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ABSTRACT

This publication is the product of a workshop held in Chicago in November, 1976. The workshop involved twelve community college leaders and twelve representatives from ERDA (Energy Research and Development Administration) in exploring ways of successfully integrating the community college system into ERDA's energy conservation programs. This publication includes: (1) conclusions and recommendations from the workshop; (2) summaries of speeches presented; (3) a summary of the community college system; and (4) summaries of the research, citizen education, and curriculum development subgroup discussions. The eleven appendices comprise the bulk of this publication. These appendices are mostly administrative hierarchy flowcharts and one-page summaries of programs or purposes. A list of workshop participants is also included. (ME)

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PREFACE

The Energy Research and Development Administration (ERDA) Energy Conservation Workshop for Community College Leaders emerged from a concern by the Office of Conservation and specifically the Division of Conservation Research and Technology (CONRT) that there were technician training needs which were not clearly defined and that the community college system was in the best position to assist in that effort. Concurrently, there also was an interest from the Office of Conservation as to what roles might seem appropriate for participation by the community college system in application research and citizen education.

A contract was awarded to the Charles County Community College which resulted in a workshop in Chicago, Illinois, November 3-5, 1976, in which twelve community college leaders met with twelve representatives from ERDA. The ERDA group included representatives from Operations Offices, the Office of Public Affairs, and the Office of University Programs, as well as from the Office of Conservation.

What follows is the result of that workshop. Since the emphases were on conclusions and recommendations that could lead to action strategies, these are presented first followed by a narrative of the proceedings.

J. N. CARSEY

FOREWORD

In recent years, a number of community colleges have developed courses and programs centering on energy conservation concerns. This development is a natural outgrowth of the major emphasis in community college curricula on technical and career-oriented education and on continuing education for the local community. This trend has important implications beyond purely academic considerations. The community college serves more than half of the students enrolled in higher education. More than 5,600,000 students are currently matriculating in the 1,230 colleges in the system. The community colleges, then, offer a broad forum for programs relating to energy conservation that will reach a significant number of prospective energy users from diverse backgrounds. In addition, since these colleges are specifically designed to serve local communities, such energy-related projects have an immediate impact within the community college context.

To examine and explore appropriate ways of successfully integrating the community college system into ERDA's conservation programs, this workshop was conducted with the following objectives:

- Survey current community college programs and projects in energy conservation
- Identify new priorities for action
- Recommend strategies for implementing these priorities in the community college context.

This workshop and the Energy Technology Training Conference sponsored by the ERDA Division of Labor Relations have formed the basis for a continuing effort aimed at fully utilizing the unique capabilities of the community college system.

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CONCLUSIONS

1. The concepts of "citizen education" as espoused by ERDA and its Office of Conservation are ideally matched to the role and scope of the community college system. It is imperative that the Office of Conservation, the appropriate staff groups in ERDA, and the community college system work together to utilize the current delivery systems for citizen education. The community college network should be an integral part of the "energy extension/outreach concept" which is pending under current legislation.

2. The local characteristics of the community college system make it ideal for use by the Office of Conservation in acquiring regional involvement and for feedback on programs.

3. There is evidence that manpower needs will emerge from programs supported by the Office of Conservation which will require technicians with specific skills and expertise. The Office of Conservation cannot afford to take the chance that industry will effectively fill those needs alone. Comprehensive, in-depth study is warranted, and the community college system is best equipped to provide leadership in such a study in a close cooperative venture with the Office of Conservation and the industrial community.

4. There is little likelihood that community colleges can compete successfully for Office of Conservation research monies. The exceptions would be Request for Proposals (RFPs) on educational or manpower surveys or specialized RFPs which might seek a particular community college's strength (i.e., solid waste, pollution abatement, etc.).

5. The American Association of Junior and Community Colleges is the one entity capable of speaking for the entire community college system and is the logical choice to serve as a broker and clearinghouse between ERDA and the community college system.

RECOMMENDATIONS

1. Community colleges should closely follow the progress of the Energy Extension Service concept and make contacts with the appropriate State agencies in order to assure an appropriate role in subsequent State actions related to the Energy Extension Service.

2. The Office of Conservation should actively utilize the community college system in the implementation of the citizen education projects it will be responsible for in the future.

3. In early 1977, the Office of Conservation should utilize four community colleges as sites for workshops in which a cross-section of community leadership can react to plans under preparation by the Office of Conservation.

4. The Office of Conservation should sponsor a workshop (or workshops) in which selected community college technical curriculum experts can study in-depth the specific long-range technician-level needs which programs sponsored by the Office of Conservation will create. These workshops should involve industrial representatives and should carefully look at alternative delivery systems, cooperative educational strategies, replicable units of instruction, and training, as well as the traditional two-year curricula models.

5. The Office of Conservation should consider placing research RFPs with educational "set-asides," or even possibly community college "set-asides," if legally possible, when the task solicited is particularly apropos to their expertise.

6. The substantial research results produced by ERDA programs should be shared throughout the community college system. A community-college-based national clearinghouse for this purpose should be established and supported.

NARRATIVE

Introduction

The Agenda is shown in Appendix A. The conference was built around four separate operations as follows:

1. The ERDA personnel outlined their system of organization, including their missions, goals, and concerns.

2. The community college personnel sketched the overall community college system and then reinforced the concept of the diversity of the system by describing individual programs, problems, and priorities in their specific community colleges.

