evaluated on the "single" question of price, together with an evaluation of the facilities needed to perform. Some, if not many, of the proposal evaluation boilerplates appear to follow this binary breakdown between a single (or small set of) selected major characteristic(s) and a "lumped" assessment of capability (of personnel and/or the organization). The forced selection of a (usually) small number of technical problems may result in an overemphasis on some problems (and which may include problems which cannot be adequately described or "solved" within the bidding period) and the exclusion of others, perhaps equally critical, which the bidder may feel compelled to respond to because of prior knowledge or from "hints" he receives from other descriptive materials, e.g., program plans provided as part of the bid set. Coupled with this is the difficulty of assigning a single, overall measure to the "qualifications" of the bidder, either as an independent assessment or one which parallels the technical part. For at least some of these "middle-ground"

procurements, the additional flexibility and freedom to define the evaluation in terms of whatever factors can be identified would appear to be desirable.

The next specific characteristic, and related to the above, is the use of a single framework, the set of "Proposal Evaluation Factors" [15], for the preparation of proposals and for their evaluation. By organizing the "Statement of Work," the "Schedule," and the "Scope of Effort" [15] on the same basis, and making clear that all other descriptive materials are relevant only to the extent they contribute to the central framework, the bidders and the evaluation team have a common frame of reference. The bidder can concentrate his attention on providing information which will describe his capability (understanding of the problem, present or proposed approach, and present or potential capability to perform) with respect to a specific set of sub-factors; the evaluation team can, likewise, concentrate its attention on the same set, and with a minimum risk of overlooking the relevant part of the proposal. They share, to a large degree, a common set of information and know the rules.

A related specific characteristic is the elimination of the necessity for a limitation on length. The evaluation team member can quickly find the information relevant to a specific sub-factor, and the bidder can be sure that what he is presenting will be found; each can, if necessary, develop or quickly identify necessary cross-references to other parts of the proposal. The necessity (or desirability) for over-long, "shotgun" approaches to cover any conceivable area which may be of interest to some individual member of the evaluation team, or to cover ambiguities in the amount of detail required, is diminished; in contrast, there is an obvious premium on clarity and conciseness in zeroing in on the specific sub-factor.

The next specific characteristic is the makeup of the evaluation team. Instead of centering the responsibility (and burden) for the entire evaluation on the project officer (together with anyone he can trap into helping him), the team is formed by calling upon a wider set from among those who have a prior (and continuing) interest in the subject of the procurement or who have special competence to evaluate particular sub-factors (and factors). Because of the framework used, participation in the evaluation process can be limited, by the individual, to reading parts of the proposal, evaluating those parts, and participating in only those factor team meetings concerned with those parts. This functional breakdown substantially limits the time commitment, and it allows concentration on parts which are of specific interest (and/or within the specific competence) of the individual. A larger evaluation team provides an opportunity for those interested in parts of the procurement (and who may be called upon to work with the successful contractor in the future) to provide inputs and to contribute their expertise and perspective; and, similarly, specialists in particular areas can increase the likelihood of an effective evaluation. In a systems sense, these team members provide an interface with the several systems they represent.

The next specific characteristic is the removal of artificial restrictions on information the evaluation team members can use. There is no requirement for a "blind" evaluation, i.e., not knowing the bidder's identity, of the "technical part." While the rating of a "brilliant technical idea" in the abstract

may be useful in a research procurement, the object here is to rate the specific sub-factor in the light of all the relevant evidence, and this requires access to the whole proposal, if desired. Similarly, it is considered only realistic to recognize that individual members of the evaluation team bring a wide variety of prior experience (and information) not only on areas relevant to the several sub-factors but also, in some cases, with respect to the capabilities of specific bidders. While this information may either add to or subtract from the rating of the specific bidder, there is no advantage to pretending it will be not considered, and its weight is more properly assessed, and accounted for, by the evaluation team through a requirement that it be openly disclosed.

The next characteristic is a corollary of the above. The members of the evaluation team are instructed that they must rate each bidder affirmatively, i.e., they must have a basis for low ratings as well as high ratings. Where there is ambiguity or an unclear or missing response, the evaluation team cannot assign a "zero" but must obtain the required information by asking a specific question. It is recognized that in some cases of an extremely (and uniformly) weak bidder, the team may properly decide that the proposal is a clear and unambiguous representation of the capability of the bidder.

The final specific characteristic to be noted is the process for "aggregating" the individual ratings of each team member with the ratings of the other team members, and, in turn, "aggregating" sub-factor ratings into factor ratings, and, in turn, into an overall rating. The process is sequential, with a summary hard-copy record retained of each stage to provide a traceable record of the process and as additional assurance that the contributions of the individual team members are reflected in the end result. The basis for aggregation of individual team member ratings and of the sub-factor ratings is the factor team; using any process acceptable to them, the members of the factor team determine the relative rating of all of the bidders against a fixed scale (the same one each used for individual ratings on individual sub-factors). Formal voting is precluded; somewhat analogous to a petit jury or an arbitration team, the factor team is required to interchange information and explore their several positions until they arrive at a mutually acceptable result. Provisions are made to append clarifying or qualifying notes, and, particularly, to identify areas which will require negotiation (or further clarification) in the event a particular bidder is chosen. In prior experience with nearly forty factor teams there were no instances in which this was not accomplished. The final step of aggregation, the combining of the ratings across all of the separate factors, is the first one in which formal weights are introduced, and these, characteristically, are limited to a range of no more than two to one (and this is disclosed to the bidders). This step is largely mechanical, and the summary report will not only include a description of the strong and weak points of the several bidders but also be accompanied with the complete set of factor ratings. While the summary weighted score may serve to identify the "winner" and other acceptable bidders, the individual factor ratings direct attention to any relative weak points. Similarly, the summary score and factor ratings will identify "in-between" and weak bidders, and specific areas of unacceptability.

If the process can be captured in terms of simple underlying concepts, there are at least three which would appear to be central. First, where uncertainty (of various kinds) makes unlikely (or difficult) the identification of what, in research terms, might be referred to as the dominant independent variable (or "summing independent variable"), the set of parameters (plausible rival hypotheses) are used as a surrogate independent variable. In contrast to the more familiar (research) approach in a priori proposition testing, where parameters are, at best, "unwanted" variables, to be controlled or otherwise isolated from the central problem of interest, in this process we "use" the parameters to increase the likelihood that we shall achieve our (administrative) purpose of obtaining some desired value of the dependent variable. Second, the process is structured sequentially to provide for a series of decompositions and compositions in several dimensions, including a degree of "value free" partitioning. Third, the process is explicit, open, relatively fully defined and self-checking, including the sense of "rule of law."

APPLICATIONS OF THE PROCESS

As has been noted, this procurement process was developed to meet a specific procurement problem and may be neither needed for nor applicable to other specific procurement problems. It would appear to be inapplicable to procurements in which there is a single (or small number of) critical basis(es) for evaluation, e.g., procurements for well-defined products or services where the basis is price, and research procurements where the basis is a particular technical approach or capability. More generally, there would appear to be no need for this procurement process where the prior experience of the procuring agency (and the set of prospective suppliers) has provided a basis for successful procurement, and especially where there are comparable previous procurements. There are probably a number of other procurement situations in which alternative methods are being used, including the following:

- a) where the procuring agency has the time and resources to carry out the preliminary design phase (or even further stages) and prepare detailed specifications;
- b) where the procuring agency has the money (and time) to let parallel (competitive) contracts for the preliminary design (or concept) phase;
- c) where the procuring agency has the time (and money) to let a "sole source" contract for the preliminary design phase, with the flexibility to drop the program or to start over if the first effort was unsuccessful;
- d) where one or more prospective suppliers are willing and able to carry out the preliminary design phase (or even further phases) prior to action by the procuring agency;
- e) where the item to be procured can be "decomposed" from technical and scheduling interfaces through the use of standards, and the like, or where there are acceptable alternates available.

With these exceptions noted, it should not be assumed that this procurement process is limited to large and complex systems, whether hardware or software. The basic criteria for use of this process include the following:

- a) that there is a degree of uncertainty or complexity in the item to be procured which makes it difficult to describe the item to bidders and to identify a suitable basis for evaluating bidders' proposals, using available procurement methods;
- b) that there are limits on time, money, or personnel which preclude considering other alternatives; and
- c) that there is some basis in prior experience for believing that it is critical to both the procuring agency and the (successful) bidder to develop a reasonably sound initial mutual understanding in order to ensure a progressive and successful mutual accomplishment of the object of the procurement.

A number of possible applications might be suggested, and the categories which follow, and the illustrations, represent only one way in which they might be organized. First, the case of multiple candidates (bidders or projects) which must be compared against an uncertain or complex set of requirements, including:

- a) competitive procurement based on a complex set of design requirements or of a system, e.g., the present case;
- b) rank ordering of a series of competing projects (which may not be directly comparable) against the twin standards of likelihood of success and probable payoff (future value), i.e., the "project selection" process;
- c) comparison of alternative techniques, solutions, or (assumed) resources and constraints against a set of "independent" and/or differentially affected requirements, e.g., cost-benefit analysis.

Second, the case of a single candidate (bidder or project) which must be compared against a complex or uncertain set of requirements, including:

- a) a project or proposal submitted for "acceptance" under a complex statutory requirement, e.g., application for qualification as a health maintenance organization (HMO), submission of an "impact statement" for a power plant or other facility;
- b) comparison of a proposed project against a set of "independent" requirements, e.g., cost-benefit analysis.

Third, the case where one (or more) candidates are to be compared against one (or more) uncertain or complex requirements by a set of raters who may differ not only in the kind of information they will accept but also in their value structures; in at least some cases where group decision processes are used

(e.g., arbitration, negotiation, the Delphi Method, and, perhaps, some political processes) it may be desirable to initially separate out those areas which are "value-free," i.e., facts or agreed statements of facts, to allow a more narrow concentration on those remaining areas in which there are value-based differences.

