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Report To The President  
And The Congress

By The Professional Audit Review Team

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# Performance Evaluation Of The Energy Information Administration

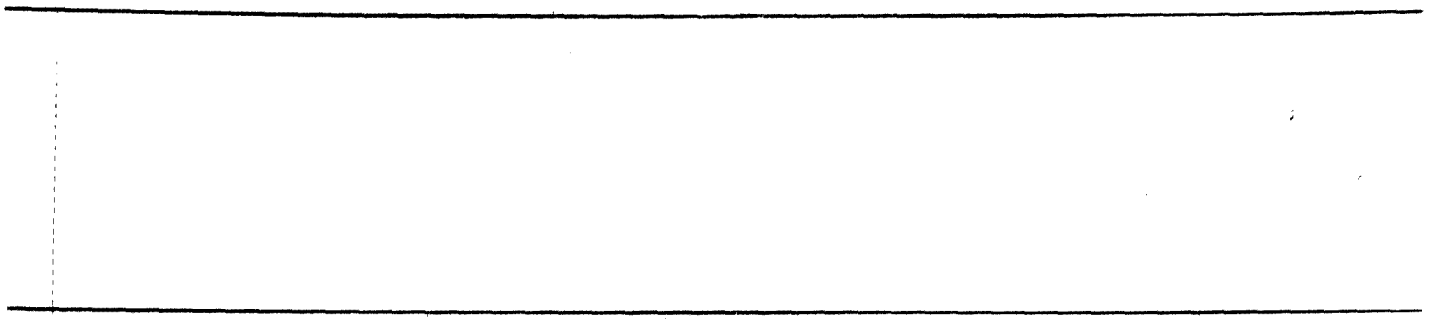
*Department Of Energy*



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April 16, 1986

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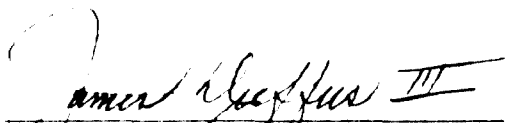
441 G Street, N.W.  
Washington, D.C. 20548


April 16, 1986


To the President of the United States,  
the President of the Senate, and the  
Speaker of the House of Representatives

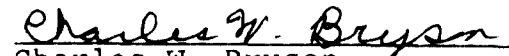
This report discusses the results of the Professional Audit Review Team (PART) evaluation of the performance of the Energy Information Administration (EIA), as required by the Department of Energy Organization Act (Public Law 95-91, August 4, 1977). The report covers EIA activities during fiscal years 1984 and 1985.

Copies of this report are being sent to the Secretary of Energy, the Director of the Office of Management and Budget, the chairmen of the energy-related congressional committees, and to the heads of the PART member agencies.

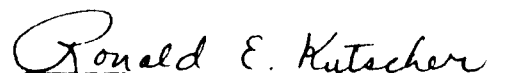
  
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## EXECUTIVE SUMMARY

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The energy crises of the past decade increased awareness of the need for comprehensive energy information programs. To meet this need, the Energy Information Administration (EIA) was established to develop and maintain information for national energy policy decisions.

Congress created the Professional Audit Review Team (PART) to evaluate periodically whether EIA performed its activities independently, objectively, and professionally. PART is reporting on its evaluation for fiscal years 1984 and 1985. A principal objective of this review was to follow up on recommendations made in PART's 1984 report.

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## BACKGROUND

The Department of Energy Organization Act established EIA as the federal focal point to collect, process, and publish data and information relevant to energy resource reserves, production, demand, and technology. The act also recognized the need to ensure that energy data collection and analysis functions are not biased by political considerations or energy policy formulation and advocacy activities. (See p. 8.)

PART, composed of members from leading federal statistical and analytical agencies, previously made several recommendations for expanding and improving EIA's quality control and assessment activities to ensure the accuracy and credibility of energy information.

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## RESULTS IN BRIEF

EIA implemented several of the recommendations PART made in its 1984 report, resulting in improvements in EIA's management of the quality of its data and analyses.

However, further progress is needed in EIA's data quality evaluation. Specifically, EIA

- has not yet established a cycle detailing the scope and frequency of its quality audits, and

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**EXECUTIVE SUMMARY**

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--has models and data collection systems whose documentation did not meet EIA standards or were in need of evaluation or updating.

In addition, PART noted one instance in which EIA did not disclose the extent of its involvement with a requesting agency in the establishment of study criteria. This could give the appearance of EIA not being independent.

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**PRINCIPAL FINDINGS**

Management of quality program

Ensuring the quality of energy information was a principal reason for EIA's creation. A primary method of doing this is through quality audits assessing its data collection process. However, EIA has not established any standards on the scope and frequency of quality audits.

EIA has performed quality audits for about 35 percent of its data collection forms and has issued reports assessing quality of data for most of its major fuel use areas. However, the number and frequency of quality audits EIA does are determined by staffing considerations rather than quality assurance needs. (See p. 16.)

When an EIA report relies on statistics from a data collection system, on analyses or forecasts provided by a model, EIA is required by law to provide documentation (descriptions of how the system or model operates). This allows others a basis for evaluating the quality of the data and analyses. Although EIA improved model documentation, PART noted that documentation for 7 of 27 basic models did not meet EIA standards. (See p. 18.)

EIA's independence

Congress created EIA as a separate entity within the Department of Energy, purposely distinguishing EIA's energy data collection and applied analysis functions from the Department's responsibility for formulating and advocating national energy policy.

In 1984 and 1985, EIA performed studies done at the request of the Secretary of Energy, the results of which were used by the Secretary to

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**EXECUTIVE SUMMARY**

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reach a decision on the viability of the uranium mining and milling industry. EIA did not disclose, however, its involvement in developing the criteria on which the viability determination was based.

PART's limited work in this area did not disclose any problems with the manner in which the studies were carried out. However, PART believes that the failure to disclose EIA's involvement could give an appearance of EIA not being independent. (See p. 36.)

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**RECOMMENDATIONS**

PART is making several recommendations for improving EIA operations. The principal recommendations are that the Administrator, EIA

- Systematically plan and carry out quality audits of EIA's data collection activities, with consideration as to how often each system needs auditing. (See p. 17.)
- Have the documentation for all basic models evaluated and brought into compliance with EIA standards; take steps to update the documentation of data collection systems. (See p. 20.)
- Help assure that the criteria-setting process is independent by ensuring that each report fully disclose the scope and extent of involvement of both EIA and the requesting agency in the establishment of the study criteria. (See p. 37.)

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**AGENCY  
COMMENTS**

PART obtained official EIA comments on this report. (See app. I.) EIA endorsed the spirit of this report's conclusions and recommendations but noted that resource constraints require EIA to perform better with fewer resources.

With respect to planning and carrying out quality audits systematically, EIA stated that its strategy is responsive to the highest priorities of quality maintenance on the most timely basis in view of limited resources. PART recognizes

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**EXECUTIVE SUMMARY**

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resource constraints, however, PART believes that such a response will not identify overall evaluation needs.

Concerning documentation, EIA noted that it is on schedule in evaluating and bringing all documentation into compliance with its standards. However, EIA did not provide any specifics as to the extent of progress toward meeting documentation goals.

With respect to criteria setting on the uranium viability studies, EIA noted that while each report did not disclose EIA's role, report appendices did. PART does not believe that the disclosure in the report appendices clearly identifies the respective roles of EIA and the Secretary of Energy.

# C o n t e n t s

	<u>Page</u>
EXECUTIVE SUMMARY	2
CHAPTER	
1 INTRODUCTION	8
EIA's organizational structure	8
Transition in energy information programs	9
Role of Professional Audit Review Team	10
Objectives, scope, and methodology	10
2 PROGRESS IN EIA'S QUALITY PROGRAM NEEDS TO BE CONTINUED	12
Overall evaluations of data quality	12
Conclusions	16
Recommendation	17
Agency comments	17
Documentation of statistical and forecast reports needs further improvement	17
Conclusions	19
Recommendations	20
Agency comments	20
Successful resolution of problems in quality functions and responsibilities	20
Conclusions	23
Recommendation	24
Agency comments	24
Frames maintenance being performed	24
Conclusion	25
3 STAFFING AND PLANNING ACTIVITIES	26
Staffing needs assessment study	26
Conclusion	27
Comprehensive planning process	27
Conclusion	28
4 PROGRESS IN DETERMINING USEFULNESS OF EIA'S DATA AND PUBLICATIONS	29
Data requirements reviews are being performed or planned	29
EIA evaluates use of prior reviews	32
Conclusions	33
5 EIA'S INDEPENDENCE AND OBJECTIVITY	34
System to monitor client-requested analyses still not in place	34
Appearance of not being independent	35
Conclusions	37
Recommendation	37
Agency comments	37



## APPENDIX

I	Advance comments from the Energy Information Administration	38
II	Organization chart - Energy Information Administration	41
III	Elements of documentation for EIA models	42
IV	Elements of documentation for data collection systems	44
V	Description of the quality control categories	45

### ABBREVIATIONS

DOE	Department of Energy
EIA	Energy Information Administration
OPR	Office of Planning and Resources
OSS	Office of Statistical Standards
PART	Professional Audit Review Team

## CHAPTER 1

### INTRODUCTION

Energy crises during the past decade increased the nation's awareness of its energy problems and the need for adequate information to formulate and develop energy policies and programs. Twenty-three executive departments and independent agencies operated 238 major energy data gathering programs in 1976.