3. The group was divided into three sub-committees as shown below.

Committee I – Research

ERDA	–	Mr. Wm. Burnett
		Dr. G. Garbarini
		Mr. I. L. Harry
		Dr. J. R. Lawson
Com. College	–	Dr. J. Carsey
		Dr. B. Morton
		Dr. H. Traylor
		Dr. R. Wilson

Committee II – Citizen Education

ERDA	–	Mr. J. Duane
		Ms. M. Fowler
		Mr. D. J. Monetta
		Mr. Wm. Porter
Com. College	–	Mr. J. Mahoney
		Dr. R. O'Donnell
		Dr. E. Speller
		Dr. N. Watson

Committee III – Curricula Development

ERDA	–	Mr. J. Doggette
		Mr. J. Dugan
		Mr. J. Parker
		Dr. K. Smika
Com. College	–	Dr. L. Luchsinger
		Dr. S. Meservey
		Dr. J. Piland
		Dr. K. Tidwell

Each of the sub-committees met and responded to a list of questions and issues and then reported back to the total group.

4. The total group discussed the conclusions and recommendations offered by the sub-committees. Final conclusions and recommendations emerged from that process and are outlined in the first part of this report. The participants are shown in Appendix B.

ERDA Narrative

Speaker – Mr. Monetta

Mr. Monetta, Assistant Director of the Division of Conservation Research and Technology (CONRT), provided an ERDA Office of Conservation welcome to the community college people and then gave an overview of the Office of Conservation, outlining the purposes, organization, and programmatic interests. An organization chart is shown in Appendix C.

Speaker – Mr. Burnett

Mr. Burnett specifically addressed the Division of Conservation Research and Technology and introduced the process by which CONRT does its planning and budgeting, with emphasis on the current federal fiscal budget cycle, and provided information on procurement and contract procedures within the division. Materials related to Mr. Burnett's talk are shown in Appendix D.

Speaker – Mr. Doggette

Mr. Doggette gave specifics on the recently held technical conference in Atlanta sponsored by ERDA and the American Association of Community and Junior Colleges in which all the offices of ERDA convened to discuss specific technician programs underway or in the planning stage in their particular areas. He also described the role of the Oak Ridge Associated Universities as an ERDA contractor and his own personal philosophy about the role of that group in its relationships to the community college system.

Speaker – Mr. Duggan

Mr. Duggan provided an overview and many of the particulars on the role of the ERDA Office of Public Affairs and expressed the specific interest of that office in the concept of citizen education. Materials pertinent to his talk are shown in Appendix E.

Speaker – Ms. Fowler

Ms. Fowler provided information on the Energy Extension/Outreach Service as well as the general interests of the Division of Buildings and Community Systems within ERDA. She stressed the particular utilization of research and development in the consumer section. Additional details of the concepts of the Energy Extension Service are shown in Appendix F.

Speaker – Dr. Garbarini

Dr. Garbarini gave a description of the perspective of ERDA as seen by the operations offices. Dr. Garbarini focused on the operations of the San Francisco office, while covering, in general, procedures used by all the ERDA operations offices, including procurement contracting policies, and information on the proposed management decentralization currently being considered. Materials related to her talk are shown in Appendix G.

Speaker – Mr. Duane

Mr. Duane discussed the interests and programs of the Division of Buildings and Community Services. He particularly emphasized technology transfer, information, and dissemination, and the introduction of the proposed energy extension service as viewed from his particular division. Materials related to Mr. Duane's talk are displayed in Appendix H.

Speaker – Dr. Lawson

Dr. Lawson provided information on the activities of the Office of University Programs, emphasizing the functions and purposes of that office. He noted that they wished to see that the community colleges have an active role in ERDA's future programs. Materials related to Mr. Lawson's office are shown in Appendix I.

Speaker – Mr. Parker

Mr. Parker, a member of the Chicago operations office, gave a report on the Task Force on Minority Career Development and emphasized the interest which his office had in technical curricula development. He noted that he particularly was interested in heightening the awareness of the community college's capabilities and expertise in these areas.

Speaker – Mr. Porter

Mr. Porter provided the general outline for the Division of Industrial Energy Conservation and emphasized their interest in technology transfer and citizen education. Materials on his talk are shown in Appendix J.

Speaker – Mr. Smika

Mr. Smika outlined his position as a recently hired consultant to the Office of University Programs and expressed specific interest in technical curricula development.

Speaker – Mr. Harry

Mr. Harry provided details on the CONRT programs and interests and gave his analysis of the Atlanta ERDA Technology Training Conference. He described the general operations of ERDA procurement, including contracting policies within CONRT. He expressed the interest of CONRT in citizen education, technology transfer, and technical curricula development.

COMMUNITY COLLEGE SYSTEM NARRATIVE

The American Association of Community and Junior Colleges (AACJC) is the organization most closely allied with the total public and private two-year college sector. Of the roughly 1,200 community and private junior colleges in the United States, almost 1,000 belong to the AACJC. Mr. James Mahoney from the AACJC opened the community college narrative by providing an overview of the community college system for ERDA personnel. He pointed out that there are currently 1,230 community colleges, technical institutions, and junior colleges offering programs up to two years beyond high school. These programs are of a comprehensive nature, and the colleges are predominately under local control. He noted that more than half of the student population lives within ten miles of local community colleges and that, with rare exceptions, community colleges are practicing "open-door admissions" in the sense that any student with a high school diploma can enter the college and seek education which can provide him with the opportunity to transfer to a 4-year college for additional work or to go into the job market with a technical or administrative skill. Mr. Mahoney stressed the tremendous variety of the programs being offered. He noted that over half of the more than 14 million students currently registered in community colleges are in credit programs in the career and occupational areas. There are over 16,000 occupational programs with more than 1,400 distinct offerings given nationally. General information materials on the community college systems are displayed in Appendix K.

Another strength of the community college system is its movement into the non-credit continuing education programs, which include a variety of courses in addition to workshops, seminars, and special programs with industry and government. More than one million individuals were enrolled in these courses in 1975-76.