It is important to make clear that these comments on other applications are, at this point, to a degree speculative, and are offered to suggest possible areas for further consideration.

THEORETICAL CONSIDERATIONS

The main purpose of this paper has been to present a description of a specific procurement process, and the discussion here will be limited to a brief indication of related theoretical areas. The original development and testing of the process was largely empirical, and the extent to which prior theory entered into the process can be traced through reference to a paper [8] written just prior to that event and which was used as the model upon which the process was based. A more generally available, and briefer, version, was presented, subsequently, at a technical conference. [10]

Any reasonably thorough examination of the academic and philistine literature would uncover a virtually unlimited variety of articles related to an area as complex and pervasive as this one. No attempt has been made to do this for purposes of this paper, but an attempt will be made to identify some of the major areas and to include some representative references which may provide a useful frame of reference. First, and perhaps most obvious, is the extensive area of procurement, including federal and armed services procurement regulations, their statutory bases, amplifying and clarifying administrative and court decisions, and a wide variety of related agency policies and procedures. Complementing this government documentation are articles in trade magazines, books, conference proceedings, scientific journals, and law reviews commenting on present practice and/or suggesting alternatives and improvements. The importance of procurement to industry has generated a market-oriented "how to" literature which may be the most accurate assessment of present procurement practice, and there is a related literature on project and systems management. Less directly related to procurement but concerned more directly with the technical and related problems in the design and management of systems, and comparably complex problems, is the relatively diffuse literature on systems engineering, systems management, systems analysis, cost-benefit analysis, urban planning, and specific kinds of systems, e.g., transportation, health care, environmental.

In the scientific literature there is an early and extensive record of work in small group theory which is, perhaps, as good a place to start as any other comparably specific area in the wide variety of research in the management, management science, organization theory, behavioral science, etc., literature. Simon's early work [5] is representative of a small and select group of authors who described the administrative decision process in terms which were clear and understandable. Several different "schools" have developed to pursue the problems of decision making, some concentrating on empirically-based

behavioral models and others on more formal analytical models, with or without empirical testing. In this latter group, and of central importance to the present subject, are a number of researchers variously described as decision or utility theorists. With some risk of simplification, reference will be made to a useful, and brief collection of readings [3] which includes an article more or less directly applicable, entitled "On Subjectively Optimum Selections among Multi-attribute Alternatives," [4] It should be made clear that the exploration of the theoretical implications of the proposed process, and the examination and further testing of the specific mechanisms used, remains to be done.

One other, and extensive, literature is relevant to the present paper, and that is the subject of program evaluation. Two basic references are Suchman [6] and Caro [2]; and two useful and relevant current discussions appear in Federal Evaluation Policy [16] and Academic and Entrepreneurial Research. [1]

The subject area has been a matter of interest to the present writer, starting with the previously mentioned papers. [8] [10] The general area of systems is represented in two papers [12] [13]; the problems of cooperative decision making are discussed in two papers [7] [9]; and the subject of evaluation is described in another. [11] These do not provide the comprehensive basis that a more thorough review of the literature would achieve, but they do provide an additional perspective on the considerations which were instrumental in the present application.

SUMMARY

A brief description has been presented of a procurement process developed and applied to meet a specific procurement problem. To provide a modest perspective, additional comments have been made on background, the salient characteristics and applications of the process, and relevant theory.

While the process has been previously "tested," the current application is in mid-process, and the "test" remains to be completed. From past experience, the process should be successful in rating bidders from strong to weak, and in choosing a "winner" whose performance after award will reasonably meet our expectations.

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- [15] U. S. Department of Commerce, Experimental Technology Incentives Program, "Proposal Preparation Procedure," February 1976. (Note: This is part of RFP 6-35756, as are other related documents identified in the text; copies of these parts of the bid set may be obtained from ETIP.)
- [16] Wholey, Joseph S., Scanlon, John W., Duffy, Hugh G., Fukumoto, James S. and Vogt, Leona M., Federal Evaluation Policy. Washington, D.C.: The Urban Institute, 1975.

TABLE I PROPOSAL EVALUATION FACTORS

- I. Management

This factor is a measure of the background and overall management capability of the bidder.
- II. Reports and Reviews

This factor is the measure of the bidder's ability to assure that the Government is able to effectively and progressively review a very large scale effort with a minimum of people, and of the bidder's ability to coordinate his activities with those of other related individuals and organizations.
- III. Objectives

This factor is a measure of the bidder's overall understanding of the objectives of this procurement (and related programs).
- IV. Background Information

This factor is a measure of the bidder's overall understanding of the background and characteristics of this procurement.
- V. Evaluation Design

This factor is a measure of the bidder's capabilities to carry out the evaluation design requirements.
- VI. Data Collection Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the acquisition of data on the variables and parameters of interest.
- VII. Data Analysis Process

This factor is a measure of the bidder's capability to carry out all of the functions necessary to the analysis of the data and to present the results and recommendations.

TABLE II FACTOR WITH SUB-FACTORS

V. Evaluation Design

This factor is a measure of the bidder's capabilities to carry out the evaluation design requirements.

V.1 Exploratory (Descriptive) and A Priori Proposition Testing Hypotheses, Variables and Parameters

This sub-factor is a measure of the bidder's ability to define the detailed evaluation objectives.

V.2 Experimental and/or Study Designs

This sub-factor is a measure of the bidder's ability to define the overall experimental and/or study design.

V.3 Data Collection Design

This sub-factor is a measure of the bidder's ability to design the overall data collection process, including sources of information, sampling strategies, timing, etc.

V.4 Data Analysis Design

This sub-factor is a measure of the bidder's ability to design the overall data analysis process, including processing and analysis, and presenting results and recommendations.

V.5 Phase Two Evaluation Design

This sub-factor is a measure of the bidder's ability to redefine the detailed experimental and/or study design to reflect the results of Phase One, the several objectives, and model of the process in a comprehensive detailed design to meet both basic data (base line data) and special data requirements.

V.6 Phase Three Evaluation Design

This sub-factor is a measure of the bidder's ability to further redefine the above, to provide for a detailed design, and necessary supporting materials, which would allow an on-going evaluation process.

TABLE III SUB-FACTOR WITH ILLUSTRATIVE QUESTIONS

V.2 Experimental and/or Study Designs

This sub-factor is a measure of the bidder's ability to define the overall experimental and/or study design.

V.2.1 Discuss the problem(s) of and approaches to experimental and/or study design. Alternatively, you may wish to demonstrate your capability by reference to the relevant education and experience of your staff. It is suggested that you may wish to distinguish among the several kinds of designs which may be appropriate for meeting the several kinds of objectives which are the outcome of the process discussed in V.1.

V.2.2 Discuss the problem(s) of and approaches to identifying and controlling for the potential effects of parameters.

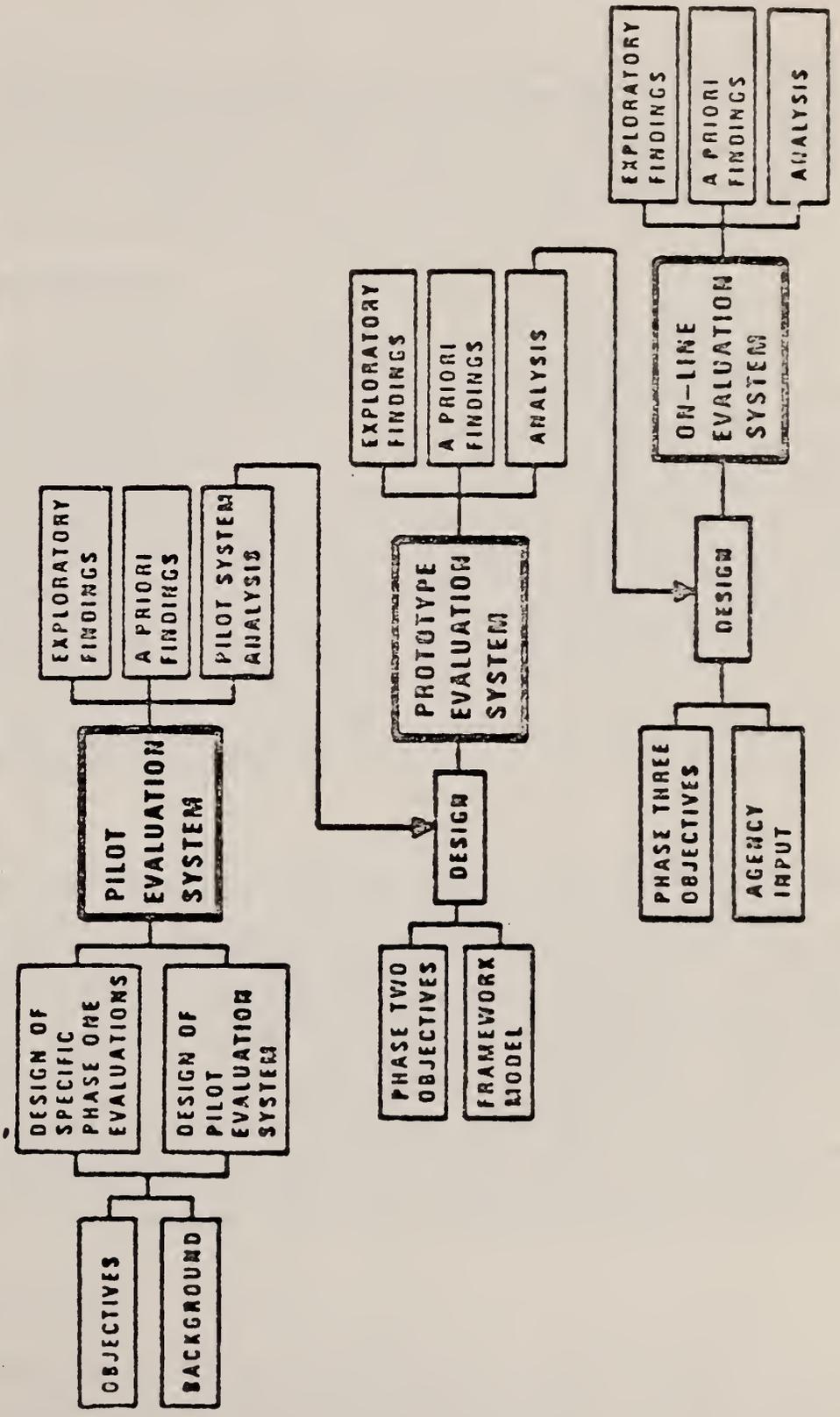
V.2.3 It is proposed that the bidder can design an overall evaluation system and, in parallel, carry out evaluations of specific selected experiments during Phase One. Discuss the advantages and disadvantages of this. Can you identify specific experiments which can be evaluated during Phase One? Can you identify base-line data which can, or should, be collected during Phase One? which can, or should, be collected during later phases?