Established by the Department of Energy (DOE) Organization Act (42 U.S.C. 7101) in 1977, the Energy Information Administration (EIA) was made the federal focal point for developing and maintaining comprehensive energy information programs. In accordance with the act, EIA was given responsibility for information systems previously situated in the Federal Power Commission, the Bureau of Mines, and the Federal Energy Administration. The act also transferred to EIA the responsibilities of its predecessor, the Federal Energy Administration's Office of Energy Information and Analysis. These responsibilities included carrying out a unified program to collect, process, and publish data and information relevant to energy resource reserves, production, demand, and technology.

The DOE Organization Act specified that EIA be organized as a separate entity within DOE, separated from DOE's role in formulating and advocating national energy policy. EIA was to be headed by a professionally qualified administrator appointed by the President with the advice and consent of the Senate. In specifying the character of EIA and in describing some of the statistical and forecasting capabilities and reports it desired, the Congress attempted to create an organization capable of providing credible energy data and analyses necessary for sound decisions on national energy policy.

#### EIA's ORGANIZATIONAL STRUCTURE

During our review there was a change of Administrators. Mr. J. Erich Evered resigned effective November 16, 1984. Dr. Helmut A. Merklein received a recess appointment on December 31, 1984, and his permanent appointment was confirmed by the Senate on May 17, 1985.

Three offices--Oil and Gas; Coal, Nuclear, Electric and Alternative Fuels; and Energy Markets and End Use--are the program offices responsible for collecting, producing, and analyzing information on major fuel areas. (See organization chart in app. II for principal components of EIA.) The data provided by these offices are published in statistical periodicals, special studies, and analysis reports.

The Office of Oil and Gas collects, processes, and interprets data about crude oil, petroleum products, natural gas, and natural gas liquids. The office also analyzes and projects the level and distribution of petroleum and natural gas reserves and production.

The Office of Coal, Nuclear, Electric and Alternative Fuels gathers and integrates data on coal, nuclear energy, electric power, and alternative fuels. It also develops projections of supply and demand for the fuels.

The Office of Energy Markets and End Use develops and operates EIA's statistical and forecasting information systems on energy consumption and supply. The office collects and processes data on energy consumption, supply and demand balances, prices, and economic and financial matters. It also prepares and publishes reviews of foreign energy developments that could affect the U.S. economy.

Five additional offices provide support services for EIA. The Office of Statistical Standards (OSS) provides EIA with strategies for survey and statistical design and monitors quality control for information collection, analysis, and forecasting. The office manages the clearance process of energy data forms for public use. The office also monitors and assesses the quality and meaningfulness of energy information and the processes used to collect, analyze, and forecast information. It provides periodic reports on quality control activities throughout EIA.

The Office of Planning and Resources (OPR) manages EIA's program planning, evaluation, project control, budgeting, procurement, personnel, and legislative support services. The ADP Services Staff provides computer-processing support for DOE's energy information programs, including those of EIA, the Federal Energy Regulatory Commission, and other DOE organizations.

The National Energy Information Center edits manuscripts and prepares graphics for EIA publications and distributes all EIA products. The center also responds to public inquiries. The Systems Integration Staff provides direction for the integration of major energy information and modeling systems and coordinates these systems with ongoing EIA activities and needs. At the conclusion of our audit, it had not been fully staffed.

#### TRANSITION IN ENERGY INFORMATION PROGRAMS

Since fiscal year 1982, EIA has had to adjust to fluctuations in its available funding and staffing levels. From 1978 to 1980, EIA's funding had almost doubled from about \$49 million to about \$91 million. However, in 1982 funding had decreased to about \$79 million and since that time it has ranged around \$65 million. At

the close of 1978, EIA had 744 full-time permanent staff, and by 1980 staff had increased to 906. In 1983, there were 480 full-time equivalents (yearly staff average), and since then the staff level has remained at 490 full-time equivalents.

#### ROLE OF PROFESSIONAL AUDIT REVIEW TEAM

The Congress, in the DOE Organization Act, mandated that the Professional Audit Review Team (PART) make an annual review and evaluation of EIA's work and determine whether data collection and analytical activities are being performed in an objective and professional manner consistent with the intent of the Congress.

This is the fifth report that PART has issued since its initial report of December 5, 1977. This report is intended for the use of the President of the United States and the Congress in obtaining a current perspective on EIA's operations and its overall performance.

In accordance with the authorizing legislation, PART consists of a Chairman, designated by the Comptroller General of the United States, and members drawn from the following federal agencies:

- Bureau of the Census,
- Bureau of Labor Statistics,
- Council of Economic Advisers,
- Federal Trade Commission,
- Securities and Exchange Commission.

PART staff members during the period covered by this report and their agency affiliations were

- Mr. David D. Cahalen, General Accounting Office
- Mr. Carl D. McClure, General Accounting Office
- Mr. L. Lewis Adams, General Accounting Office
- Mr. James R. Callis, Jr., General Accounting Office
- Ms. Martha Mister, General Accounting Office

#### OBJECTIVES, SCOPE, AND METHODOLOGY

Our objective was to determine whether EIA's data collection and analytical activities were performed objectively and professionally, consistent with the intent of the Congress.

We reviewed EIA's

- quality maintenance activities (ch. 2),
- staffing and planning processes (ch. 3),
- efforts to determine the relevancy of energy data and publications (ch. 4), and
- independence from policy formulation and advocacy functions (ch. 5).

In each of the above areas, we gave particular attention to following up on EIA activities since our last report in 1984.<sup>1</sup> Our review covered EIA activities during fiscal years 1984 and 1985.

In performing our evaluation, we examined EIA policies, procedures, records, and other documents relating to its operations. We also interviewed EIA officials responsible for program planning, energy models, quality maintenance, and relevancy of data and publications. In addition, to obtain the widest possible range of information upon which to base our evaluation of EIA, we attended committee meetings where energy data collection, validation, forecasts, and energy modeling matters were discussed by energy officials from the business, research, and educational areas.

In the following chapters, the discussions of our findings include descriptions of the specific methodologies we employed. Our review was performed in accordance with generally accepted government auditing standards.

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<sup>1</sup>PART, Performance Evaluation of the Energy Information Administration, PART-84-1, June 15, 1984.

## CHAPTER 2

### PROGRESS IN EIA'S QUALITY

#### PROGRAM NEEDS TO BE CONTINUED

In 1979, EIA established a long-range plan whose goal was to validate all energy systems by 1986. Since its establishment EIA has emphasized the importance of its quality functions; however, our prior reports noted that EIA's progress in determining the accuracy and reliability of its energy information was not adequate. Further, as a result of budget reductions in recent fiscal years, the scope and depth of EIA activities directed toward assuring the quality of its products were drastically reduced.

In our 1984 report we stated that EIA

- did not have an adequate basis for making an overall judgment on the quality level of its data;
- had not developed adequate documentation of its models which would enable others to evaluate the quality of its analyses;
- had not clearly assigned responsibilities for ensuring quality, developed a uniform quality control strategy, or provided broad direction for conducting quality control work; and
- needed to make improvements in the universes from which it collected its data.

The Administrator agreed with our recommendations for addressing these problems. During our current review, we found that while EIA had made progress in implementing our recommendations, further progress is needed to provide an adequate basis for evaluating the overall quality level of its data and analysis products.

#### OVERALL EVALUATIONS OF DATA QUALITY

Our 1984 report concluded that EIA did not have an adequate basis for making an overall judgment on the quality level of its data because it had made little progress in its quality control and assessment activities since our last review.

#### Development of quality audit program

One of the primary ways that EIA used to evaluate the accuracy of the data it collected and published was through validation studies. Validation studies were wide-scoped evaluations of all aspects of EIA's data collection forms,

including the statutory basis for the collection, the determination of data needs, the performance of cost-benefit studies, the ability of respondents to provide the data, and the determination of various error rates.

In our 1982 report, we noted that EIA's emphasis on the validation function had been scaled back drastically.<sup>1</sup> In our 1984 report, we found that EIA had continued to deemphasize its validation studies. Fourteen data validation studies had been completed between early 1979 and the latter part of 1982. These 14 studies covered only about 16 percent of the total forms in use at March 1983. At that time, the Director of the Quality Assurance Division, OSS, told us that EIA had decided that the large-scale validation studies were too expensive to perform and that other methods would have to be used to assess data quality.

In place of validation studies, OSS now performs quality audits. According to the Director, quality audits are more focused, more timely, and less expensive than validation studies. The primary purposes of the quality audits are to

- determine whether the manual and automated procedures of the data collection system collect and process data in a manner which ensures data reliability and produces accurate and timely information,
- ensure that the system documentation accurately describes the data collection and processing procedures, and
- evaluate the extent of that system's compliance with current applicable EIA standards.

The quality audit program was still in its early stages at the time of our 1984 report. Therefore, in that report, we recommended that the Administrator have the Director, OSS

- Develop a plan for expediting its audits of the quality of EIA's data and for providing more current and detailed coverage in assessing the quality of EIA's major data series.
- Continue the development of the concept of quality audits by
  - (a) issuing guidelines that describe quality audits and include recognition of the quantitative measures that result from the statistical process and can be used to describe the level of quality, and

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<sup>1</sup>PART, Performance Evaluation of the Energy Information Administration, PART-82-1, May 19, 1982.