Mr. Mahoney also pointed out the variety of the typical student body in community colleges. Recent studies have shown that the average student in community colleges is in his late twenties, married, employed, and attending part-time, suggesting that the students in the community colleges are more mature and serious about their education and more clear about their goals and their educational focus. He went on to point out that one of the strengths of community colleges is their local responsiveness, which is evidenced by the predominance of local control. One of the distinctive characteristics of community colleges is that they are designed to address the specific needs of the community populations which they serve. They are truly a "peoples college" and many are supported to a great extent by county and municipal tax dollars. Occupational programs are often structured to address current labor needs as identified by government, industry, and business, and are in response to locally forecasted job needs. Also, most of the programs are shaped jointly with representatives of the employer organizations and are partially evaluated and controlled by local advisory committees. The transfer programs are designed for students seeking professional 4-year degrees articulated with other higher educational universities and state colleges within the regions in which the community colleges are located. Non-credit continuing education programs, workshops, and seminars are created most frequently in response to perceived community needs on request from federal, state, municipal, or county agencies.

Local control of community colleges is indicated by a recent study sponsored by the AACJC in which the community colleges responding showed that roughly 65% are governed by local boards. Most of these local governing boards have fewer than 10 members who are generally placed through an elective or appointive process. Sixty percent were elected by the community while the other forty percent were appointed by elected local or state officials. Their authority usually includes budget, curriculum control, and the selection of the top executive. Members are generally outstanding, influential persons within the community and represent a cross section of the community.

Mr. Mahoney pointed out that the AACJC is in an excellent position to be of service to organizations like ERDA and particularly to serving as a broker for the overall community college system. The AACJC objectives include representing the interest of their institutions and alerting their members of trends and issues and identifying the constraints within those issues. He noted that the AACJC has an established office of governmental affairs which serves as a liaison with the appropriate governmental and congressional offices and often conducts seminars for college development officers. It provides publications, operates a data collection office, and participates in a number of consortia and task forces. AACJC also operates a substantial projects office, with most of the special projects being financed originally through federal contracts or grants or through foundation grants. Some examples of the current programs underway at the AACJC include occupational safety and health programs, vocational and educational programs, and international education.

Following Mr. Mahoney's description of the overall community college system and the role and function of the AACJC and its potential to ERDA and the Office of Conservation, the other eleven community college leaders spoke briefly to the specific concerns, missions, problems, and interests of the community college they represented. Of specific interest to the group was the description by Dr. Richard O'Donnell of the programs which are currently underway in New Hampshire. New Hampshire is active in all three areas for which the workshop had concern. Dr. O'Donnell outlined the programs which he and other members of his staff are conducting, including workshops in citizen education within his region, specific developments in curricula in energy conservation, and the development of surveys and other research mechanisms which are of benefit to the office and of specific interest to ERDA and the Office of Conservation.

Dr. Meservey from the Dutchess Community College described their ongoing program in conservation technology. The move of Dutchess Community College is to get more actively involved in the development of a more comprehensive curriculum in this area.

Drs. Carsey and Piland described the work of small rural community colleges, including their potential for flexibility and the development of esoteric occupational programs to attract students from outside the rural areas to which these colleges serve.

Dr. Watson described the tremendous impact of telecommunications on the ability of the community college systems in California to reach out to the public with a variety of credit and non-credit offerings.

Drs. Speller and Wilson of Chicago and Detroit, respectively, described inner-city community colleges and expressed interest in the potential which energy conservation and specialized technical programs provide within the occupational spectrum of the urban student.

Dr. Morton, Chancellor of the West Virginia Board of Regents, described the concept of higher education in West Virginia, which included a highly tight-knit cooperation between the universities, state colleges, and the community and technical institutes within that state, and pointed out the strengths of this type of system in responding to specialized needs of agencies such as ERDA and the Office of Conservation.

Drs. Luchsinger, Traylor, and Tidwell described the specific strengths of their institutions. Miami-Dade, represented by Dr. Traylor, is the largest college in Florida with a heavy emphasis on specialized programs and the use of multimedia in discharging their programs. Dr. Tidwell from the DeKalb Community College system of Georgia specifically addressed the flexibility that system enjoys in innovative development of curricula and the establishment of highly flexible continuing education projects.

Research. The traditional role of universities and industry in ERDA, and more specifically the Office of Conservation-supported research, was discussed. In exploring the rationale for the use of industrial and university units, it was concluded that for most research efforts, particularly in response to Request for Proposals (RFPs), community colleges were not the appropriate institutions. Part of this resulted from the fact that, traditionally, community colleges have not been research-oriented; in fact, their orientation is away from research and more toward applications-oriented efforts. In academic circles, research has been identified as the domain of the universities with graduate programs and of personnel specifically oriented toward research and development, whereas, the community colleges have emphasized the teaching of undergraduates and instructional development. Therefore, it was the consensus of the sub-committee that most research and development RFPs issued by the Office of Conservation would not be of sufficient interest to the community college system to encourage them to respond.

Additional discussions, however, did point out the fact that there may be specific RFPs of interest to community colleges. Examples of these include the types of programs in which manpower surveys, educational surveys, and community data are being requested. In some cases, community colleges might be in the best position to respond to these. Research RFPs which deal with programs which community colleges might claim as a strength should also be considered for response. Examples would be in areas such as solid waste, data processing, energy conversion, and pollution abatement. The possibility of community colleges becoming involved with industries of their region which conduct research and development programs for the Office of Conservation was explored. This interaction would strengthen the role of the community colleges with their local industry.

There was also discussion within the group concerning community colleges being aware of RFPs which appear in the Commerce Business Daily (CBD). Large community colleges have a developmental staff which scans the CBD and other sources to ascertain if any of the RFPs have relevance. The possibility that AACJC might be of some benefit to small community colleges without the staff to keep up with RFPs was raised.

The possibility as to whether some of the RFPs issued by the Office of Conservation and other ERDA organizations might be designated as "set-asides" for the universities and colleges (or even only community colleges) in cases where the objectives seem to be oriented toward the academic community was also explored.