V.2.4 To what extent do you see differences among the several PAA which will affect the design of the evaluation system? Will differences in the progress in initiating experiments among the several PAA be an advantage or disadvantage?

V.2.5 It is anticipated that some part or all of the bidder's activity in this area will be dependent upon the activities of another ("agency impact") contractor. How critical is this from a time point of view? from an interface point of view? Will segmentation (by industry, technology, market) provide advantages or disadvantages? to what extent will longitudinal designs be important, and will this be an advantage or disadvantage (COMMERCIAL IMPACT ONLY)

FIGURE 1

EVALUATION SYSTEM DESIGN PROCESS (INCLUDING RELATION TO EVALUATIONS OF SPECIFIC EXPERIMENTS)



APPENDIX C

Instructions Given to Evaluation Panel Members

PROPOSAL EVALUATION PROCEDURE

GENERAL

Information and guidance on proposal evaluation is contained in the Proposal Preparation Procedure and Scope of Effort documents. Covered below are additional suggestions to assure a uniform, thorough and efficient evaluation. Comments on how to improve the procedures are welcomed and should be furnished to the COTR for early consideration and dissemination.

INDIVIDUAL PREPARATION

All proposal evaluation team members should become familiar with the entire RFP, at least sufficiently to know what documents are contained in it. All team members should have copies of the Statement of Work, Schedule(s), Proposal Preparation Procedure, Proposal Evaluation Factors, and Scope of Effort. In addition, team members should have blank copies of the Factor (and Sub-factor) Worksheets. During the entire evaluation period, you should make notes on important points or questions you have, and be prepared to progressively rate each bidder on each sub-factor you have comments on. These notes will aid you in the factor team discussions when the relative positions of the bidders are established.

If you have any question at any time concerning the process, you should contact the COTR.

PROPOSALS

All copies of the bidders' proposals will be received by the Contracting Officer on April 15. The Contracting Officer will retain the contractual provisions, including price data, and one or more copies of the rest of the proposal. Fifteen copies of each bidder's proposal, which includes the information responsive to the Proposal Evaluation Factors and Scope of Effort documents, will be provided to the COTR. The COTR will provide copies to the members of the evaluation team, together with any required additional guidance or forms. A sign-out procedure will be used to keep track of the proposals. Access will be limited to members of the evaluation team, and to personnel of DOC whose official responsibilities require access.

PRELIMINARY REVIEW

It is proposed that all team members will spend Friday, April 16, at ETIP to accomplish a preliminary review. Proposals will be distributed in the morning, and members will spend most of the day reviewing the proposals both overall and with

respect to specific factors and sub-factors. The purpose of this is the following: a) to estimate the overall magnitude of time required for review as a basis for planning and scheduling the review process; b) to identify any critical problems faced by evaluation team members; c) to identify any critical specific questions which must be directed to a specific bidder (through the C.O.); d) to determine if one or more factor teams will be ready to meet by Monday morning; e) to establish which of the two procurements will be evaluated first; and f) to review the assignments of team members to specific sub-factors.

By the end of the day (Friday), it is proposed to schedule one or more factor team meetings on Monday; and, possibly tentatively schedule subsequent factor team meetings.

QUESTIONS

Because it is not anticipated that any of the individual bidders will be invited for oral presentations and questioning (prior to the completion of the factor team meetings), any additional information from the bidders can be obtained only by directing specific questions to the specific bidder through the Contracting Officer. These questions should be identified by sub-factor, and limited to the clarification of ambiguities or to clearing up omissions (on apparent strong or weak points) which would be expected to substantially affect the team's ability to rate the sub-factor. It is important that these be identified as early as possible to allow time to obtain answers; waiting for an answer may delay the scheduling of the affected factor team meeting.

Specific questions should be entered on the Question Form and given to the COTR. Because of the time delay involved, each question should be reviewed to be sure that the additional information is absolutely necessary.

If additional information is required from someone other than the bidder (e.g., a COTR on another program), put that question on a Question Form, and give to the COTR.

Note: No questions should be directed to anyone outside of the evaluation team, except by the COTR through the CO.

INDIVIDUAL REVIEW

The process of individual review is largely within the discretion of the evaluation team member. There are only two specific checkpoints: 1) that you identify specific questions (see previous heading) as early as possible, and 2) that you have

completed your review of the relevant (and/or assigned) part of the bidders' proposals prior to each factor team meeting (which will be scheduled with this requirement in mind).

All evaluation team members are encouraged to review all parts of all proposals, and may attend all factor team meetings.

It is recommended that all members of a specific factor team review all of the sub-factors which make up the factor.

Each member of a factor team must review the sub-factors to which he is assigned. For this purpose (and, optionally, for the others), a Factor (and Sub-factor) Worksheet must be completed for each assigned sub-factor. You may use duplicate copies of the Worksheet, or any convenient form. The purpose is to be sure that you have established clearly what the bidder proposes, and that you have a quick reference to your rating and supporting reasons for them for use during the factor team meeting.

FACTOR TEAM MEETINGS

Members of the proposal evaluation team who have been assigned to one or more sub-factors within a specific factor make up the "factor team" for that factor.

When the members of the team are ready, a factor team meeting will be scheduled. These factor team meetings will be scheduled separately for each factor and will last about an hour.

The procedure of the factor team meetings will include the following steps:

First, an informal discussion and comparing of notes to establish that we are using the same standards and information (to uncover major discrepancies or omissions).

Second, comparing and/or discussing individual reviews, and rough ranking.

Third, establishing relative differences or distribution.

The following ground rules should be observed in the conduct of the factor team meetings:

Information to be considered:

1st - RFP, and associated documents

2nd - Written proposals, including "Scope of Work"

- 3rd - Responses to specific questions, if any
- 4th - Individual experience of the factor team members - if there is critical personal information, it should be presented to the team for consideration.

Rating (factor and sub-factor) shall be by considering these points, all together:

- 1st - Comprehension or understanding of the problem presented.
- 2nd - Approach described or outlined
- 3rd - Present or potential capability to accomplish this. (Rating of potential capability is a very important point-the teams must try to project, formally, the capability of the bidder to correct deficiencies which are due to misunderstanding or inadvertence.)

Major emphasis should be on the factor or sub-factor being rated; however, no factor exists in total isolation, and the impact of other factors should not be excluded. The overall standard is "the extent to which you believe the factor will be accomplished, keeping in mind his understanding, approach and capability."

Comparative "weighting" of sub-factors and individual evaluations: The factor team is expected to hammer out the comparative evaluation of the several sub-factors; there is no preconceived arbitrary division. Similarly, the factor team members are required to establish a mutually satisfactory evaluation. Other members of the factor team may properly inquire into the basis and reasoning of a specialist in his area; and, conversely, should give appropriate weight to his evaluation. No arbitrary voting procedure is established.

The process to be used in arranging the order and distribution of the contractors is to be established by each factor team. Various summary steps, such as proceedings by sub-factors, by individual evaluators, or the overall factor, may be used.

Distribution: After a rough ranking of the bidders, the team should separate the bidders to indicate the distribution, that is, the relative gaps reflecting the differences observed. This may be accomplished by having a team member adjust them on a black-board until the team agrees on the distribution. Once an order and a distribution have been mutually agreed upon, the distribution shall be transcribed to record form (the Factor Worksheet) for file purposes and signed by each member of the factor team. Any strong individual disagreements with the outcome of the team should be noted on the record form

together with a concise supporting statement. Also, any points which will require negotiating in the event a certain bidder is ultimately chosen, should be noted on the same form.

When using the blackboard as a graphical scale, these suggestions are made. The top of the board should be reserved for the bidder, if any, who makes you "sing," you believe that nothing can stop him from being a success on this factor (or sub-factor). The bottom should be reserved for the bidder who is hopeless within reasonable money and time limits. Care should be taken to avoid bunching everybody in the middle. Reflect the comparative value of the bidders over the total scale.

REVIEW

The COTR will incorporate the factors and prepare a summary of the evaluation for presentation and/or any procurement review. Procurement practice requires that this stage and up to signing of contract be limited to minimum personnel required to prepare review documents.

APPENDIX D

Ratings from the Agency Impact Contract Evaluation

Displays of the way the ratings appeared on the blackboard during the factor team meetings. The initial individual ratings and the agreed upon sub-factor ratings appear on one sheet per sub-factor.