- (b) requesting that an independent statistical professional group (such as the American Statistical Association's Committee on Energy Statistics) evaluate the concept of quality audits and the frequency and scope of coverage of accuracy controls.

#### Audit cycle

An important aspect of the quality audit program is the frequency of the audit or the audit cycle. The dynamic nature of EIA's subject dictates that quality evaluations be periodically performed, or knowledge of the data quality grows stale. There are changes both in energy firms supplying information to EIA and their personnel as well as changes in EIA's personnel, forms, and procedures.

While EIA had a plan and goal for validation studies, it has not yet established a similar goal or plan for quality audits. Instead, audits of the individual data collection systems are initiated on the basis of staff and budget resources rather than on the frequency needed to keep the knowledge of the quality of the data current. Officials of the Quality Assurance Division informed PART that the rate at which the quality audits are performed is limited by personnel constraints. The division is now performing eight quality audits each fiscal year.

Because of staff ceilings during the past two fiscal years, only one person is presently available to supervise the contractors performing the quality audits. The Director of the Quality Assurance Division said that if the number of quality audits were increased, the supervisor would not have enough time to supervise properly the contractors' work. The division director also pointed out that eight quality audits per fiscal year represent an increase over the rate (about six) that PART had noted in its 1984 report.

Between April 29, 1983, when the first quality audit was done, and July 12, 1985, EIA issued 14 quality audit reports covering 30 data collection forms. Eight reports each covered a single data collection form, and the remaining 6 covered 2 to 8 related forms. There were 86 data collection forms in use by EIA as of October 1984. Therefore, about 35 percent of the data collection forms had been covered by a quality audit by July 12, 1985.

In a September 1984 memorandum to the Deputy Administrator, the Director, OSS, said that OSS was not intending to do quality audits of all data collection forms, but rather would use a nonrandom sample. The Director, Quality Assurance Division, told us that the selection of data collection forms to be covered by the quality audits was carefully planned each fiscal year. He, and others involved in this planning, said that the selection



takes into consideration coverage of all program offices and all fuel areas, the importance of the survey, the frequency of form modifications, and the resources that the program office had invested in the survey.

#### Audit guidelines

With respect to issuing guidelines describing quality audits, we were told by the Quality Assurance Division that two differing approaches had been used in the first four audits and had been combined for the succeeding audits. The combined approach was accomplished through an informal change to the statement of work for the contractors. Also, a checklist was developed to augment the combined approach. The statement of work was further revised in December 1984 to reflect these changes.

#### Independent professional evaluation

Because the quality audit concept involves evaluation of compliance with EIA's standards for data collection activities, in our 1984 report we recommended that EIA have the concept evaluated by an independent statistical professional group. This was done during EIA's April 12 and 13, 1984, meeting with the American Statistical Association's Committee on Energy Statistics.

EIA presented a paper to the Committee which described the quality audit program and identified the evaluation criteria and techniques used in the program. EIA asked for comments from the Committee on (1) coverage of topics used as evaluation criteria, (2) specific techniques proven effective in other areas of auditing that could be used in this context, and (3) suggestions for making the results available that would be most helpful to energy data users.

There was discussion of the subject by the Committee and no suggestions for changing the quality audit concept were made.

#### Assessment of the quality of EIA data from all data collection series

Another source of information about the quality of EIA's data products is the so-called "State-of-the-Data" reports, which provide in a single document what EIA knows about the quality of the data series being addressed. Most of these are prepared by OSS, but some reports are also prepared by the program office operating the data collection series.

State-of-the-Data reports use two approaches to assess the quality of the data series. The first is to describe the data collection and processing, with particular emphasis on where errors may enter in the data and what EIA is doing to minimize

these errors. The second is to compare the data series to similar data series, usually published by others, with particular emphasis on the differences among the series and the source and effect of the differences.

The two approaches are complimentary in that the first provides information on how the data collection and processing affect the quality of the data, while the second provides a basis for discovering potential problems in the universe of respondents providing the data, potential problems in the definitions used, and changes in (or aspects of) the industry of which EIA was unaware.

In our 1984 report, we noted that EIA had issued two such reports and concluded that they fell short of providing a comprehensive assessment of the quality of EIA's principal data series. We recommended that the Administrator have the Director, OSS, develop a plan for providing more current and detailed coverage in assessing the quality of EIA's major data series.

EIA has now issued five additional State-of-the-Data reports, covering all major energy topic areas, except alternative fuels and energy consumption by end users. It is planning a report to cover the consumption areas next. It also has issued three reports on the results of its verification of respondents' annual reports of oil and natural gas reserves for the years 1977 through 1980, and plans to continue this series.

### Conclusions

While EIA has made some improvement in obtaining information to judge the quality of its data since our 1984 report, more needs to be done. EIA has (1) issued State-of-the-Data reports on the quality of the data for most of its major fuel areas, (2) issued reports on the verification of data on oil and natural gas reserves, and (3) developed a program of quality audits to assess the quality of its data collection process. It is in the last area, however, where improvement is needed.

When validation studies were the principal quality control, EIA had established a goal to validate all systems by 1986. However, when EIA switched from validation studies to quality audits, it did not establish a similar goal for quality audits. As of July 12, 1985, EIA had performed quality audits on data systems covering about 35 percent of its data collection forms. The number and frequency of quality audits that EIA performs are determined by staffing considerations rather than need. EIA should establish an audit cycle detailing the scope and frequency of quality audits to be performed. Some systems may need to be audited more frequently than others. While EIA has continued to develop the concept of quality audits, it has not established a

systematic plan for carrying them out. Therefore, EIA does not have a basis for making adequate judgments on the quality of its data.

### Recommendation

We recommend that the Administrator systematically plan and carry out quality audits of EIA's data collection activities. Consideration should be given to how often each system needs auditing.

### Agency comments

The Administrator, in commenting on this recommendation (see app. I), stated that EIA's selection of data collection forms to receive quality audits "is responsive to the highest priorities of quality maintenance on the most timely basis possible while reflecting the actual resources available to perform the work."

We recognize that available resources may constrain the extent of quality maintenance activities. Yet, without an overall plan which would identify the need for and the relative priority of quality audits for the individual data collection forms, there is no assurance that EIA in fact does focus on the highest quality maintenance priorities.

### DOCUMENTATION OF STATISTICAL AND FORECAST REPORTS NEEDS FURTHER IMPROVEMENT

Under the DOE Organization Act, EIA is required to ensure that adequate documentation for its statistical and forecast reports is made available to the public when the reports are published. Models provide the basis for forecast reports and computer-based data collection systems supply the basis for statistical reports.

For models, EIA requires that such documentation include a description of the purpose, methodology, assumptions, capabilities, and limitations. (See app. III for a description of the elements of model documentation required by EIA.) Model documentation facilitates revising or updating the model and training new users of the model. It also promotes the credibility of the model by providing a basis for users to acquire an understanding of its capabilities and limitations.

For computer-based data collection systems, the documentation serves similar purposes and includes descriptions of the data to be collected, the computer system and its program, and other information for those who operate and maintain the system and use the reports generated by it. (See app. IV for a description of the elements of data collection systems documentation required by EIA.)

Our past reviews have focused on EIA's efforts and progress in adequately documenting its models. In our 1984 report, we recommended that the Administrator improve the documentation for active models. Since then, EIA has increased the number of models and data collection systems whose documentation meets EIA's standards; however, further progress is needed to document the remaining models.

#### Policy statements by the Administrator reinforce the statutory requirements

The EIA Administrator has provided instructions to his senior staff on preparing planning and budgeting documents for EIA.<sup>2</sup> With respect to documentation, the instructions stated that:

- Every data collection system and every model must be documented to EIA standards by April 1985 or be scheduled for documentation by October 1986.
- No proposal for a new data collection system would be approved unless the proposal provides for the system's documentation to EIA's standards.
- Beginning on March 1, 1985, no EIA report would be issued unless any forecasting model or data collection system on which it is based is documented to EIA standards.

#### Model documentation

In our 1984 report, we stated that EIA had 44 models in use, including 16 basic models designated by the Administrator as sufficiently important to require sustained support and public scrutiny. EIA had received contractors' reports evaluating the documentation for 10 of the 16 models. None of the 10 models were considered by the contractors to be fully documented. The contractors had evaluated nine elements of the documentation and, for most of the models, found only four or fewer of the nine elements to be adequate.

At the time of our current review, EIA had 33 models in use, including 27 basic models. As of July 1985, OSS had evaluated 26 of the basic models to determine compliance with EIA documentation standards and found that documentation for 19 models met the EIA standards, and documentation for 7 models did not meet EIA standards. According to the OSS evaluations, two models had incomplete documentation. While most of the documentation for the other five models was available, it was poorly organized. One of the models with incomplete documentation was undergoing revision.

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<sup>2</sup>Memorandum from Administrator, EIA, to senior EIA staff dated April 10, 1984.

## Data collection system documentation

In order to help determine the extent of compliance with EIA documentation standards, OSS inventoried the documentation for each data collection system<sup>3</sup> and found 65 automated systems.<sup>4</sup> The program offices, as part of the inventory, provided their judgments of the status of the documentation. They reported that 38 systems, or about 58 percent, had documentation that was complete or nearly so, and that updates were required for the remaining 27.