There were also discussions in this sub-committee about techniques through which community colleges might be more responsive to ERDA. One desire of the Office of Conservation which emerged was the need to obtain broad-based reaction to planning documents. One of the techniques for obtaining such reactions is the development of regional workshops or conferences sponsored by a community college which could then draw on its broad-based clientele (industry, government, and private citizens) to respond to the planning documents and programming priorities of the Office of Conservation.

Citizen Education. The focus of the Sub-committee on Citizen Education evolved from the expressed interest of the Office of Conservation to have linkages with people and from the specific knowledge that ERDA itself was considering the concept of energy extension services. These extension services were seen as mechanisms by which the public, industry, and the communities would have access to the technology developed by ERDA and also would have a system by which feedback could be most readily funneled between the community and ERDA.

The possibility that the community colleges might be an important delivery system for the ERDA developed technologies was explored. The sub-committee defined "citizen education" as elevating the awareness of the public. Awareness became a key word, having three components which involved: 1) establishing a conservation ethic, 2) understanding how to conserve energy, and 3) knowing the resources available to assist individuals, communities, and industry to apply these conservation methods. Once again, community colleges were identified as natural vehicles for assisting in this work because of their flexibility, quick response, innovative program development, and close ties with their communities. The community colleges provide particular expertise in various mechanisms which ERDA can take advantage of including 1) seminars, such as those being currently offered at the New Hampshire Vocational Technical College, 2) public television, perhaps based on the kinds of models used at the Coast Community College district and Miami-Dade, 3) dial access systems, similar to those used at community colleges such as Central Piedmont and North Carolina, and 4) seminars, workshops and self-instructional modules which could be utilized by industry and other community groups within the region served by the community college.

It was noted that programs should be addressed to a number of audiences, including the general public, individual professional persons, organizations, and industry within the community served by the community college. These groups should include professional personnel, such as engineers, architects, construction company administrators, and executives in business, industry, labor, and government. Because of the general nature of community colleges, relationships with all of these separate groups are often already established and more specific relationships can be created through college Boards of Trustees, curriculum advisory committees, and special advisory committees reporting to the Board as well as highly specialized program activity groups.

The Citizen Education Group came to the conclusion that it was important that the proceedings of meetings such as this be made available to all the community colleges in the network.

It was emphasized that one of the primary missions of the community colleges, should they wish to become involved with the energy extension service, which will most likely come into fruition within the next three years, is to make direct contact with the State Energy Offices. In this way they can establish the proper liaison so that when federal block grants do become available, they may play the appropriate roles in the implementation of the energy extension service concept. It was also suggested that in the area of citizen education an organization such as the AACJC might serve as a national clearing house for the variety of workshops, seminars, and technologies available through the community colleges. In this way, it could facilitate the correspondence between local community colleges, faculty, and the ERDA national and regional offices by developing a comprehensive list of experts who could provide technical assistance to the various ERDA divisions, and in particular the Office of Conservation. It is interesting to note that the Citizen Education Group came to a similar conclusion as did the Research Sub-committee, i.e., that one very appropriate function of the community colleges might be to serve as a vehicle by which the planning and developmental documentation of ERDA and the Office of Conservation could be reviewed at the regional level. The Citizen Education group also suggested that meetings might be held on the same format as this Chicago meeting, in which different community college representatives in other regions could participate.

Curriculum Development. It became apparent in the Curriculum Development Sub-committee that much work needed to be done in a highly comprehensive way to attempt to define the manpower requirements of the technologies under development by the Office of Conservation. Although the ERDA participants had intuitive feelings that there would be technician needs which should be addressed by the academic community and particularly the community colleges, the actual specifics of these needs were elusive. In a number of areas there seemed to be a general consensus that at some point in the future a large number of technicians would

be needed. Yet, it was difficult to sort out these manpower needs in a definitive way. In addition, there had been no attempt to assess the kinds of capability which currently existed in industry.

The group also wrestled briefly with the problem of the concept of an energy conservation technologist and agreed that although it is possible that a core curriculum in this area might be of some future benefit, that much more study needed to be made before community colleges should be encouraged to enter such a market. This is because the field is fraught with the peril that the graduate of such a program would have difficulty finding specific jobs, and that the job and manpower market may not have been properly assessed enough to make such a program feasible. However, it was an important factor, and the sub-committee felt that allowing the system to drift with the hope that industry would provide the technician base for future needs as energy conservation programs were integrated into a broader base was not sufficient, and that there needed to be a definite attempt to identify emerging technician needs and to develop training models, programs, and schedules which would allow the community college system to properly and adequately address these needs.

APPENDIX A

ERDA/COMMUNITY COLLEGE CONFERENCE
AGENDA

THURSDAY – 4 NOVEMBER 1976

8:45 – 9:15	Introduction Definition of Objectives	– J. N. Carsey
9:15 – 10:45	Descriptive Analysis of the Community College System	– Jim Mahoney, et al
10:45 – 11:00	Break	
11:00 – 12:30	Descriptive Analysis of ERDA and CONRT	– Dom Monetta, et al
12:30 – 2:00	Lunch	
2:00 – 5:00	Group Working Sessions Group I – Room 950 Group II – Conference Room (786) Group III – Room 850	
8:00	Dinner	

FRIDAY – 5 NOVEMBER 1976

9:00 – 9:15	Administrative Procedures
9:15 – 10:15	Group I Report & Discussion
10:15 – 10:30	Break
10:30 – 11:30	Group II Report & Discussion
11:30 – 1:00	Lunch
1:00 – 2:00	Group III Report & Discussion
2:00 – 3:30	Conference Wrap-Up