The displays of agreement on factor ratings are provided after the last sub-factor within each factor.

| I.2 | EVAL202 | EVAL205 | EVAL208 | EVAL211 | I.1 | I.2 | I.3 | I.4 | I |
|-----|-------------------|-----------|---------|------------------------|-----------|-------------------------------------|-----|-----|---|
| 10 | | B201 B206 | | | | | | | |
| 9 | | | | B201 B202
B203 B204 | B203 B205 | | | | |
| 8 | | | | B205 | | | | | |
| 7 | B202 B203
B205 | | | | B202 | B203 B204
B201 B202
B205 B206 | | | |
| 6 | B204 B206 | B202 | | B206 | B206 | | | | |
| 5 | B201 | B205 | | | B201 | | | | |
| 4 | | B203 | | | B204 | | | | |
| 3 | | | | | | | | | |
| 2 | | | | | | | | | |
| 1 | | B204 | | | | | | | |

| I.3 | EVAL202 | EVAL205 | EVAL208 | EVAL211 | I.1 | I.2 | I.3 | I.4 | I |
|-----|-----------|-----------|---------|-----------|-----------|-------------------------------------|-------------------|-----|---|
| 10 | | B201 | B205 | B206 | | | | | |
| 9 | | | | B205 | | | | | |
| 8 | B206 | B206 | | | | | | | |
| 7 | B202 B205 | | B203 | B202 B203 | B205 B205 | | B203 B205 | | |
| 6 | B201 B203 | | B202 | B201 | B202 | B203 B204
B201 B202
B205 B206 | B201 B202
B206 | | |
| 5 | | | | B204 | B206 | | | | |
| 4 | B204 | B205 | B201 | | B201 | | B204 | | |
| 3 | | | B206 | | | | | | |
| 2 | | B203 | B204 | | | | | | |
| 1 | | B202 B204 | | | B204 | | | | |

| I.4 | EVAL202 | EVAL205 | EVAL208 | EVAL211 | I.1 | I.2 | I.3 | I.4 | I |
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| 8 | B205 B206 | B203 | | | B203 B205 | | B203 B205 | B203 B205
B206 | |
| 7 | B203 | B205 | | B201 | B202 | B203 B204
B201 B202
B205 B206 | B201 B202
B206 | B201 | |
| 6 | B201 | B205 | | B201 | B202 | B206 | | B202 | |
| 5 | B202 | | | B204 | B201 | | | | |
| 4 | | | | | B204 | | B204 | B204 | |
| 3 | | B204 | | | | | | | |
| 2 | B204 | | | | | | | | |
| 1 | | B202 | | | | | | | |

| II.3 | EVAL202 | EVAL205 | EVAL207 | EVAL208 | EVAL210 | EVAL211 | II.1 | II.2 | II.3 | II.4 | II |
|------|-----------|-----------|------------------------|---------|---------|-----------|-----------|-------------------|-----------|------|----|
| 10 | | | | | | | | | | | |
| 9 | | | | | | B203 B205 | | | | | |
| 8 | B202 B203 | B201 | B205 | | | B202 | B203 | B205 | B203 | | |
| 7 | | | B203 | | | | B205 | B201 B202
B205 | B202 | | |
| 6 | B205 | B203 | | | | | B202 B206 | | B201 B205 | | |
| 5 | B201 B204 | | B201 B202
B204 B206 | | | B201 | B201 | B206 | | | |
| 4 | B206 | B205 B206 | | | | B206 | B204 | B204 | B206 | | |
| 3 | | | | | | | | | B204 | | |
| 2 | | | | | | | | | | | |
| 1 | | B202 B204 | | | | B204 | | | | | |

| II.4 | EVAL202 | EVAL205 | EVAL207 | EVAL208 | EVAL210 | EVAL211 | II.1 | II.2 | II.3 | II.4 | II |
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| 10 | | B201 | B205 | | | | | | | | |
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| 8 | B201 B202 | | | | | | B205 | B201 B202
B203 | B202 | B205 | |
| 7 | | | B201 B203
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| 6 | B203 B205 | B203 B206 | B202 | | | B202 | B202 B206 | | B201 B205 | | |
| 5 | | | B206 | | | B206 | B201 | B206 | | B206 | |
| 4 | B204 B206 | | | | | | B204 | B204 | B206 | B202 B204 | |
| 3 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 1 | | B202 B204 | | | | B204 | | | | | |

| III.2 | EVAL204 | EVAL205 | EVAL208 | EVAL209 | EVAL210 | EVAL211 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-------|-----------|-----------|---------|---------|---------|-----------|-------|-------|-------|-------|-------|-----|
| 10 | | B206 | | | | | | | | | | |
| 9 | B205 | | B205 | | | B205 | B205 | B205 | | | | |
| 8 | B202 | B202 B203 | B202 | | | B202 | B206 | B202 | B202 | | | |
| 7 | B203 | B205 | | | | B203 | B202 | B203 | | | | |
| 6 | | B204 | B201 | | | B204 B206 | B201 | B206 | | | | |
| 5 | B204 B206 | | B204 | | | | | B204 | | | | |
| 4 | | | B203 | | | | | B201 | | | | |
| 3 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 1 | | | B206 | | | B201 | B204 | | | | | |

| III.4 | EVAL204 | EVAL205 | EVAL208 | EVAL209 | EVAL210 | EVAL211 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-------|-----------|---------|-----------|---------|-----------|-----------|-------|-------|-----------|-----------|-------|-----|
| 10 | | B206 | | | | | | | | | | |
| 9 | B205 | | | | | B202 B203 | B205 | B205 | | | | |
| 8 | B202 | B202 | | | B203 | B205 | B206 | B202 | B202 | B202 B203 | | |
| 7 | B203 | B203 | | | B205 | | B202 | B203 | B205 B206 | B205 | | |
| 6 | | | B205 | | | | | | | | | |
| 5 | B204 B206 | B205 | B202 | | B204 | B206 | B201 | B206 | B203 | B206 | | |
| 4 | | | | | B202 B206 | B204 | | B204 | | B204 | | |
| 3 | | | B203 B204 | | B201 | | B204 | | B201 B204 | | | |
| 2 | | | B201 B206 | | | | | | | B201 | | |
| 1 | | B204 | | | | B201 | | | | | | |

| III.5 | EVAL204 | EVAL205 | EVAL208 | EVAL209 | EVAL210 | EVAL211 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-------|---------|---------|-----------|---------|-----------|-----------|-------|-------|-----------|-----------|-----------|-----|
| 10 | | B206 | | | | | | | | | | |
| 9 | B205 | | B205 | | | B206 | B205 | B205 | | | | |
| 8 | B202 | B202 | | | B203 B205 | B202 | B206 | B202 | B202 | B202 B203 | B202 B205 | |
| 7 | B203 | | | | B204 | B203 B205 | B203 | B203 | B205 B206 | B205 | | |
| 6 | | B205 | B202 | | B202 | B204 | B201 | B206 | B203 | B206 | B203 B206 | |
| 5 | B204 | B203 | | | | | | B204 | | B204 | B204 | |
| 4 | | | B201 B203 | | B201 B206 | | B204 | | B201 B204 | | B201 | |
| 3 | | | | | | | | | | B201 | | |
| 2 | | B204 | B204 B206 | | | | | | | | | |
| 1 | B206 | | | | | B201 | | | | | | |

| IV.1 | EVAL203 | EVAL204 | EVAL206 | EVAL208 | EVAL211 | IV.1 | IV.2 | IV.3 | IV.4 | IV.5 | IV |
|------|--------------------------------|-------------------|---------|-------------------|-------------------|-------------------|------|------|------|------|----|
| 10 | | | | | | | | | | | |
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| 8 | B202 | | | | | B205 | | | | | |
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| 6 | | B203 B204 | | B202 B203
B204 | B204 | B204 | | | | | |
| 5 | | | | | B201 | B201 | | | | | |
| 4 | | | | | | | | | | | |
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| 2 | | | | | | | | | | | |
| 1 | | | | B201 | | | | | | | |

| IV.3 | EVAL203 | EVAL204 | EVAL206 | EVAL208 | EVAL211 | IV.1 | IV.2 | IV.3 | IV.4 | IV.5 | IV |
|------|-------------------|-----------|---------|---------|-----------|-------------------|-----------|------|------|------|----|
| 10 | | B202 B205 | | B206 | B202 B205 | | B202 B205 | B205 | | | |
| 9 | | | | | | B205 | | B202 | | | |
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| 7 | B203 B204
B206 | B203 | | | B201 | | | | | | |
| 6 | | | | B202 | | B204 | B203 B204 | B203 | | | |
| 5 | | B204 B206 | | | B203 B204 | B201 | B206 | B204 | | | |
| 4 | | | | | B206 | | | B206 | | | |
| 3 | | | | B203 | | | | | | | |
| 2 | | | | B204 | | | | | | | |
| 1 | | | | B206 | | | B201 | | | | |

| IV | IVAL203 | IVAL204 | IVAL206 | IVAL208 | IVAL211 | IV.1 | IV.2 | IV.3 | IV.4 | IV.5 | IV |
|----|---------|---------|---------|---------|---------|-------------------|-----------|------|-----------|-------------------|-----------|
| 10 | | | | | | | | | | | |
| 9 | | | | | | | B202 B205 | B205 | B205 | | B205 |
| 8 | | | | | | B205 | | B202 | B202 | B202 | B202 |
| 7 | | | | | | B202 B203
B206 | | B201 | | B205 | |
| 6 | | | | | | B204 | B203 B204 | B203 | B203 | B203 | B203 |
| 5 | | | | | | B201 | B206 | B204 | B204 | | B204 B206 |
| 4 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 1 | | | | | | | B201 | B206 | B201 B206 | B201 B204
B206 | B201 |

| V.3 | EVAL201 | EVAL205 | EVAL206 | EVAL210 | EVAL211 | EVAL212 | V.1 | V.2 | V.3 | V.4 | V.5 | V.6 | V |
|-----|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|------|-----------|-----|-----|-----|---|
| 10 | | | | | | | | B205 | | | | | |
| 9 | | | | | | B205 | B205 | | B202 B205 | | | | |
| 8 | B202 B205 | | B202 B205 | B205 | B202 B205 | B202 | B205 | | | | | | |
| 7 | B204 | B205 | | | B203 B206 | B203 | | B202 | B203 | | | | |
| 6 | | | | | | B201 | | | | | | | |
| 5 | B203 | B206 | | | B204 | B204 B206 | B202 B203 | B206 | B206 | | | | |
| 4 | B203 | | B204 | | | | B206 | B203 | | | | | |
| 3 | B201 | B201 B204 | | B201 B202
B203 B206 | B201 | | B201 | B201 | B204 B206 | | | | |
| 2 | | | B206 | | | | | B204 | | | | | |
| 1 | | B202 B203 | | B204 | | | B204 | | B201 | | | | |