The general conclusion of OSS was that the 38 systems had the documents required by the EIA standard. The report cautioned that this was a quantitative rather than a qualitative evaluation and that no attempt was made to evaluate whether the documentation was adequate to run the software. As the updates for the other 27 systems are completed, similar examinations will be made and OSS will report on the results.

The quality audits conducted by the Quality Assurance Division, OSS, (discussed earlier in this chapter), also are directed toward the documentation of data collection systems. One of the purposes of the quality audits is to assure that the system documentation accurately describes the data collection and processing procedures.

Twelve of the 14 quality audits completed by July 12, 1985, addressed the documentation for the data collection systems. Eleven of the 12 quality audit reports contained recommendations for improving the documentation. Seven of the 11 cases revealed deficiencies in the documentation--such as incomplete or outdated information. The scope of our review did not determine the extent to which the recommendations have been implemented.

## Conclusions

EIA has increased the number of models and data collection systems having documentation which meet EIA's standards. However, despite the importance placed on documentation by the EIA Administrator, we found models and data collection systems whose documentation did not meet EIA's standards, was not evaluated, or needed updating. The documentation for one of EIA's 27 basic models had not been evaluated and 7 had documentation evaluated as not meeting EIA's standards. Also, 27 of 65 data collection systems required updates in their documentation. In view of the policy requiring documentation for all active models on which

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<sup>3</sup>A system is composed of one or more data collection forms.

<sup>4</sup>Status Report on EIA Systems Documentation, EIA, July 1985.

reports are based, the Administrator, from time to time, could be faced with the dilemma of either delaying or not issuing a major report or issuing a report without documentation.

### Recommendations

We recommend that the Administrator have the documentation for all basic models evaluated and brought into compliance with EIA standards.

We also recommend that documentation for data collection systems be updated. The Administrator should also enforce EIA's April 10, 1984, policy relating to model and data collection systems documentation. Specifically, no EIA reports should be issued unless the models or data collection systems on which they are based are documented to EIA standards.

### Agency comments

In commenting on these recommendations (see app. I), the Administrator stated that EIA was on schedule in evaluating and bringing all documentation into compliance with its standards. However, he did not provide any specifics as to the extent of progress toward meeting the October 1986 documentation goal. We plan to monitor EIA's progress toward meeting this goal in our future work.

### SUCCESSFUL RESOLUTION OF PROBLEMS IN QUALITY FUNCTIONS AND RESPONSIBILITIES

In our 1984 report, we noted that, following the July 1981 reorganization of EIA, some problems developed in implementing the division of quality control and quality assessment responsibilities. These problems were highlighted in a July 13, 1983, memorandum from the Director, OSS, to the Administrator. While acknowledging the positive effect of the reorganization in promoting program office initiative to identify problems, the Director also said that it had led to differences of opinion among offices regarding what each office should be doing to improve EIA's products.

We also found that there were wide variances in the approach that the program offices took to carry out their quality control functions. In addition, although quality control responsibilities were assigned to the program offices over two years earlier (1981), the offices had not yet developed broad, office-wide written procedures for conducting their quality control work.

The Administrator agreed with our recommendations for action on these problems. The recommendations and their implementation are discussed below.

## Quality activities defined and responsibilities assigned

In our 1984 report we recommended that the Administrator develop guidance to ensure that specific quality assessment and quality control activities are clearly understood to be the responsibility of OSS or of the program offices. OSS and the Office of Planning and Resources collaborated in preparing definitions of EIA quality-related terms. The definitions were categorized under quality assurance, quality control, and quality support activities, which together constitute quality maintenance.

Senior EIA staff received the definitions as an attachment to the Administrator's memorandum of April 10, 1984, which provided guidance for preparation of the Multiyear Operating Plan. The Multiyear Operating Plan covers a 2-1/2 year span and combines planning and budgeting activities associated with

- a mid-year review of operations in the current fiscal year,
- development of an operating plan for the following fiscal year, and
- development of the budget for the next fiscal year.

The definitions were also attached to the memorandum of October 5, 1984, to senior EIA staff from the Director, Office of Planning and Evaluation, concerning quality maintenance in EIA. This memorandum provided guidance on the specific quality maintenance responsibilities of the various offices. It stated that, as a general rule, quality assurance is the responsibility of OSS, and quality control and support are the responsibilities of the offices which manage the specific functions or systems for or under which they are conducted.

## Agency-wide direction reduces quality control variations

In our 1984 report we recommended that the Administrator take actions to

- Have the directors of program offices develop broad, office-wide written procedures for performing their quality control functions; these procedures would guide the further development of detailed quality control procedures for specific data collection forms, systems, and publications.
- Have the directors of the OPR and OSS evaluate the comparative effectiveness and efficiency of the quality control strategies employed by the program offices.

The development of the Multiyear Operating Plan in mid-1984 and the fiscal year 1985 Annual Operating Plan contributed to

the development of unified quality control approaches and the direction on quality control procedures. The Multiyear Operating Plan was used to make a mid-year review of the fiscal year 1984 Annual Operating Plan implementation and to begin planning the fiscal year 1985 Annual Operating Plan and the fiscal year 1986 budget. However, under the approach used, the fiscal year 1985 quality control program was based on a proposed budget allocation. We believe that evaluation needs should determine the level of funding instead of available funding determining the extent of evaluation.

In 1984, OSS completed a report which evaluated the quality control projects proposed by the program offices for the Multiyear Operating Plan.<sup>5</sup> An appendix to the report describes the strategy each of the program offices followed for conducting quality maintenance projects and points out that each of the strategies was different. In a memorandum transmitting the report to the Administrator, the Director, OSS, pointed out that, just as each office has a different philosophy for quality control, so each views priorities differently. The Director stated that OSS had developed six categories of quality controls and assigned priorities to them. They are, in descending order of priority:

- Documentation and archiving,
- Frames activities,
- Performance statistics,
- Testing and updating,
- Evaluation, and
- Special projects and studies.

The Director stated that this approach concentrates on the tools for quality control. (See app. V for a description of the quality control categories.)

The report cited the results of a quality control survey conducted by OSS in March 1984 and assessed the status of the six categories of quality controls in each of the program offices. The report stated that the first three categories are considered basic quality control while the last three categories are needed to ensure that products are of adequate quality and up-to-date on methodology and information. The report then drew on the survey's results to analyze the funding requests of the program offices for fiscal year 1985. The report stated that the funding requested

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<sup>5</sup>Alternatives for Allocating Quality Control Investment Funds,  
Sept. 26, 1984.



for fiscal year 1985 did not cover all needed basic quality activities (the three highest priority categories of quality control).

The report discussed four alternatives for using the priority categories to allocate the funds available for quality maintenance activities. It suggested that through an alternative that would limit funding to basic quality control activities--documentation and archiving, frames activities, and performance statistics--EIA could achieve greater coverage of all information areas.

OSS made recommendations to the Administrator on the quality control projects proposed for the fiscal year 1985 Annual Operating Plan. These recommendations were consistent with the suggestions OSS made earlier on the Multiyear Operating Plan proposals. A subsequent meeting was held with the office directors to arrive at a consistent, balanced quality program. A later memorandum from the Director, OPR, provided preliminary decisions on the Annual Operating Plan proposals, stating that, in general, the recommendations by the Director, OSS, as modified by the office directors' recommendations, were followed to arrive at a \$4 million EIA program. Originally, a \$9.1 million program had been proposed. We believe this does not represent an adequate means of evaluating the quality of EIA's data because all six categories of quality control are not being considered.

The approach used to develop the quality control program for fiscal year 1985 resulted in the program being tailored to a budget figure rather than the reverse. We believe particular attention should be given to the need to include testing and updating, evaluation, and special projects and studies. Once the appropriate scope and frequency of audit is determined, EIA should seek the staffing and resources needed to carry out the quality maintenance activities.

### Conclusions

EIA took action consistent with the recommendation in our 1984 report to control and document the quality of EIA's data. However, the action limits quality control funding to documentation and archiving, frames activities, and performance statistics, while excluding testing and updating, evaluation, and special projects and studies. As EIA's report on alternatives for quality control activities notes, all six categories need to be considered to ensure product quality.

The Administrator provided definitions of EIA quality-related terms and guidance on quality activities that are the responsibility of OSS and the program offices. This action addresses the problem we noted concerning the need for a clear understanding as to the responsibilities of OSS and the program offices for improving the quality of EIA's products.

The evaluation of program office strategies and proposals for quality control activities and the development of a uniform approach for funding quality control projects constituted an assessment of program offices' quality-related work and gave overall direction for carrying out quality control activities. And, by limiting funding, EIA expects to achieve greater coverage of all information areas. This may be true. However, testing and updating, evaluation, and special projects and studies are extremely important aspects of determining data quality and, in our opinion, should not be completely excluded from funding. These activities provide information on whether a system or model is operating in the way it was designed to operate and to identify needed modifications or changes.

### Recommendation

We recommend that the Administrator assess the adequacy of quality maintenance activities, as currently being carried out, to examine the quality of EIA's data. Particular attention should be given to the need to include all six categories of quality controls in carrying out quality maintenance activities. Once the appropriate scope and frequency of audit are determined, EIA should seek the staffing and resources needed to carry out the audit program.

### Agency comments

The Administrator's comments did not specifically address this recommendation. (See app. I.) However, in his opening comments, the Administrator noted the need to operate within the resource constraints imposed by the Congress. As noted previously, PART recognizes these constraints. PART also notes that without an assessment of the adequacy of current quality maintenance activities, EIA has no assurance that the scope and frequency of quality maintenance activities are adequately focused.