APPENDIX B

ERDA CONSERVATION WORKSHOP FOR COMMUNITY COLLEGE LEADERS

PALMER HOUSE – CHICAGO, ILLINOIS

NOVEMBER 4 & 5, 1976

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ERDA CONSERVATION WORKSHOP FOR COMMUNITY COLLEGE LEADERS

PALMER HOUSE – CHICAGO, ILLINOIS

NOVEMBER 4 & 5, 1976

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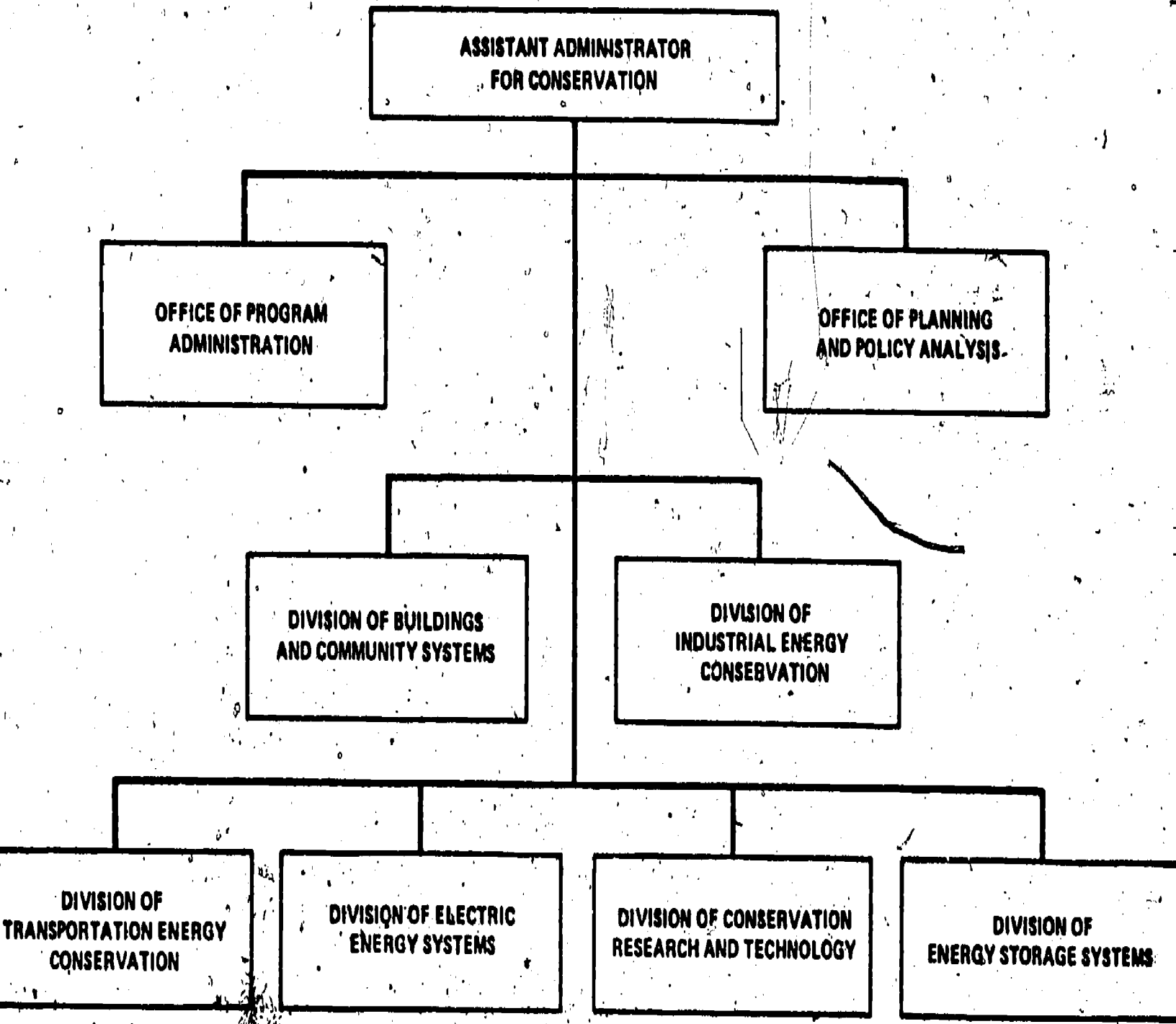
APPENDIX C

ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION



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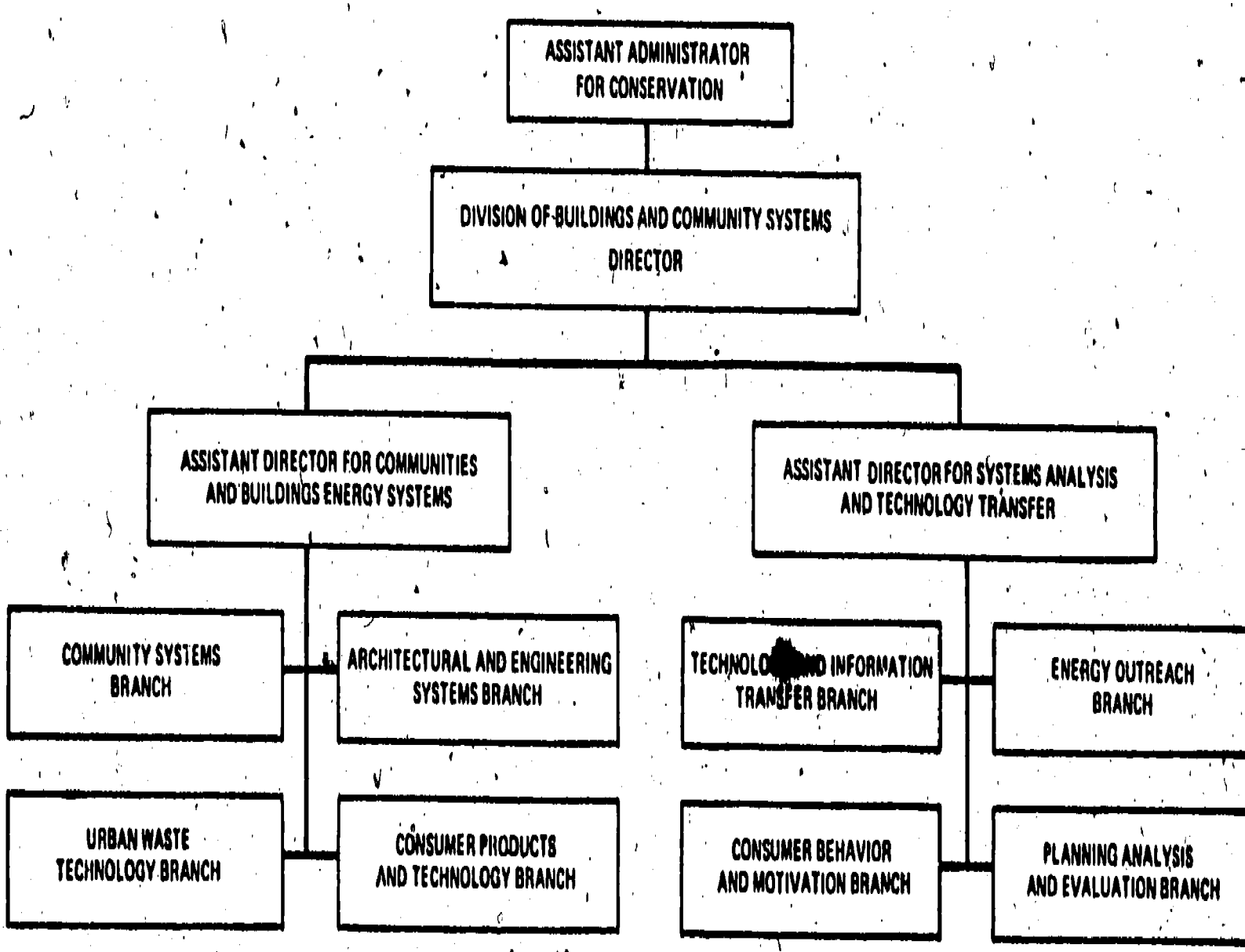
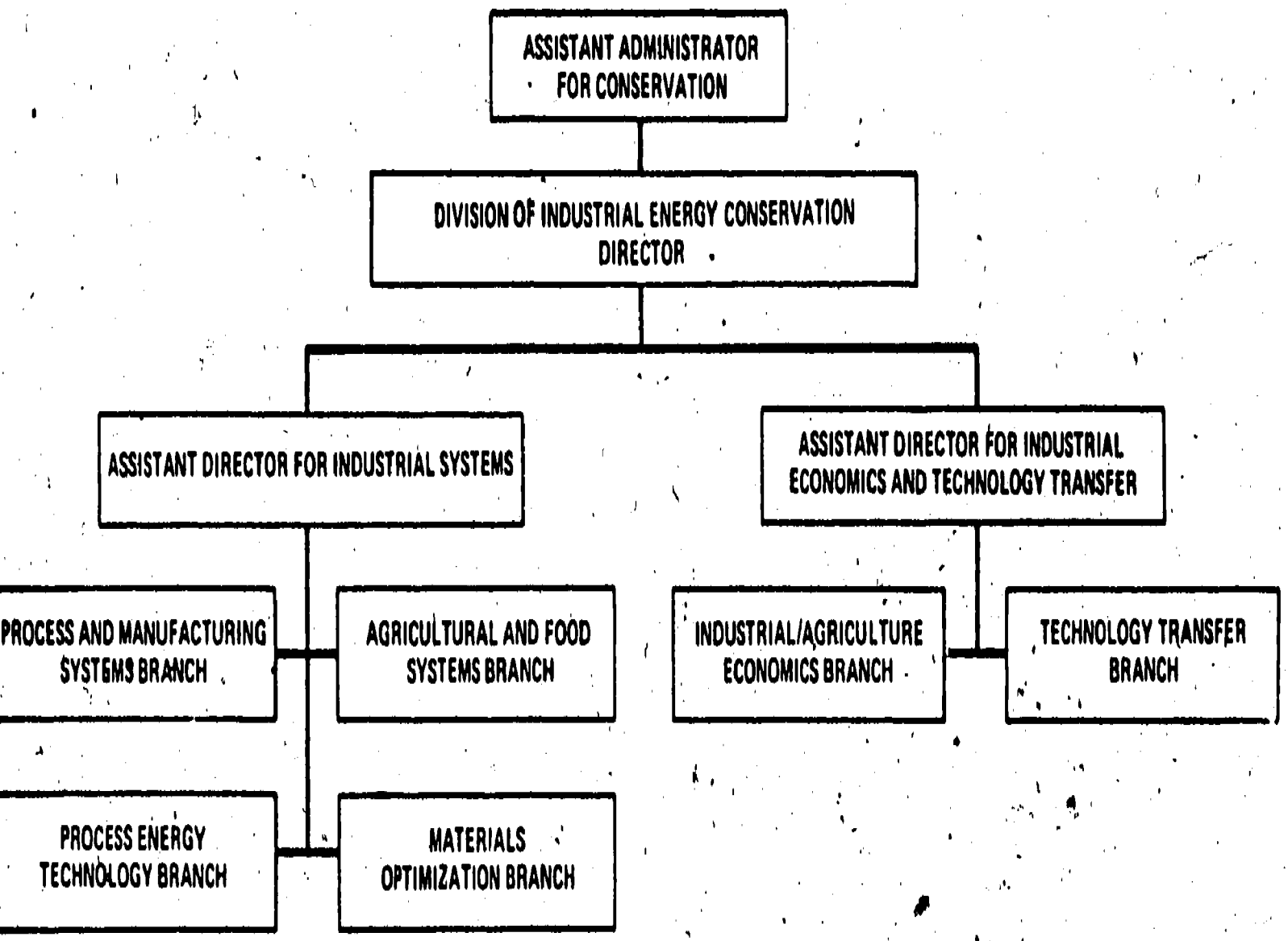
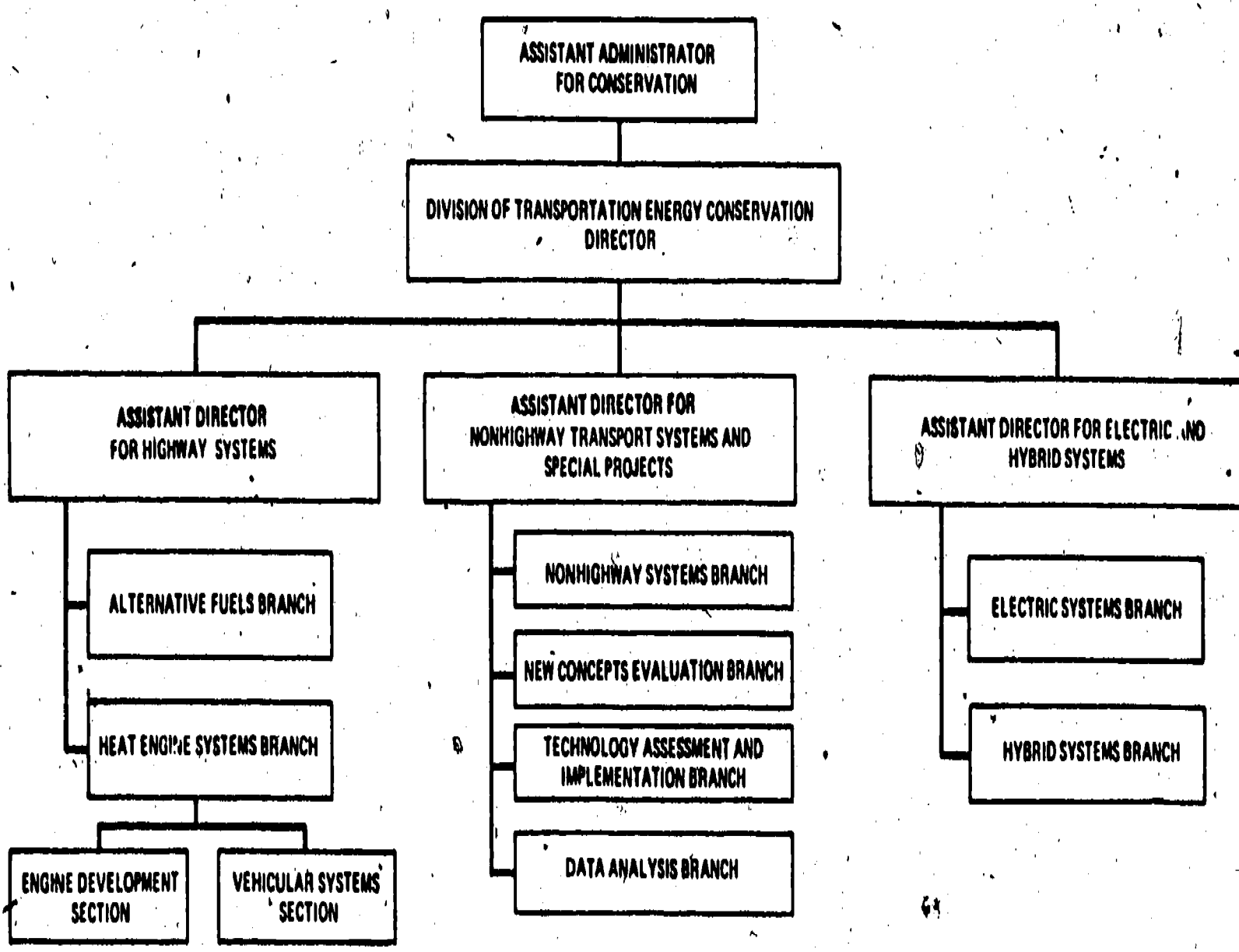