| V.4 | EVAl201 | EVAl205 | EVAl206 | EVAl210 | EVAl211 | EVAl212 | V.1 | V.2 | V.3 | V.4 | V.5 | V.6 | V |
|-----|---------|---------|---------|-------------------|-----------|-----------|-----------|------|-----------|-----------|-----|-----|---|
| 10 | | | | | B203 B204 | B205 | | B205 | | | | | |
| 9 | | | | | B205 | B203 | B205 | B205 | B202 B205 | B203 B205 | | | |
| 8 | | | | | B202 | B202 | | B202 | B203 | B203 B205 | | | |
| 7 | | B205 | | B201 B203
B205 | B202 | B202 | | B202 | B203 | | | | |
| 6 | | B203 | | | B206 | B201 B206 | B202 B203 | B206 | | B202 | | | |
| 5 | | B204 | | | | | B206 | B203 | | | | | |
| 4 | | | | | | B204 | B201 | B201 | B204 B206 | B20b | | | |
| 3 | | B206 | | | | | | | | | | | |
| 2 | | B201 | | | | | | | | | | | |
| 1 | | B202 | | B204 | B201 | | B204 | B204 | B201 | B201 B204 | | | |

| V.5 | VAL201 | VAL205 | VAL206 | VAL210 | VAL211 | VAL212 | V.1 | V.2 | V.3 | V.4 | V.5 | V.6 | V |
|-----|--------|--------|--------|-------------------|------------------------|-------------------|-----------|------|-----------|-----------|-------------------|-----|---|
| 10 | | | | | | | | | | | | | |
| 9 | | | | | | | | B205 | | | | | |
| 8 | | | | | | B205 | B205 | | B202 B205 | | | | |
| 7 | | | | B201 B203
B205 | B202 B203
B204 B205 | B202 B203
B206 | | B202 | B203 | | B202 B203
B205 | | |
| 6 | | | | | | | B202 B203 | B206 | | B202 | | | |
| 5 | | | | | | | B206 | B203 | | | | | |
| | | | | | | | B201 | B201 | B204 B206 | B206 | B206 | | |
| 4 | | | | | | | | | | | | | |
| | | | | | | | B204 | B204 | | | | | |
| 3 | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | |
| 1 | | | | B204 B206 | | | B204 | B204 | B201 | B201 B204 | B201 B204 | | |

| VII.3 | EVAL201 | EVAL205 | EVAL210 | EVAL211 | VII.1 | VII.2 | VII.3 | VII.4 | VII |
|-------|-------------------|--------------|------------------------|-----------|-------------------|-----------|-------------------|-------|-----|
| 10 | | B206 | | | | | | | |
| 9 | | | | | | | | | |
| 8 | B202 | B201 | | | B203 B205
B206 | B202 B203 | | | |
| 7 | B205 | | B206 | B202 B205 | | B205 | B202 B206 | | |
| 6 | -B203 | | | | | | | | |
| 5 | B201
B204 B206 | B202
B205 | B202 B203
B204 B205 | B203 B206 | B201 B202 | B206 | B201 B203
B205 | | |
| 4 | | | B201 | B204 | B204 | B201 | B204 | | |
| 3 | | | | | | | | | |
| 2 | | | | | | | | | |
| 1 | | B204 | | B201 | | B204 | | | |

APPENDIX E

Ratings from the Commercial Impact Contract Evaluation

Displays of the way the ratings appeared on the blackboard during the factor team meetings. The initial individual ratings and the agreed upon sub-factor ratings appear on one sheet per sub-factor.

The displays of agreement on factor ratings are provided after the last sub-factor within each factor.

| I.3 | EVAL102 | EVAL103 | EVAL107 | EVAL108 | I.1 | I.2 | I.3 | I.4 | I |
|-----|---------|---------|-----------|-----------|------|------|--------------|-----|---|
| 10 | B101 | | | | | | | | |
| 9 | | B101 | | | | B101 | B101 | | |
| 8 | | | B101 | B101 | B101 | | | | |
| 7 | | | | | | | | | |
| 6 | | B102 | | | | | | | |
| 5 | | | B102 B103 | | B102 | B103 | B102
B103 | | |
| 4 | B102 | B103 | | | | | | | |
| 3 | | | | B102 B103 | B103 | | | | |
| 2 | | | | | | | | | |
| 1 | | | | | | | | | |

| I.4 | EVAL102 | EVAL103 | EVAL107 | EVAL108 | I.1 | I.2 | I.3 | I.4 | I |
|-----|---------|---------|---------|-----------|------|------|------|------|---|
| 10 | | | | | | | | | |
| 9 | | | | B101 | | | | | |
| 8 | | B101 | | | | B101 | B101 | B101 | |
| 7 | B101 | | B101 | | B101 | | | | |
| 6 | | | B102 | | | | | | |
| 5 | | B102 | B103 | | B102 | B103 | B102 | B102 | |
| 4 | | | | | | B102 | B102 | B103 | |
| 3 | B102 | B103 | | B102 B10J | B103 | | | | |
| 2 | | | | | | | | | |
| 1 | | | | | | | | | |

| I | EVAl 102 | EVAl 103 | EVAl 107 | EVAl 108 | 1.1 | 1.2 | 1.3 | 1.4 | I |
|----|----------|----------|----------|----------|------|------|------|------|------|
| 10 | | | | | | | | | |
| 9 | | | | | | | | | |
| 8 | | | | | | B101 | B101 | B101 | B101 |
| 7 | | | | | B101 | | | | |
| 6 | | | | | | | | | |
| 5 | | | | | B102 | B103 | | B102 | B102 |
| 4 | | | | | | | B102 | | |
| 3 | | | | | | B102 | B103 | B103 | B103 |
| 2 | | | | | | | | | |
| 1 | | | | | B103 | | | | |

| II.3 | EVAL105 | EVAL107 | EVAL108 | EVAL109 | EVAL111 | II.1 | II.2 | II.3 | II.4 | II |
|------|---------|-----------|---------|-----------|---------|------|-----------|-----------|------|----|
| 10 | | | | | | | | | | |
| 9 | | B101 | | | | | | | | |
| 8 | | | | | | | | | | |
| 7 | | B101 B102 | | | | B101 | B101 | B101 | | |
| 6 | | B103 | | B102 | | | | | | |
| 5 | | | | B101 B103 | | B102 | | | | |
| 4 | | | | | | B103 | B102 B103 | B102 B103 | | |
| 3 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 1 | | | B103 | | | | | | | |
| | | | B102 | | | | | | | |

| II | II.1 | II.2 | II.3 | II.4 | II |
|----|------|-----------|-----------|------|-----------|
| 10 | | | | | |
| 9 | | | | | |
| 8 | | | | | |
| 7 | B101 | B101 | B101 | B101 | B101 |
| 6 | | | | | |
| 5 | B102 | | | B102 | |
| 4 | B103 | B102 B103 | B102 B103 | B103 | B102 B103 |
| 3 | | | | | |
| 2 | | | | | |
| 1 | | | | | |

| III.2 | EVAL102 | EVAL105 | EVAL106 | EVAL108 | EVAL110 | EVAL112 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-------|---------|---------|---------|---------|-----------|---------|-----------|-------|-------|-------|-------|-----|
| 10 | | | | | | | | | | | | |
| 9 | B101 | | | B102 | B101 | B101 | | B101 | | | | |
| 8 | | | | | | | B101 B102 | | | | | |
| 7 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 5 | | | | B101 | | B102 | | B102 | | | | |
| 4 | | | | | B102 B103 | | B103 | | | | | |
| 3 | | | | | | | | B103 | | | | |
| 2 | | | | | | | | | | | | |
| 1 | | | | B103 | | B103 | | | | | | |

| III.3 | EVAL102 | EVAL105 | EVAL106 | EVAL108 | EVAL110 | FV01112 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-------|---------|---------|---------|---------|---------|---------|-----------|-------|-----------|-------|-------|-----|
| 10 | | | | | | | | | | | | |
| 9 | | | | B102 | | | | B101 | | | | |
| 8 | | | B101 | | | B101 | B101 B102 | | | | | |
| 7 | B101 | | | | | | | | | | | |
| 6 | | | | | B101 | B102 | | | B101 | | | |
| 5 | B102 | | B102 | | B103 | | | B102 | | | | |
| 4 | | | | B101 | | | B103 | | B102 B103 | | | |
| 3 | | | | | | | | | | | | |
| 2 | | | B103 | | B102 | | | | | | | |
| 1 | | | | B103 | | B103 | | | | | | |

| III.4 | EVAL102 | EVAL105 | EVAL106 | EVAL108 | EVAL110 | EVAL112 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-------|---------|---------|---------|---------|---------|---------|-----------|-------|-----------|-------|-------|-----|
| 10 | | | | | | | | | | | | |
| 9 | | | | | B101 | B101 | B101 | B101 | | | | |
| 8 | | | | B102 | B101 | | B101 B102 | | | B101 | | |
| 7 | | B101 | | | | B102 | | | | | | |
| 6 | | | | | | | | | B101 | | | |
| 5 | | B102 | | | B103 | | | B102 | | | | |
| 4 | | B103 | | | | | B103 | | B102 B103 | | | |
| 3 | | | | | | | | B103 | | B103 | | |
| 2 | | | | | B102 | | | | | B102 | | |
| 1 | | | | B101 | | B103 | | | | | | |