### FRAMES MAINTENANCE BEING PERFORMED

Frames are the universes from which EIA collects its data. In OSS' 1984 report to the Administrator, Alternatives for Allocating Quality Control Investment Funds, frames activities were designated as the second highest priority of the quality control categories. This was reemphasized in the FY 1985 Annual Quality Control and Assurance Plan, dated March 1985, prepared by OSS and approved by the Administrator. The reason stated for the high priority was that

"Frames and universe lists are fundamental to the production of valid data. If the frame or universe list is inadequate, then the data collected on the basis of the frame will be defective and there are no accepted remedies."

In our 1984 report, we discussed a contractor-prepared report entitled Frames Status Report, dated May 31, 1983, which provided an overview of the status of 26 frames associated with EIA's major surveys in all fuel areas. The contractor's report stated that considerable work had been done in the past 3 years to upgrade the coverage of EIA survey frames. However, the contractor also pointed out that only 30 percent of the EIA surveys it examined had time periods established for conducting major frames reviews or updates. The report stated that, while key staff are generally aware of time periods required for independent review of frames, this knowledge is not typically "institutionalized" through documented plans. In addition, the report said that EIA could provide the contractor written update procedures for only 2 of the 26 survey frames examined.

At the time of our 1984 report, the contractor's May 1983 report was still being evaluated by EIA. We recommended that the Administrator obtain the recommendations of the Director, OSS, on the findings in the report and have the program office directors develop a plan for correcting the problems in the quality of the frames. The Administrator agreed with the recommendation. In our current review we found that OSS had made recommendations to the Administrator on the Frames Status Report by memorandum dated April 12, 1984, and the Administrator acted on the recommendations on June 15, 1984. In addition, the Director, OSS, has been reviewing the program offices' plans for implementing the recommendations.

Frames projects were included in the Multiyear Operating Plan covering fiscal years 1984 through 1986 and the fiscal year 1985 Annual Operating Plan. According to OSS' FY 1985 Annual Quality Control and Assurance Plan, dated March 1985, all the frames projects were approved, although some large frames projects were partially funded with a consequent commitment for further funding in fiscal year 1986. The plan states that, as a result of the approved projects, OSS anticipates that, by the end of fiscal year 1985, all frames will be sufficiently updated to ensure integrity of data, or the updating process will have been initiated.

### Conclusion

EIA has implemented our recommendation for obtaining the recommendations of the Director, OSS, on the Frames Status Report and for having the program office directors develop a plan for correcting the problems in the quality of the frames. We plan, in our future work, to consider EIA's implementation of the recommendations and plans as well as assess their effectiveness in correcting the problems they address.

## CHAPTER 3

### STAFFING AND PLANNING ACTIVITIES

The 1982 and 1984 PART reports discussed problems in staffing and planning assessments occurring after the 1981 EIA reorganization. EIA has since completed a staffing needs assessment study and developed a comprehensive planning process.

#### STAFFING NEEDS ASSESSMENT STUDY

Since its inception, EIA has had dramatic fluctuations in its staffing. From fiscal year 1978 to fiscal year 1980, authorized full-time, permanent positions increased 22 percent, from 744 to 906 positions. From fiscal year 1980 through 1983, however, authorized staffing decreased by 46 percent, to 490 full-time, permanent employees. In July 1981, to carry out effectively its missions with this reduced staff, EIA reorganized its structure.

Because of the technical nature of EIA's missions, it is essential that EIA be staffed with a proper number and composition of professionals in a variety of specialized areas, including statisticians, economists, operations research analysts, and industry specialists. However, following EIA's July 1981 reorganization, EIA was unable to provide us with documentation supporting its determination of the number of specialist positions of each type needed in its individual offices. Therefore, in 1982 we recommended that the Administrator require the Director, OPR, to assess the number and types of skills needed by EIA to meet its overall requirements and to determine whether staffing allocations to each EIA office were appropriate. Through early 1983, EIA disagreed with the recommendation for a staffing needs assessment. In June 1983, however, EIA announced that it would conduct the proposed assessment, noting that EIA was then in a different posture--staffing levels had stabilized and EIA was attempting to hire personnel to replace staff lost through attrition.

EIA's staffing study, conducted by an OPR analyst, was initiated in the fall of 1983 and completed in March 1984. The general finding of the report, approved by the EIA Administrator on July 23, 1984, was that EIA is properly, effectively, and efficiently using its staff resources and that the majority of its programs require little adjustment. The report made individualized office-by-office recommendations for staffing levels and better mixes and/or allocations of personnel for offices.

To carry out the study, the analyst examined about 200 individual EIA program descriptions which were prepared for the fiscal year 1984 Annual Operating Plan. She interviewed about 100

senior level managers or individual program managers with respect to current staffing, vacancies, and additional staffing required to accomplish the work projects/programs. In addition, the analyst examined sample work products, such as reports, form clearance packages, and scoping papers. The analyst also used the time charges recorded in an EIA management information system during October through December 1983 to determine the rates at which program offices were utilizing their staff allocations.

### Conclusion

As recommended in our 1984 report, EIA has completed a staffing needs assessment study. EIA's study concluded that the majority of EIA programs require little adjustment.

### COMPREHENSIVE PLANNING PROCESS

In our 1982 report, we stated that, during the 4 years of its existence, EIA made several attempts to implement a comprehensive planning process for setting realistic program priorities, making short- and long-term decisions, and helping to ensure that resources are managed effectively and economically. However, EIA experienced difficulties in meeting several planning requirements, including identifying and formalizing short- and long-term needs.

We also noted that EIA was attempting to improve its planning and decision making by developing a comprehensive planning, programming, and budgeting process. Through this process, EIA planned to identify both its short- and long-term needs and to reflect these needs in a multiyear plan. To ensure adequate progress in developing a comprehensive planning process, we recommended that the Administrator assign a high priority and adequate resources to implement such a process.

Subsequently, in our 1984 report, we stated that EIA had continued to enhance its annual operating plan but had not prepared the multiyear plan needed for a comprehensive planning system. Such a multiyear plan is needed to identify priorities and resources needed for EIA's systems and programs, which must compete for limited funding over a number of years while being developed. To ensure adequate progress in comprehensive planning, we recommended that the Administrator have the Director, OPR, develop a comprehensive multiyear plan.

During our current review, we found that EIA had prepared a Multiyear Operating Plan. In his April 10, 1984, guidance to senior EIA staff for the preparation of the Multiyear Operating Plan, the Administrator stated that the planning and budgeting activities associated with the mid-year review, annual operating plan, and the internal review budget would be combined. He said that this combined program and budget planning process would ensure that decisions about issues in the short term would be made

with an understanding of their effect on plans to meet longer-term objectives. The Administrator noted that the past practice had been to undertake each planning activity separately. As a result of this practice, every year EIA had three sound but functionally independent organizational plans that lacked the necessary consistency to make them more useful management tools.

The Director of Planning and Evaluation, EIA, stated that the Multiyear Operating Plan is a change in EIA's planning concept which extends EIA's planning activities forward 2-1/2 years, from mid fiscal year 1984 through fiscal year 1986.

The Director of Planning and Evaluation also referred to two longer-range planning documents, one concerning the energy consumption surveys to be conducted from 1984 through 1990 and the other concerning automatic data processing needs beginning in fiscal year 1985 and continuing through 1989. The energy consumption surveys are recurring, but not annual, surveys.

The Director of Planning and Evaluation described how EIA manages the projects through their completion. He pointed out that the project control numbers in the Multiyear Operating Plan are also used in an EIA management information system. We noted that the individual project description sheets in the plan provide for assignment of a priority, estimated start and completion dates, staff and other resource estimates by fiscal year, and justification for the work. The Director also stated that the Multiyear Operating Plan was used in developing EIA's fiscal year 1986 budget request.

### Conclusion

EIA has developed a comprehensive planning process in accordance with our prior recommendation for development of a comprehensive multiyear plan. It is being used for identifying priorities and resources needed for EIA's systems and programs, making short- and longer-term decisions, managing resources, and budgeting for EIA's needs.

## CHAPTER 4

### PROGRESS IN DETERMINING USEFULNESS

#### OF EIA'S DATA AND PUBLICATIONS

General requirements for EIA's data are established through legislation and regulations, requests of the Congress and executive branch agencies, and inquiries of private industry and the general public. To meet these widespread requirements cost-effectively, EIA must identify the specific needs of the current and potential users of its data. Our 1982 report showed that EIA was not making much progress in determining energy data users' needs. Our 1984 report showed that EIA was beginning to make significant progress, although it needed to improve its planning for these activities. In our 1984 report, we recommended that EIA develop a plan for performing comprehensive data requirements studies of all major energy topics and for updates to ensure that EIA's data and publications meet new requirements.<sup>1</sup> EIA took corrective action. In the fall of 1984, EIA's program office directors developed plans for conducting requirements reviews for all fuel sources and survey data systems areas and for updating them as appropriate.

In consonance with our approach (see ch. 1), we have not evaluated the results of the completed reviews. However, their objectives, scope, and methodology, if properly followed during the review, would appear to provide an adequate evaluation of the users' data needs.

#### DATA REQUIREMENTS REVIEWS ARE BEING PERFORMED OR PLANNED

As part of the development of EIA's fiscal year 1985 Annual Operating Plan, the Administrator instructed the program offices to develop plans for conducting user requirements reviews covering all the major energy topic areas. The Annual Operating Plan is EIA's principal short-term planning document. It contains estimates of the fiscal year funding and staffing resources for programs and projects.

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<sup>1</sup>We are using the term "comprehensive" to denote a requirements review which covers

--all significant facets of an energy topic area (e.g. resources, reserves, exploration, production, processing, and transportation); and

--all significant data users (e.g. federal, state, and local government; industry, and consumers).

The fiscal year 1985 Annual Operating Plan included the requirements reviews which were approved for that year. To emphasize the importance of these reviews, the Director, OPR, prepared a list of recently completed, in-progress, and planned data requirements reviews and advised the EIA senior staff that all planned reviews would be tracked in EIA's Product Accountability System.

A single comprehensive review has been completed or is in-process for each of five energy topic areas--oil and petroleum products, electric, natural gas, alternative energy, and nuclear. The other three areas--coal, energy markets, and end use--are being covered by several more narrowly-scoped reviews.

The completed comprehensive studies for the oil and electric topic areas were discussed in our 1984 report. A discussion of the remaining areas follows.

Seven major topics were considered in EIA's requirements review for the nuclear area: (1) uranium supply (covering reserves and resources, exploration, the mining and milling industry, marketing, and utilities as uranium purchasers), (2) conversion, (3) enrichment, (4) fuel fabrication, (5) nuclear power plants, (6) spent fuel storage, and (7) waste management.<sup>2</sup> However, because waste management was added late in the requirements review, it was not included in the user survey portion of the review. The study also examined the information requirements for a study of the viability of the domestic uranium mining and milling industry.

To carry out the study, a questionnaire with 213 potential nuclear data collection items was presented to 55 federal data users. Each user was asked to rate each data item as essential, useful, or not used. Rankings of data benefits and data costs were developed by the study team. EIA received and analyzed 46 responses to its questionnaire. More than half were from various offices within DOE. The remaining responders were from various executive departments and agencies and legislative offices and agencies.

The EIA study manager said that only federal users were contacted because of limitations on the funds available for the study and the extensive data needs of the federal government in the nuclear area. However, he also pointed out that in other contacts with interested industry sources, including Federal Register notices of the intent to use the data collection forms, he received no indication that additional information was desired.

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<sup>2</sup>Nuclear Energy Information Requirements Review, EIA, January 1984.



Five topics were covered in a study of information needed to attain national goals as they relate to renewable energy resources: (1) solar, (2) biomass (primarily wood), (3) wind, (4) geothermal, and (5) small-scale hydroelectric power facilities.<sup>3</sup> In the user survey, 54 individuals were contacted, representing 13 DOE organizations, 21 other federal agencies, 5 states, and 7 nongovernmental organizations, including industry associations.

In 1983, EIA contracted with the National Academy of Sciences/National Research Council to perform a comprehensive study of the need for natural gas data. The report was issued in September 1985. EIA had not completed its evaluation of the report and its recommendations when our report was being finalized.

EIA has ongoing or planned reviews of each of the six end use areas. For example, EIA plans a Manufacturing Energy Consumption Survey in early 1986 to collect information on industrial energy consumption. EIA recognizes that its current lack of industrial energy consumption data represents a conspicuous gap in its baseline end use energy statistics program, since industrial energy use represents about 40 percent of total national energy consumption. During the fiscal year 1985 congressional budget formulation process, both the House and Senate agreed to fund this data collection survey. As a result, EIA's fiscal year 1985 budget was increased by \$1.1 million. One of the initial actions in the industrial use area was a requirements review.

EIA was also conducting a requirements review of the Commercial/Nonresidential Buildings Energy Consumption area. An analysis of the Agriculture, Mining, Construction, and the Non-Residential Transportation sectors was scheduled for completion in July 1985, but now is on a slower schedule with no set completion date. The Director of the Energy End Use Division told us that a requirements review of the Residential Transportation sector would be put into EIA's next Multiyear Operating Plan with a projected completion date sometime within the next 2 years.

With respect to the Residential Energy Consumption Survey data collection, EIA intends to conduct a broad-scale requirements review sometime within the next 2-3 years, according to the Director, Division of Energy End Use.

EIA now has a study planned for the international energy statistics sector of the energy markets area. With respect to

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<sup>3</sup>Alternative Fuels Information Requirements, EIA, September 30, 1983.

the domestic sector of energy markets, the Director, Office of Energy Markets and End Use, said that the office takes data from other program offices on individual fuels to produce reports providing summary information on all fuels. He feels that other program offices have the basic responsibility for users' needs studies on individual fuels. He said his office has no formal outreach for users' needs for the summary data on all fuels, although a standard reader-response form is inserted in the publications by the National Energy Information Center. Most feedback, in fact, is on an informal basis.

In our 1984 report, we pointed out that EIA had conducted only one limited review of coal data requirements, a 1981 requirements review of coal production data. EIA, in technical comments to our 1984 report, maintained that assessments of users' needs for coal data had been performed as part of four validation studies. According to EIA, three of the validation studies concerned electric power plants, which consume 80 percent of domestic coal production. The fourth study concerned coal production. EIA said it believed these studies, in total, provided a comprehensive study of coal data users' needs.

We evaluated whether the studies cited by EIA were comprehensive. We found that they did not cover coal distribution, coke plant coal stocks, and other industrial plants' coal stocks and consumption. Subsequently, OPR issued a listing of ongoing and planned reviews which included planned projects to review these areas in 1986.

#### EIA EVALUATES USE OF PRIOR REVIEWS

In 1985, OSS completed a study which, among other things, was for the purpose of summarizing the major findings of requirements reviews conducted by EIA in 1980-1984 and determining which recommendations had been implemented by EIA's program offices. The study was supposed to assess the extent to which recommendations of requirements reviews have been implemented and determine the reasons for non-implementation. Sixteen requirements reviews were examined.

The study disclosed that a user survey was employed in 93 percent of the requirements reviews and cost/benefit analyses were used in 40 percent of the reviews. Nearly 74 percent of the recommendations were implemented. The primary reasons given for not implementing some recommendations were excessive cost, office disagreement with the recommendation, unreasonable respondent burden, another solution implemented or under consideration, and contradiction of the findings by more recent studies.

The study concluded that the requirements reviews seemed to serve as facilitators of actions which were otherwise recognized

as needed. In particular, examination of the data requirements in a given area provided a rationale for eliminating data collections which no longer served their initial purpose or which imposed a burden on the respondents. The study also identified data which had become important to users.

### CONCLUSIONS

Our review shows that, through its recently completed, in-progress and planned reviews of data requirements, EIA continues to make progress in determining the comprehensive data needs for all of its major energy topic areas. Furthermore, by developing plans for conducting data requirements reviews and for periodically updating them, we believe that EIA has implemented the recommendation in our 1984 report. We also believe that EIA has met our 1982 report recommendation by its increased emphasis on contacting the end users to determine their needs.

## CHAPTER 5

### EIA'S INDEPENDENCE AND OBJECTIVITY

In our past reviews, we found no reason to question EIA's independence and objectivity. In our last two reports, however, we noted that EIA needed to improve its internal controls to ensure that all assumptions inherent in EIA's analyses are documented and fairly stated in EIA's written reports.

In our current review, we found EIA has taken action to address our prior recommendation to improve its internal controls over requests for analyses. In addition, we noted an instance where EIA involvement in establishing study criteria was not disclosed, which could give the appearance of a lack of EIA independence in the process.

#### SYSTEM TO MONITOR CLIENT-REQUESTED ANALYSES STILL NOT IN PLACE

DOE's enacting legislation stressed the importance of EIA's mission to provide objective information to policymakers and others. In carrying out this mission, EIA has provided studies and analytical assistance requested by numerous government agencies and congressional committees. In our prior reports, we concluded that, in meeting these requests, EIA was independent of energy policy functions and was organized and administered to promote its credibility as a neutral source of energy data and analysis.<sup>1</sup> Specifically, unlike its predecessor,<sup>2</sup> EIA had established procedures to record the assumptions used in its analyses and to describe clearly those products prepared at a specific client's request.

When we reviewed EIA's analysis function in November 1981, following EIA's July 1981 reorganization, we found that EIA's order, which provided a centralized internal control system for approving, recording, or monitoring the status of analysis request work, had not been revised to recognize that such work was being performed by its three program offices, nor had the order been rescinded or enforced. Further, the individual

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<sup>1</sup>PART, Activities of the Energy Information Administration, May 7, 1979, and November 13, 1980.

<sup>2</sup>The Office of Energy Information and Analysis, Federal Energy Administration, had become an extension of the administration's energy policy and planning function and failed to make public the assumptions on which its analyses were based.

offices did not have procedures which collectively provided assurance that work on analysis requests was properly documented.

Because we believed that internal controls over EIA's analytical services were essential to maintaining EIA as a credible and independent source of energy information, we recommended in our 1982 report the use of a central process and uniform procedures to record requesters' assumptions and to assure that the resultant products clearly describe the requesters' specifications. In response, the Administrator said that an analysis tracking system was being developed by OPR and would be implemented.