| III.5 | IVAL102 | IVAL105 | IVAL106 | IVAL108 | IVAL110 | IVAL112 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-------|---------|---------|---------|---------|---------|---------|-----------|-------|-----------|-------|-------|------|
| 10 | | | | | | | | | | | | |
| 9 | | | | | | | | B101 | | | | |
| 8 | | | | B102 | | B101 | B101 B102 | | | B101 | | |
| 7 | | | | | B101 | | | | | | B101 | |
| 6 | | | | | | | | | B101 | | | |
| 5 | | | | | B102 | B102 | | B102 | | | | |
| 4 | | | | | B103 | | B103 | | B102 B103 | | B103 | |
| 3 | | | | | | | | | | B103 | | |
| 2 | | | | | | | | | | | B102 | B102 |
| 1 | | | | B103 | B102 | B103 | | | | | | |

| III | EVAL 102 | EVAL 105 | EVAL 106 | EVAL 108 | EVAL 110 | EVAL 112 | III.1 | III.2 | III.3 | III.4 | III.5 | III |
|-----|----------|----------|----------|----------|----------|----------|-----------|-------|-----------|-------|-------|-----------|
| 10 | | | | | | | | | | | | |
| 9 | | | | | | | B101 | | | | | |
| 8 | | | | | | | B101 B102 | | | B101 | | B101 |
| 7 | | | | | | | | | | | B101 | |
| 6 | | | | | | | | | B101 | | | |
| 5 | | | | | | | | B102 | | | | |
| 4 | | | | | | | | | | | | B102 B103 |
| 3 | | | | | | | B103 | | B102 B103 | | B103 | |
| 2 | | | | | | | | B103 | | B103 | | |
| 1 | | | | | | | | | | B102 | B10. | |

| IV.3 | EVRL102 | EVRL103 | EVRL107 | EVRL108 | EVRL111 | EVRL112 | IV.1 | IV.2 | IV.3 | IV.4 | IV.5 | IV |
|------|---------|--------------|---------|---------|---------|---------|-----------|------|------|------|------|----|
| 10 | | | | | | | | | | | | |
| 9 | | B101 | | | | | | | | | | |
| 8 | | | | | B101 | B101 | B101 | B101 | B101 | | | |
| 7 | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |
| 4 | | B102
B103 | | | | B102 | B102 B103 | B102 | B102 | | | |
| 3 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 1 | | | | | | B103 | | | | | | |

| V.1 | EVAl 101 | EVAl 102 | EVAl 104 | EVAl 105 | EVAl 108 | V.1 | V.2 | V.3 | V.4 | V.5 | V.6 | V |
|-----|----------|----------|----------|----------|----------|-----------|-----|-----|-----|-----|-----|---|
| 10 | B101 | | | | | | | | | | | |
| 9 | B102 | | B101 | | | | | | | | | |
| 8 | B103 | | | B101 | | B101 | | | | | | |
| 7 | | | B102 | | B101 | | | | | | | |
| 6 | | B101 | B103 | | | | | | | | | |
| 5 | | | | B103 | | | | | | | | |
| 4 | | B102 | | B102 | | B102 0103 | | | | | | |
| 3 | | | | | B102 | | | | | | | |
| 2 | | | | | | | | | | | | |
| 1 | | | | | B103 | | | | | | | |

| V.5 | EV.101 | EV.102 | EV.104 | EV.105 | EV.108 | V.1 | V.2 | V.3 | V.4 | V.5 | V.6 | V |
|-----|--------|--------|--------|-----------|-----------|-----------|------|------|------|------|-----|---|
| 10 | | | | | | | | | | | | |
| 9 | B101 | | | | | | | | | | | |
| 8 | | | | | | B101 | B101 | B101 | B101 | | | |
| 7 | B102 | | B101 | B101 B102 | | | | | | | | |
| 6 | B103 | | B102 | | B101 | | | | | B101 | | |
| 5 | | | | | | | | | B102 | | | |
| 4 | | | | | | B102 B103 | B103 | B102 | | B102 | | |
| 3 | | | B103 | B103 | | | B102 | B103 | B103 | B103 | | |
| 2 | | | | | | | | | | | | |
| 1 | | | | | B102 B103 | | | | | | | |

| V.6 | EVAL101 | EVAL102 | EVAL104 | EVAL105 | EVAL108 | V.1 | V.2 | V.3 | V.4 | V.5 | V.6 | V |
|-----|-----------|---------|---------|---------|---------|-----------|------|------|------|------|-----------|---|
| 10 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 8 | | | | | | B101 | B101 | B101 | B101 | | | |
| 7 | B101 | | B101 | | | | | | | | | |
| 6 | B102 B103 | | B102 | | B101 | | | | | B101 | B101 | |
| 5 | | | | B101 | | | | | B102 | | | |
| 4 | | | | B102 | | B102 B103 | B103 | B102 | | B102 | | |
| 3 | | | B103 | | | | B102 | B103 | B103 | B103 | B102 B103 | |
| 2 | | | | B103 | B102 | | | | | | | |
| 1 | | | | B103 | B103 | | | | | | | |

| V | VAL101 | VAL102 | VAL104 | VAL105 | VAL108 | V.1 | V.2 | V.3 | V.4 | V.5 | V.6 | V |
|----|--------|--------|--------|--------|--------|-----------|------|------|------|------|-----------|------|
| 10 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 8 | | | | | | B101 | B101 | B101 | B101 | | | B101 |
| 7 | | | | | | | | | | | | |
| 6 | | | | | | | | | | B101 | B101 | |
| 5 | | | | | | | | | B102 | | | |
| 4 | | | | | | B102/B103 | B103 | B102 | | B102 | | B102 |
| 3 | | | | | | | B102 | B103 | B103 | B104 | B102/B103 | B103 |
| 2 | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | |



| VI.2 | EVAL 101 | EVAL 102 | EVAL 103 | EVAL 104 | EVAL 105 | EVAL 108 | VI.1 | VI.2 | VI.3 | VI.4 | VI.5 | VI |
|------|----------|----------|----------|----------|----------|-----------|------|------|------|------|------|----|
| 10 | B101 | | | | | B101 | | | | | | |
| 9 | | | B101 | B101 | B101 | | | B101 | | | | |
| 8 | | B101 | | B102 | | | B101 | | | | | |
| 7 | B102 | | | B103 | B102 | | | | | | | |
| 6 | | | | | | | | | | | | |
| 5 | | B102 | B102 | | | | B102 | B102 | | | | |
| 4 | B103 | | B103 | | | B102 B103 | | | | | | |
| 3 | | | | | | | B103 | B103 | | | | |
| 2 | | | | | | | | | | | | |
| 1 | | | | | B103 | | | | | | | |

| VI.3 | EVAL101 | EVAL102 | EVAL103 | EVAL104 | EVAL105 | EVAL108 | VI.1 | VI.2 | VI.3 | VI.4 | VI.5 | VI |
|------|---------|---------|--------------|---------|---------|-----------|------|------|------|------|------|----|
| 10 | | | | | | | | | | | | |
| 9 | B101 | | | B101 | | B101 | | B101 | | | | |
| 8 | | | B101 | B102 | | | B101 | | B101 | | | |
| 7 | | | | B103 | B101 | | | | | | | |
| 6 | B102 | | | | | | | | | | | |
| 5 | | | | | | | B102 | B102 | B102 | | | |
| 4 | B103 | | | | B102 | | | | | | | |
| 3 | | | B103
B102 | | | | B103 | B103 | B103 | | | |
| 2 | | | | | | B102 B103 | | | | | | |
| 1 | | | | | B103 | | | | | | | |

| VI.4 | EVAl 101 | EVAl 102 | EVAl 103 | EVAl 104 | EVAl 105 | EVAl 108 | VI.1 | VI.2 | VI.3 | VI.4 | VI.5 | VI |
|------|----------|----------|----------|----------|----------|-----------|------|------|------|------|------|----|
| 10 | | | | | | | | | | | | |
| 9 | | | B101 | B101 | | | | B101 | | | | |
| 8 | | | | B102 | | | B101 | | B101 | B101 | | |
| 7 | B101 | | | B103 | B101 | B101 | | | | | | |
| 6 | B102 | | | | | | | | | | | |
| 5 | | | | | | B102/B103 | B102 | B102 | B102 | B102 | | |
| 4 | B103 | | | | B102 | | | | | | | |
| 3 | | | | | | | B103 | B103 | B103 | B103 | | |
| 2 | | | | | | | | | | | | |
| 1 | | | | | B103 | | | | | | | |

| VI.5 | EVAL101 | EVAL102 | EVAL103 | EVAL104 | EVAL105 | EVAL108 | VI.1 | VI.2 | VI.3 | VI.4 | VI.5 | VI |
|------|---------|---------|---------|---------|---------|-----------|------|------|------|------|------|----|
| 10 | | | | | | | | | | | | |
| 9 | B101 | | | B101 | | | | B101 | | | | |
| 8 | | | | B102 | | | B101 | | B101 | | | |
| 7 | | | | B103 | B101 | B101 | | | | | B101 | |
| 6 | B102 | | | | | | | | | | | |
| 5 | | | | | | B102 B103 | B102 | B102 | B102 | B102 | B102 | |
| 4 | B103 | | | | B102 | | | | | | | |
| 3 | | | | | | | B103 | B103 | B103 | B103 | B103 | |
| 2 | | | | | | | | | | | | |
| 1 | | | | | B103 | | | | | | | |

| VI | VI.1 | VI.2 | VI.3 | VI.4 | VI.5 | VI |
|----|------|------|------|------|------|------|
| 10 | | | | | | |
| 9 | | B101 | | | | |
| 8 | B101 | | B101 | B101 | | B101 |
| 7 | | | | | B101 | |
| 6 | | | | | | |
| 5 | B102 | B102 | B102 | B102 | B102 | B102 |
| 4 | | | | | | |
| 3 | B103 | B103 | B103 | B103 | B103 | B103 |
| 2 | | | | | | |
| 1 | | | | | | |

| VII.1 | EVAl102 | EVAl105 | EVAl108 | VII.1 | VII.2 | VII.3 | VII.4 | VII |
|-------|---------|-----------|-----------|-------|-------|-------|-------|-----|
| 10 | | | | | | | | |
| 9 | | | | | | | | |
| 8 | | | | | | | | |
| 7 | | | B102 | | | | | |
| 6 | | B101 | B101 B103 | B101 | | | | |
| 5 | | | | B103 | | | | |
| 4 | | B102 B103 | | B102 | | | | |
| 3 | | | | | | | | |
| 2 | B101 | | | | | | | |
| 1 | B102 | | | | | | | |

| VII.3 | EVAL102 | EVAL105 | EVAL108 | VII.1 | VII.2 | VII.3 | VII.4 | VII |
|-------|---------|---------|-----------|-------|-------|-------|-------|-----|
| 10 | | | | | | | | |
| 9 | | | | | | | | |
| 8 | | | B102 | | | | | |
| 7 | | | | | | | | |
| 6 | | B101 | B101 B103 | B101 | B101 | | | |
| 5 | | B102 | | B103 | B102 | B101 | | |
| 4 | B101 | | | B102 | B103 | B103 | | |
| 3 | | | | | | B102 | | |
| 2 | | B103 | | | | | | |
| 1 | B102 | | | | | | | |