In our 1984 report, we noted that EIA had not implemented the tracking system it was developing in response to the recommendation in our 1982 report, and we repeated the recommendation. The Director, Division of Planning and Evaluation, OPR, told us that EIA had planned to develop a centralized system to monitor actions on each of the requests it receives, but that this task had been deferred because of higher priority work requirements.

EIA's Administrator agreed with our recommendation and stated that OPR would write and issue the Information Services Order and an Analysis Products Order to formalize existing operational processes and procedures for analytical products and for services provided to external customers. According to an OPR official, EIA instituted a tracking system on an interim basis, beginning in October 1983. EIA had planned to complete the form to be used by the system and to issue implementing instructions and procedures later in fiscal year 1984. However, this was not done because of EIA's decision to revise a management information system which is used to monitor projects, including reports requested by anyone other than EIA.

Although EIA made several more attempts to implement interim systems, it was not until October 15, 1985, that EIA issued an order formally implementing a tracking system for services provided to non-EIA clients. We have not assessed its adequacy or effectiveness. We plan to examine the order and its implementation during our next review. At that time the system should be in full operation and examination of the system through testing of a representative sample of products would be possible.

#### APPEARANCE OF NOT BEING INDEPENDENT

At the request of the Secretary of Energy, EIA published two studies, the results of which were used by the Secretary to reach a decision on the viability of the uranium mining and

milling industry.<sup>3</sup> EIA was responsible for developing the criteria, performing the study, and writing the report. While our limited work in this area did not disclose any problems with the manner in which the study was carried out, the circumstances of EIA's involvement could give the appearance of EIA not being independent.

Section 23 of the Nuclear Regulatory Commission Authorization Act of 1983 (Public Law 97-415, January 4, 1983) required (1) a report by the President providing a comprehensive review of the current and projected status of the domestic uranium mining and milling industry and (2) for each of the years from 1983 to 1992, a report and a determination by the Secretary of Energy on the viability of the industry.

The Secretary of Energy was responsible for preparing the President's report and delegated this responsibility together with preparation of the annual viability assessment to the Administrator, EIA. However, the Secretary retained sole responsibility for determining viability.

EIA's responsibility for preparing the viability assessment report included development of the criteria to be used in the assessment. The legislation specified that the criteria be established by rule, after appropriate notice. EIA developed and published in the Federal Register proposed evaluation criteria based on those specified in the legislation. Written comments were solicited and public hearings were held at three locations.

On the basis of comments received in writing and at the hearings, and consultation with the Secretary of Energy, EIA drafted the final criteria. While EIA did the actual work in developing the criteria, the final determination on what criteria would be used was made by the Secretary of Energy. The preamble to the Federal Register notice for the rule establishing the final criteria stated that EIA was establishing the criteria although the Secretary of Energy signed the notice.

We discussed EIA's role in criteria setting with the former Deputy Administrator of EIA. Although he told us that he had discussed the criteria to be used with the Secretary of Energy, he made it clear to the Secretary that the selection of the criteria was up to the Secretary.

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<sup>3</sup>Domestic Uranium Mining and Milling Industry, 1983 Viability Assessment, December 1984, DOE/S-0033; and Domestic Uranium Mining and Milling Industry, 1984 Viability Assessment, September 10, 1985, DOE/EIA-0477.

Both the December 1984 and the September 1985 reports stated that they were prepared by EIA to provide the Secretary of Energy with basic data and analyses for his determination of whether the domestic uranium mining and milling industry was viable, and that the viability criteria were established by the Secretary. Neither report disclosed EIA's involvement in developing the criteria.

### CONCLUSIONS

The independence and objectivity of EIA's activities are essential for providing credible energy information and analysis. EIA, however, has not had an effective centralized system for approving, recording, or monitoring the status of analysis request work since its July 1981 reorganization. It has agreed with our recommendations to reestablish such a system and had issued, at the close of our review, an order implementing a tracking system for services provided to new EIA clients. We plan to assess its effectiveness during our next review.

The role that EIA played in establishing criteria for assessing the viability of the uranium industry was not disclosed in the 1983 and 1984 assessment reports. The failure to disclose EIA's involvement could give an appearance of EIA not being independent.

### RECOMMENDATION

To help assure that the criteria-setting process is independent, we recommend that the Administrator ensure that each report fully disclose the scope and extent of involvement of both EIA and the requesting agency in the establishment of the study criteria. For reports requested by the Secretary of Energy, this disclosure should include the role that the Secretary had in making any final determinations regarding study criteria.

### AGENCY COMMENTS

In commenting on this recommendation (see app. I), the Administrator notes that EIA's role in the uranium viability assessment studies was described in an appendix to the reports which reproduced material from the Federal Register. We do not believe the content of the notice makes the respective roles of EIA and the Secretary clear--the issue which our recommendation specifically addresses. Even if the disclosure had made the respective roles clear, locating it in a report appendix did not sufficiently bring this important matter to the attention of report users.

ADVANCE COMMENTS FROM THE  
ENERGY INFORMATION ADMINISTRATION



**Department of Energy**  
Washington, DC 20585

**FEB 20 1986**

Mr. James Duffus, III  
Chairman, Professional Audit  
Review Team  
441 G Street, N.W.  
Washington, DC 20548

Dear Mr. Duffus:

The Energy Information Administration (EIA) appreciates the role played by the Professional Audit Review Team (PART) in our ongoing efforts to maintain and improve EIA's performance and the quality of its data and products. The present PART report presents a useful assessment of our current activities in this regard. I endorse the spirit of the conclusions and recommendations proposed to assist EIA as it continues to develop effective energy statistical, forecast, and analysis information programs.

EIA has pioneered cost-effective approaches to data collection, production, analysis, and dissemination and to the maintenance of data and product quality. I stress cost-effectiveness because EIA at its inception was mandated to reduce burden and redundancy while increasing the scope, accuracy, and relevance of energy information. During its brief history, as noted in the PART report, EIA's budget has ranged between \$49 million and \$91 million, and is currently at \$65 million including funding for reimbursable activities. That converts to \$42.5 million on a 1978 constant dollar basis, the first year of EIA's operation. Some reduction was possible because of the elimination of petroleum price regulation and because of decreases in the level of program support EIA provides to other parts of the Department. But in general, we must perform better with fewer resources.

Quality has always been a high priority. At the same time, we must operate within the budgetary limits which Congress establishes. The approach we take to achieving quality must be realistic, reflecting both the needs of users of our information and our resource constraints.



PART recommends that EIA "Systematically plan and carry out quality audits...." PART does note that we said "...the selection of data collection forms to be covered by the quality audits was carefully planned each fiscal year" and that "...the selection is made considering coverage of all program offices and all fuel areas, the importance of the survey, the frequency of form modifications, and the resources the program office has invested in the survey." I believe that this is a more appropriate strategy than the one recommended by PART because it is responsive to the highest priorities of quality maintenance on the most timely basis possible while reflecting the actual resources available to perform the work. PART states its position as: "We believe that evaluation needs should determine the level of funding instead of available funding determining the extent of evaluation." In an environment of unconstrained resources, I would agree with the PART recommendation.

PART notes that EIA has increased its pace of quality audits since the last PART report. This was a direct result of an increase in funding for EIA's quality maintenance resources. EIA has consistently requested such resources and, I believe, has effectively employed what resources it received. At the same time, the present need for all agencies to reduce spending may necessitate a future slowing in the pace of quality audits. In any event, EIA will perform those audits which are most necessary. That determination occurs through a pre-audit process which is sufficiently rigorous to assess quality vulnerability with the same intention expressed by your recommendation to consider "...whether all systems need to have audits performed and the frequency of audits performed."

In regard to PART's recommendation that all documentation be evaluated and brought into compliance with EIA standards, we are presently on schedule and anticipate no problems.

The independence of EIA has always been a high priority. In carrying out our analytical role in an independent manner we recognize as well that EIA is a service organization. In the present PART report you have cited an instance which you believe "...could give the appearance of EIA not being independent." We must be particularly sensitive to protecting our independence, as mandated by Congress. Your finding of no problems "with the manner in which the study was carried out" was gratifying. I appreciate and endorse your recommendation, but would note also that although EIA's role was not fully credited in the body of the reports, it was accurately described in Appendix A to both reports, which reproduced the Federal Register notice.

My final comment is a suggestion for the next PART report. In the spirit of what EIA itself does in State-of-the-data reports it would be useful to assess EIA both in descriptive terms, as you presently do, and in comparative terms, indicating how EIA's practices accord with norms and standards in other statistical and information agencies.

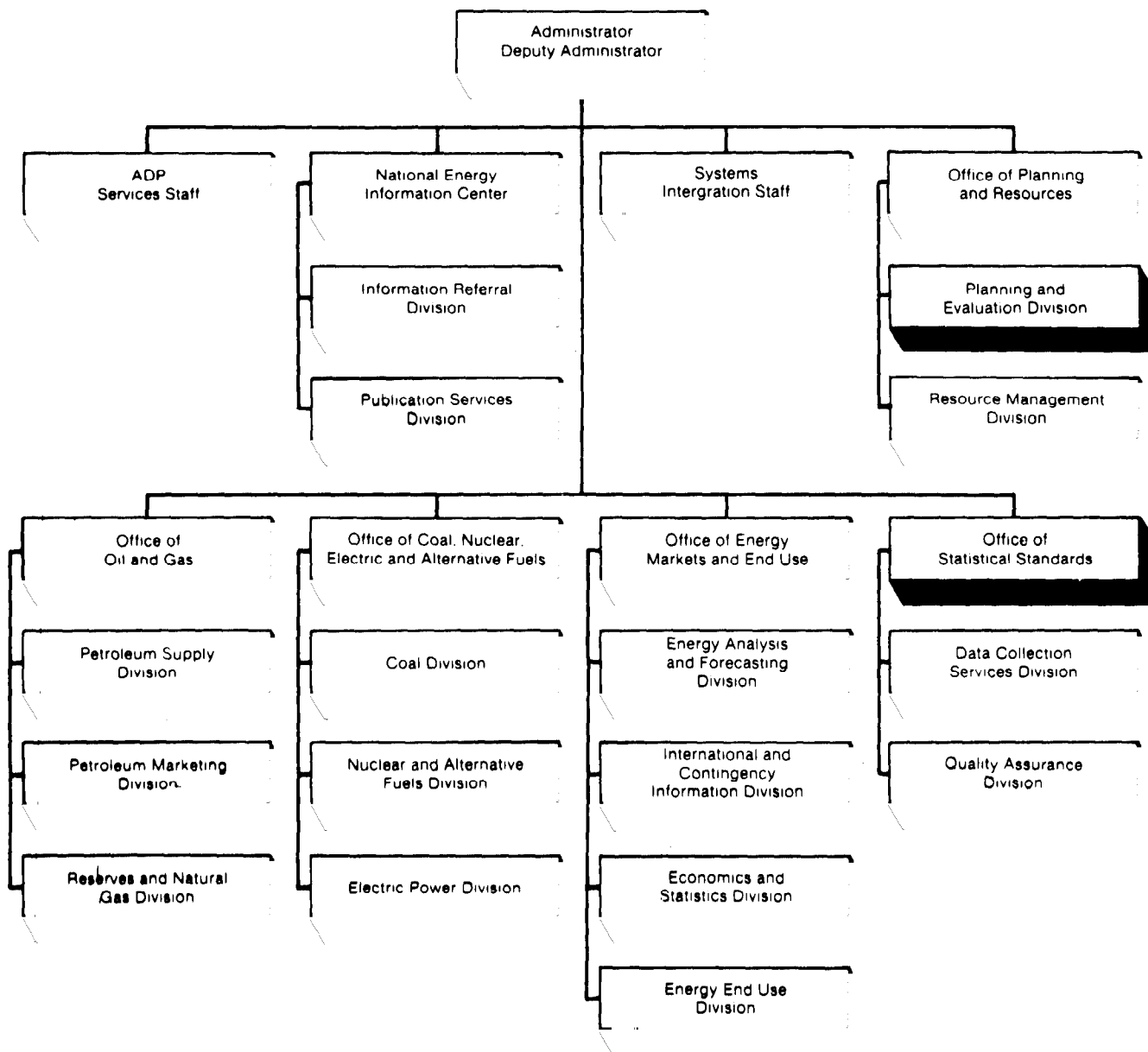
Thank you for the opportunity to comment on the PART report.

Sincerely,



Dr. H. A. Merklein  
Administrator  
Energy Information Administration

ORGANIZATION CHART  
ENERGY INFORMATION ADMINISTRATION



As of August 1985  
Source EIA

ELEMENTS OF DOCUMENTATION FOR EIA MODELS

There are three model types:

- Basic, sufficiently important to require sustained support and public scrutiny.
- Developing, under development and yet of sufficient interest to require a basic level of documentation at a future date.
- Auxiliary, used only occasionally in analysis and therefore requiring minimal levels of documentation.

The model types are also designated as active or inactive. The documentation required for the three types of models is described in the following table.

<u>Documentation elements</u>	<u>Model types</u>		
	<u>Basic</u>	<u>Developing</u>	<u>Auxiliary</u>
<u>Model abstract</u> , which is a brief presentation of the purpose and use of a model.	X	X	X
<u>Well-commented computer code</u> , which describes the model by providing extensive comments in the archive tape.	X	X	X
<u>Model documentation report for basic models or model description report for developing models</u> , which includes:			
-- <u>Model overview</u> , which describes what is being forecast by geographic area and time period, model structure and basic assumptions, estimation techniques, solution algorithms, and the forecasting procedures.	X	X	
-- <u>Process flow diagram</u> , which shows the data flow, of inputs, processes, and outputs at some high level of aggregation, to help the reader comprehend the large-scale process by which data and parameters are combined to form the forecast.	X	X	
-- <u>Variables, data and parameter listing</u> , together with their definitions, sources and their units of measurement.	X		

<u>Documentation elements</u>	<u>Model types</u>		
	<u>Basic</u>	<u>Developing</u>	<u>Auxiliary</u>
-- <u>Report of mathematical specifications, in a manner to emphasize the model structure, with enough information to permit an expert to reproduce the linear programming problem contained on the archive tape.</u>	X		
-- <u>Documentation of model estimates, identifying and describing all estimates and the results, including estimates of precision.</u>	X		
-- <u>Description of solution method, in the case of automated solution algorithms, the general method shall be identified, the exact equations listed, and the convergence criteria given. Rules for picking initial solutions and for interventions shall be explicitly described. Similar information shall be presented for nonautomated systems. The usual range of central processing unit requirements for solving the model shall be reported.</u>	X		

ELEMENTS OF DOCUMENTATION FOR DATA COLLECTION SYSTEMS

Functional Requirements Document provides a basis for the mutual understanding between users and designers of the initial definition of the software, including the requirements, operating environment, and development plan.

Data Requirements Document provides a data description and technical information about data collection requirements during the definition stage of software development.

System/Subsystem Specification stipulates for analysts and programmers the requirements, operating environment, design characteristics, and program specifications for a system or subsystem.

Program Specification describes the requirements, operating environment, and design characteristics of a computer program.

Data Base Specification describes the means of identifying a particular data base, as well as the logical characteristics and physical characteristics of a particular data base.

User's Manual sufficiently describes the functions performed by the software in non-ADP terminology so that the user organization can determine its applicability and when and how to use it. It serves as a reference document for preparation of input data and parameters and for interpretation of results.

Operations Manual provides computer operations personnel with a description of the software and the operational environment so that the software can be run correctly.

Program Maintenance Manual provides the maintenance programmer with the information necessary to understand the programs, their operating environment, and their maintenance procedures.

Test Plan provides a plan for the testing of the software in a system; it includes detailed specifications, descriptions, and procedures for all tests; and test data reduction methodology and evaluation criteria to be used.

Test Analysis Report documents the test analysis results, presents the demonstrated capabilities and deficiencies for review, and provides first phase information for preparing a statement of software readiness for implementation.

DESCRIPTION OF THE  
QUALITY CONTROL CATEGORIES

The FY 1985 Annual Quality Control and Assurance Plan, dated March 1985, prepared by the Quality Assurance Division, Office of Statistical Standards, EIA, defines quality control activities and describes the quality control categories. The following description is excerpted from that plan.

Quality Control Activities

There is a wide range of quality control activities available to maintain the quality and validity of data collection and modeling efforts. The choice of quality control projects selected for utilization in an information product is governed by the specific requirements of the product being controlled, the character of other controls already in place, and by the level or intensity of controls desired by the managers of the product. At EIA, quality control activities are the responsibility of the program offices which are required to coordinate the planning and operations of these projects with OSS.

Based on OSS surveys and audits of EIA data collection and modeling systems during the past year, OSS developed a list of priority categories of quality control activities to organize the specific needs of EIA data collection and modeling efforts during the 1985 Annual Operating Plan cycle. OSS was guided by this hierarchy of quality control categories while reviewing project proposals and while making recommendations for selection. The priority categories are:

--Documentation--Documentation is a fundamental tool for management control. With adequate documentation, any competent practitioner can operate the system or model or test and alter it. Without documentation, effective management and independent verification of operations and output is impossible.

--Frames--Frames and universe lists are fundamental to the production of valid data. If the frame or universe list is inadequate, then the data collected on the basis of the frame will be defective and there are no accepted remedies.

Studies indicate that births and deaths of firms result in annual modifications to a frame or list that can be as high as 10 to 20 percent. Hence, frames and lists must be updated regularly. Both documentation and frames are considered quality support activities at EIA directed at

facilitating quality control. They are the responsibility of the office that manages the function or system for which they are conducted.

- Performance Statistics--Performance statistics record measurable aspects of activities over time. To the extent that these measurable aspects are meaningful and reflect the activity as a whole, they provide a baseline to measure change and improvement in the activity. It is not possible to measure accurately the performance of an activity or realistically assess the effect of changes to the activity without performance statistics of some type.
  
- Testing and Updating--These types of activities test the performance of some aspect of a system or model to ensure it is operating according to specifications and performing the intended routine. If the activity is not found to be operating as intended, modifications and/or updates are introduced to improve performance. For example, an edit routine in a system may be tested to see if it is operating effectively or simulated data may be input into a model to test the model's operation.
  
- Special Studies--This category includes projects that do not fit well into the earlier categories either because they overlap categories or because they involve other quality control activities that were not separated into a category. It includes studies directed to the idea of consolidation of systems as well as feasibility studies. For surveys, special studies include validations, evaluations, and comparisons with internal and external data. For models, this activity includes backcasting, comparing forecasts with other forecasts, and systematically evaluating forecast errors.



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**Requests for copies of this report should be  
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