APPENDIX F

Cover letter and Questionnaire for Panel Members

February 15, 1980

Dear :

I am writing to request your assistance in a case study of a proposal evaluation process in which you participated in April of 1976. The procurement was for the development of evaluation systems for experiments in government procurement on behalf of the Experimental Technology Incentives Program (ETIP). This case study is designed to assess the effectiveness of the method which ETIP used to solicit and evaluate proposals. Your answers to the enclosed questions will provide ETIP with a basis for reaching conclusions on several parts of this evaluation. The total time for your participation will probably be between a half hour to an hour.

As you may recall, one of the key characteristics of the RFP was the use of a factor/sub-factor structure which required responses to issues which were thought to be critical for the procurement. To help you in answering the questions I have enclosed a list which contains the factor and sub-factor names and a summary statement of each one.

You need not mail the questionnaire back. I will be calling you in about a week to try to provide any clarifications and to obtain your answers. Prior to this, please go through the questions and write down your initial answers. Your name or the name of the firm which you represented will not be identified in the report on this research.

This case study will be published in NTIS and be disseminated to people interested in the procurement of evaluation systems.

Sincerely,

Bud Libman
Policy Analyst
Experimental Technology Incentives Program
Center for Field Methods

Enclosures

If yes, what were these gaps? _____

c) Were you able to readily locate the information in the proposals which was relevant to the issues you were evaluating?

___ Yes ___ No

If no, what changes in the structure would have helped you to more readily locate the information? _____

2. This question addresses the appropriateness of the sub-factors which were included in the RFP.

a) Did you feel that the sub-factors encompassed most of the issues which would be critical to designing the evaluation systems which ETIP desired?

___ Yes ___ No

If no, which important issues were not adequately covered? _____

b) Did you feel that many of the sub-factors dealt with issues unimportant for designing the evaluation systems which ETIP desired?

___ Yes ___ No

If yes, which sub-factors or issues did you feel were unimportant? _____

3. This question addresses whether the number of proposals evaluated was sufficient to enable panel members to be confident in their ratings.

Do you feel that being able to rate more proposals would have increased your confidence in the accuracy of the scores which were assigned?

- a) For the agency impact evaluation system contract?

___ Yes ___ No

If yes, about how many more? ___

- b) For the commercial impact evaluation system contract?

___ Yes ___ No

If yes, about how many more? ___

4. This question addresses the effectiveness and the equity of the lack of restrictions on admissible information. Of concern is the effect of knowing the identity of the bidders (i.e., non-blind evaluation) and being able to use reports of the experiences of other panel members who had previously worked with the bidders.

Did being able to use all available information about bidders in the evaluation:

- a) improve the accuracy of the scores?

___ Yes ___ No

- b) introduce unfair bias into the scores?

___ Yes ___ No

If yes, how did this occur? _____

5. What did you feel the strongest aspect of the evaluation process was? _____

6. What did you feel the weakest aspect of the evaluation process was? _____

7. Approximately how many other evaluation panels have you served on?

8. Of the total number of other proposal evaluation panels which you have served on, about how many were for projects of the magnitude (i.e., 200 man-months), complexity, and uncertainty of this one?

Bidders were furnished the following information either in the Preliminary Description or at the first Bidders Conference on February 26, 1976:

Information for Prospective Bidders

Corrected Version of the Commerce Business Daily Announcement

Introductory Notes

Definitions

Statement of Work

Statement of Work (with illustrative sub-items for Phase One)

Proposed Schedule - Overall

Schedule Phase One

Scope of Effort

Proposal Preparation Procedure (with revisions)

Proposal Evaluation Factors

Proposal Evaluation Factors with Illustrations

Numerical Weights for Proposal Evaluation Factors

ETIP Program Plan, dated February 5, 1974

ETIP Progress Report, dated April 4, 1975

ETIP Progress Report, dated August 1975

Selected Bibliography of Published Documents Related to This Procurement

Message from the President of the United States Concerning Science and Technology

Evaluation System Design Process

Description of Governmental Procurement Policy Program - ETIP

The Council of State Governments and Associated Organizations

NIGP Dictionary of Purchasing Terms

NIGP 1974 Annual Conference and Products Exposition

Memorandum to Members Regarding NIGP/ETIP Project, dated October 9, 1975

Memorandum to Members Regarding NIGP/ETIP Project on Window Air Conditioners,
dated November 26, 1975

NIGP Membership Application

Prerequisites for Certification of Public Purchasing Agents

NIGP Letter Service

APPENDIX G

Cover letter and Questionnaire for Bidder Representatives

February 15, 1980

Dear :

I am writing to request your assistance in a case study of a Department of Commerce procurement which you responded to in April of 1976 (RFP 6-35736). The procurement was for the development of evaluation systems for experiments in government procurement on behalf of the Experimental Technology Incentives Program (ETIP). This case study is designed to assess the effectiveness of the method which ETIP used to solicit and evaluate proposals. Your answers to the enclosed questions will provide ETIP with a basis for reaching conclusions on several parts of this evaluation. The total time for your participation will probably be between a half hour to an hour.

As you may recall, one of the key characteristics of the RFP was the use of a factor/sub-factor structure which required responses to issues which were thought to be critical for the procurement. To help you in answering the questions I have enclosed a list which contains the factor and sub-factor names and a summary statement of each one. I have also enclosed a list of the written materials which were included with the RFP.

You need not mail the questionnaire back. I will be calling you in about a week to try to provide any clarifications and to obtain your answers. Prior to this, please go through the questions and write down your initial answers. Your name or the name of the firm which you represented will not be identified in the report of this research.

This case study will be published in NTIS and be disseminated to people interested in the procurement of evaluation systems.

Sincerely,

Bud Libman
Policy Analyst
Experimental Technology Incentives Program
Center for Field Methods

Enclosures

Background Note

The RFP to which these questions refer was for the procurement of two systems to evaluate the impacts of experiments with government procurement methods. One system was to evaluate impacts on the commercial sector and the other was to evaluate impacts on government agencies. They were each estimated to require 200 man-months of effort for the first two phases of development.

It appeared to ETIP that there was considerable complexity and uncertainty involved in developing these systems. Complexity came in part from requirements to combine the technical concerns of doing evaluations and designing the systems with the political concerns of meeting the information needs of people at different levels in several organizations. Uncertainty was present since objectives were expected to shift over the three year period of the contracts.

Questions

1. This question addresses the effectiveness of the RFP's factor/sub-factor structure for enabling bidders to demonstrate their qualifications.

- a) Did you feel that the factor/sub-factor structure enabled bidders to demonstrate their ability to deal with the problems which might arise during the project?

___ Yes ___ No

If no, what modifications in the structure would have enabled bidders to better demonstrate their abilities? _____

- b) Did following the factor/sub-factor structure create any problems for your team, in trying to demonstrate its capability, which would not have been present if a different structure had been used?

___ Yes ___ No

If yes, what special problems were created by the sub-factor structure? _____

c) Was your team in any manner placed at a competitive disadvantage because you had to follow the factor/sub-factor structure?

___ Yes ___ No

If yes, please describe how you were disadvantaged. _____

2. This question addresses whether the proposal format enabled bidders to be confident that:

- (1) they included information in their proposals on all of the capabilities which the evaluation panel would be looking for, and
- (2) the panel would be able to find this information when it was needed.

a) Were you confident that you had written something to demonstrate your qualifications on all of the capabilities which the panel would be evaluating?

___ Yes ___ No

If no, why not? _____

b) Were you confident that the panel would find the information in your proposal which was relevant to each specific capability at the time when that capability was being evaluated?

___ Yes ___ No

If no, what information did you feel might be overlooked and why did you feel that this might happen? _____

3. This question addresses whether the information included in the solicitation document, the supporting documents and the two briefings gave bidders a sufficient general understanding of what ETIP wanted to buy. Since many of the specific objectives of the projects were not known when the RFP was issued the concern here is whether sufficient information was provided on the general nature of the projects to enable bidders to respond effectively to the sub-factor issues.

a) Did the information provided by ETIP allow you to assess the skills which would be required to do the work?

___ Yes ___ No

If no, what additional information would have helped? _____

b) Was ample information provided in the briefings and supporting documents so that you were confident that you had sufficiently related the sub-factor issues to the objectives of the projects?

___ Yes ___ No

If no, what type of additional information would have been useful? _____

4. This question addresses the appropriateness of the sub-factors which were included in the RFP.

a) Did you feel that the sub-factors encompassed most of the issues which would be critical to designing the evaluation systems which ETIP desired?

___ Yes

___ No

If no, which important issues were not adequately covered? _____

b) Did you feel that many of the sub-factors dealt with issues unimportant for designing the evaluation systems which ETIP desired?

___ Yes

___ No

If yes, which sub-factors or issues did you feel were unimportant? _____

5. This question addresses the degree to which bidders understood the proposal evaluation process which ETIP used.

a) Did the information provided enable you to understand the process which ETIP would use to assign scores on each sub-factor?

___ Yes

___ No

If no, please describe which aspects of the evaluation process were not clear. _____

b) Did the information provided enable you understand how the ratings on the various sub-factors would be combined to arrive at final scores?

___ Yes

___ No

If no, what aspects of this were not clear? _____

6. This question addresses whether the process of combining scores appeared equitable. The RFP provided weights for combining the factor scores into a final score. However, the relative weightings of the sub-factors within the factors was left to the discretion of each factor team. Were you concerned that not specifying the relative weightings of the sub-factors might lead to inequities in the process?

___ Yes ___ No

If yes, how so? _____

7. Did you feel that the process would be a) ___ difficult or b) ___ easy to corrupt? i.e., For one person, or a group of people, who favored a specific bidder to exercise sufficient control over the process to sway the award decision. Please explain your answer. _____

8. Approximately how many other RFPs have you responded to?

9. Of the total number of other RFPs which you have responded to, about how many were for projects of similar size (i.e., 200 man-months), complexity, and uncertainty as this one?

10. What do you feel was the strongest aspect of the process which ETIP used?

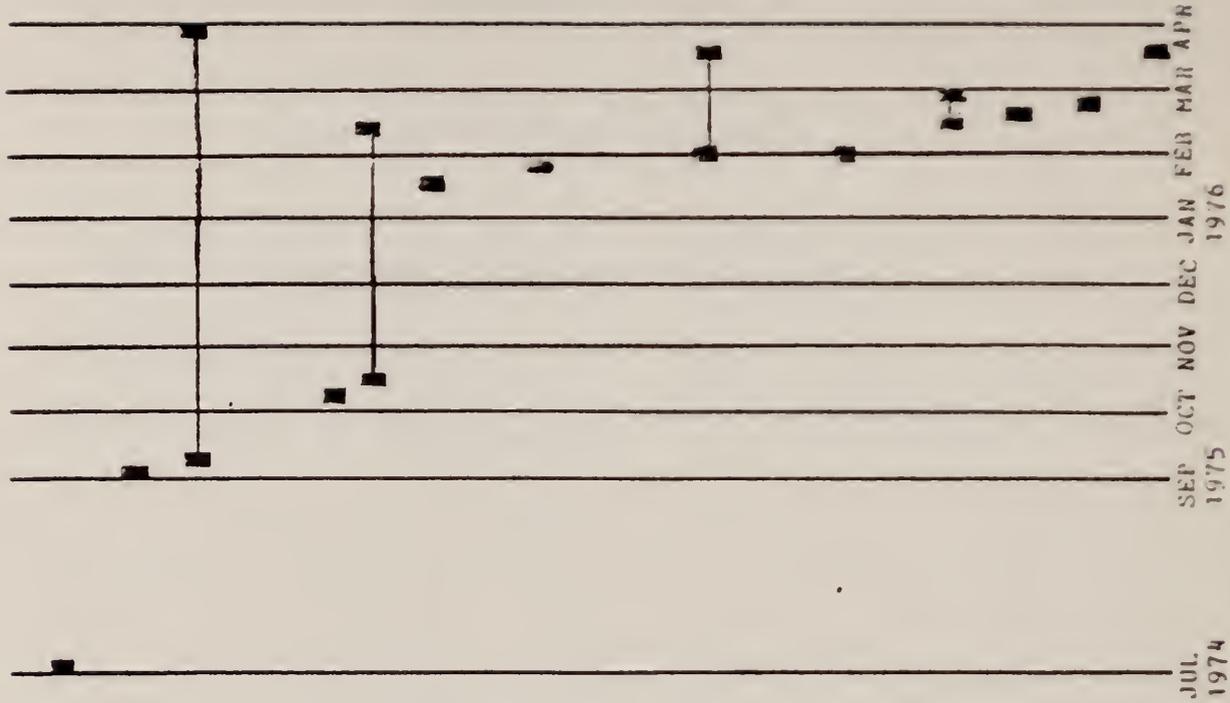
11. What do you feel was the weakest aspect of the process which ETIP used ?

APPENDIX H

Enlargement of Figure IV.1

The Activities in ETIP's Source Selection

- DECISION TO CONTRACT FOR EVALUATION SYSTEMS
- ETIP Director begins to plan to integrate evaluation into program's projects
 - COTR for evaluation contracts arrives at ETIP
 - Writing, review and approval of project plans--COTR, ETIP staff, NBS administration, PAA staff
- PREPARING THE REQUEST FOR PROPOSALS
- COTR asks Thompson to write RFP
 - Writing of RFP--involving Thompson, COTR, ETIP staff
 - Program decision to award two contracts--ETIP Director, COTR, Thompson
- INVOLVING THE CONTRACTING OFFICE
- Initial meeting with contracting office to begin procurement process -- Contracting officer, Contract Negotiator, COTR, Thompson, ETIP administrative officer
 - Solicitation document is prepared & briefings are scheduled by contract negotiator
- INVOLVING NBS MANAGEMENT
- NBS Acting Director informed by ETIP Director of intent to award contracts
- INVOLVING THE PROGRAM ADMINISTRATIVE AGENCIES
- FSS staff reviews draft RFP
- INVOLVING THE PROSPECTIVE BIDDERS
- CBD announcement is published & draft RFP issued
 - Pre-bidders conference--ETIP staff, contract negotiator, prospective bidders
 - Bidders conference & release of final solicitation document--ETIP staff, contract negotiator, prospective bidders



SELECTING AND INVOLVING THE EVALUATION PANEL.

- COTR & author invite people to join panel
- Evaluation panel members briefed by COTR & Thompson

THE PROPOSALS ARRIVE

- Closing date for submission of proposals
- Evaluation panel meets for initial review of proposals

THE FACTOR TEAMS MEET

SUMMARIZING RESULTS FOR THE CONTRACTING OFFICE

- COTR & author write memo to contract negotiator

PREPARING FOR ORALS

- Cost proposals reviewed & questions prepared by COTR, author, Thompson, contract negotiator, ETIP staff

ORALS & WRITTEN CONFIRMATIONS

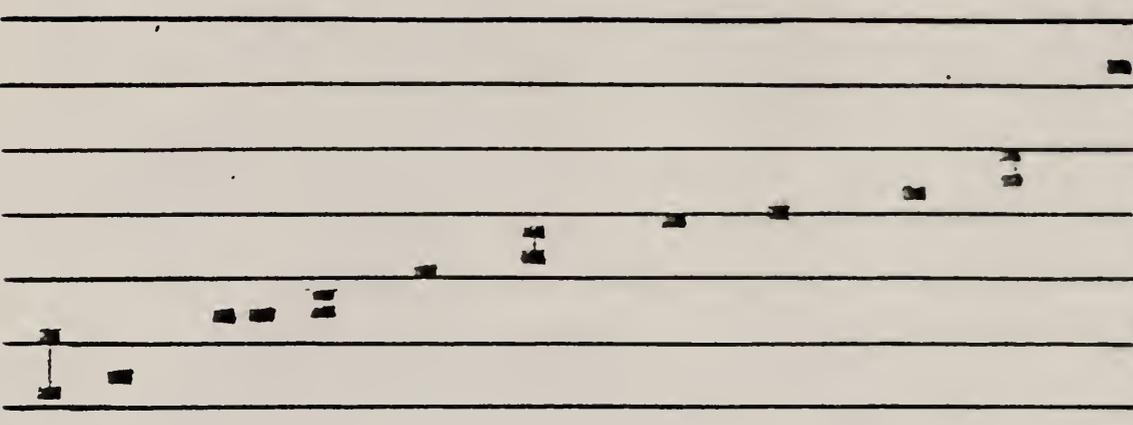
- Oral clarification sessions held with 3 bidders--contract negotiator, COTR, Thompson, ETIP staff
- Written questions for clarification submitted to 3 bidders--COTR, Thompson, ETIP staff

SUMMARY OF RESULTS & AWARD

- Written responses received & reviewed & recommendation on award made by COTR, author, Thompson, ETIP staff
- Negotiation & contracts signed--contract negotiator, contracting office

DEBRIEFING

- by COTR, contract negotiator & author



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| 15. SUPPLEMENTARY NOTES

<input type="checkbox"/> Document describes a computer program; SF-185, FIPS Software Summary, is attached. | | | |
| 16. ABSTRACT (A 200-word or less factual summary of most significant information. If document includes a significant bibliography or literature survey, mention it here.)

This document is a report of a case study of the use of a system contractor source selection process by a federal program. It is intended to be of both research and administrative value. Its primary research value is as a bench mark for future case studies on source selection techniques in general and for future research on the specific source selection process reported on here. Its primary administrative value is to those responsible for procuring systems (and other complex and uncertain products, e.g., large evaluations) as an evaluation of the outcome of the use of the specific technique in terms of the issues critical to effective source selection.

The specific problem for which the technique was used was the selection of two contractors to develop an ongoing capability to evaluate the results (agency and commercial impacts) of experimental modifications in procurement procedures by selected federal, state, and local government agencies. These evaluation systems were to be implemented by organizations outside of the developing organization.

The report of this research is the author's doctoral dissertation. His committee chairman is the developer of the technique being evaluated. A self-report of the author's biases appears in section III.5. | | | |
| 17. KEY WORDS (six to twelve entries; alphabetical order; capitalize only the first letter of the first key word unless a proper name; separated by semicolons) Acquisition research; administrative experiment; evaluation systems; Experimental Technology Incentives Program; proposal evaluation procedures; proposal preparation procedures; source selection; systems acquisition | | | |
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