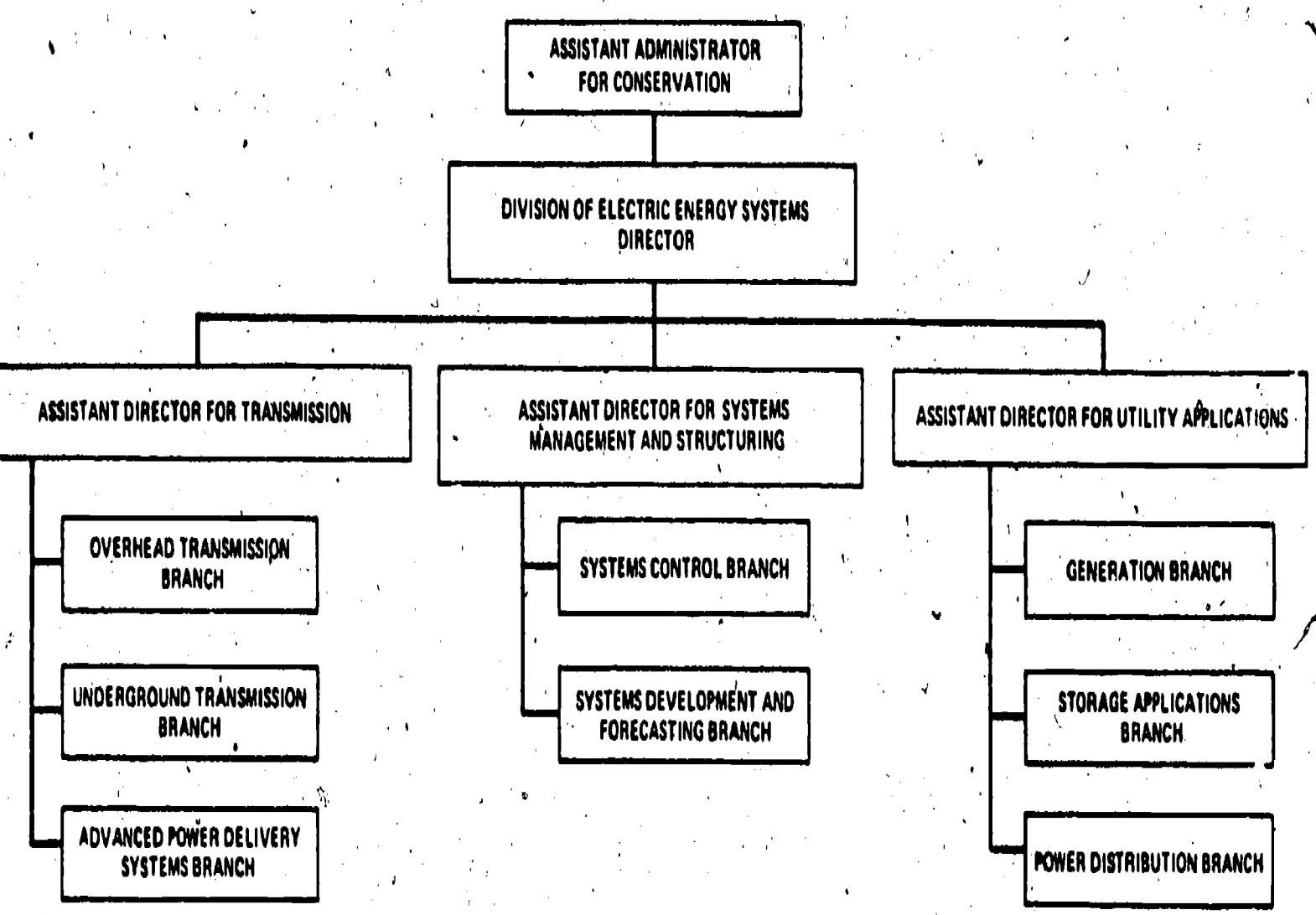
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION



ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION



ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION



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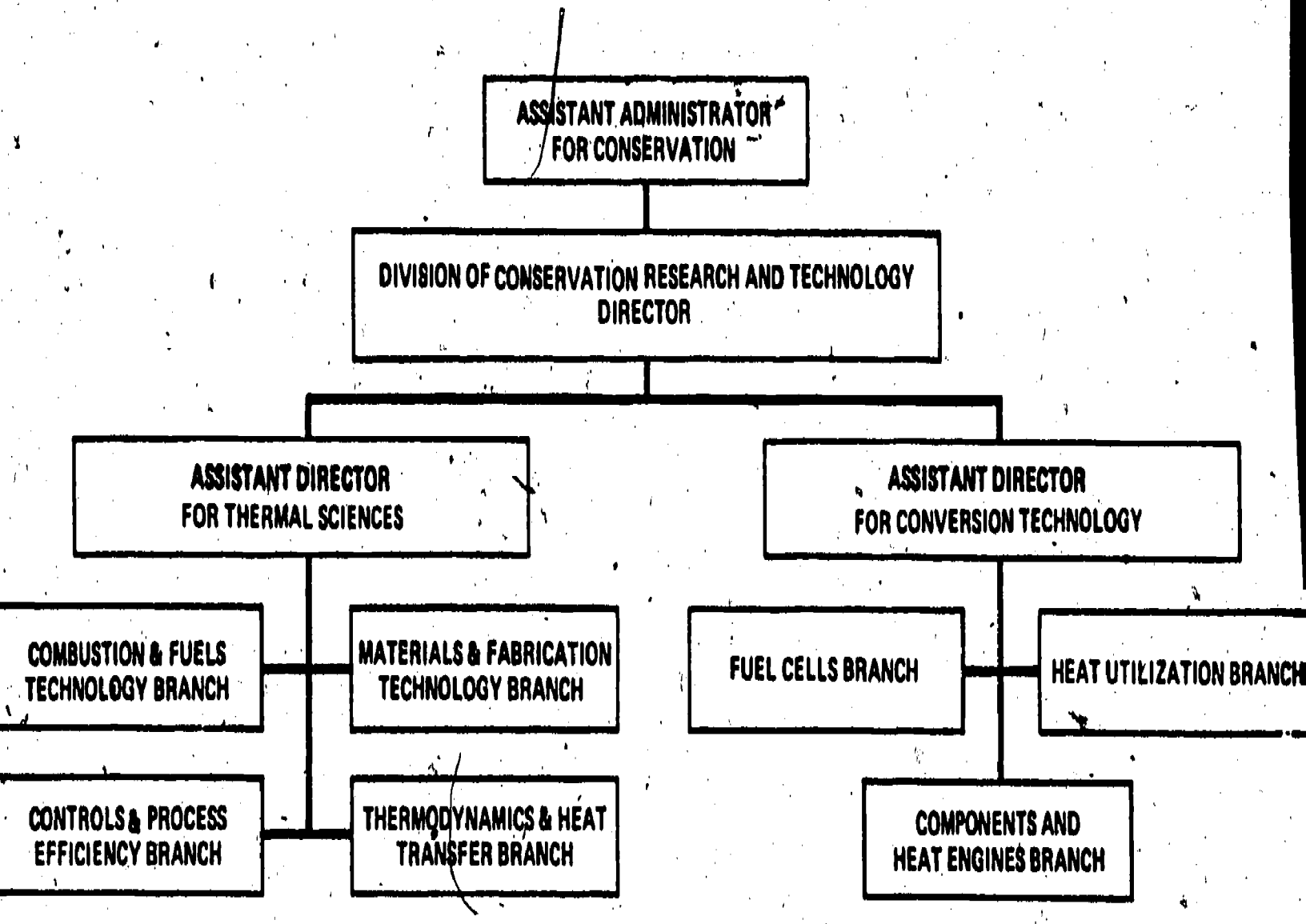
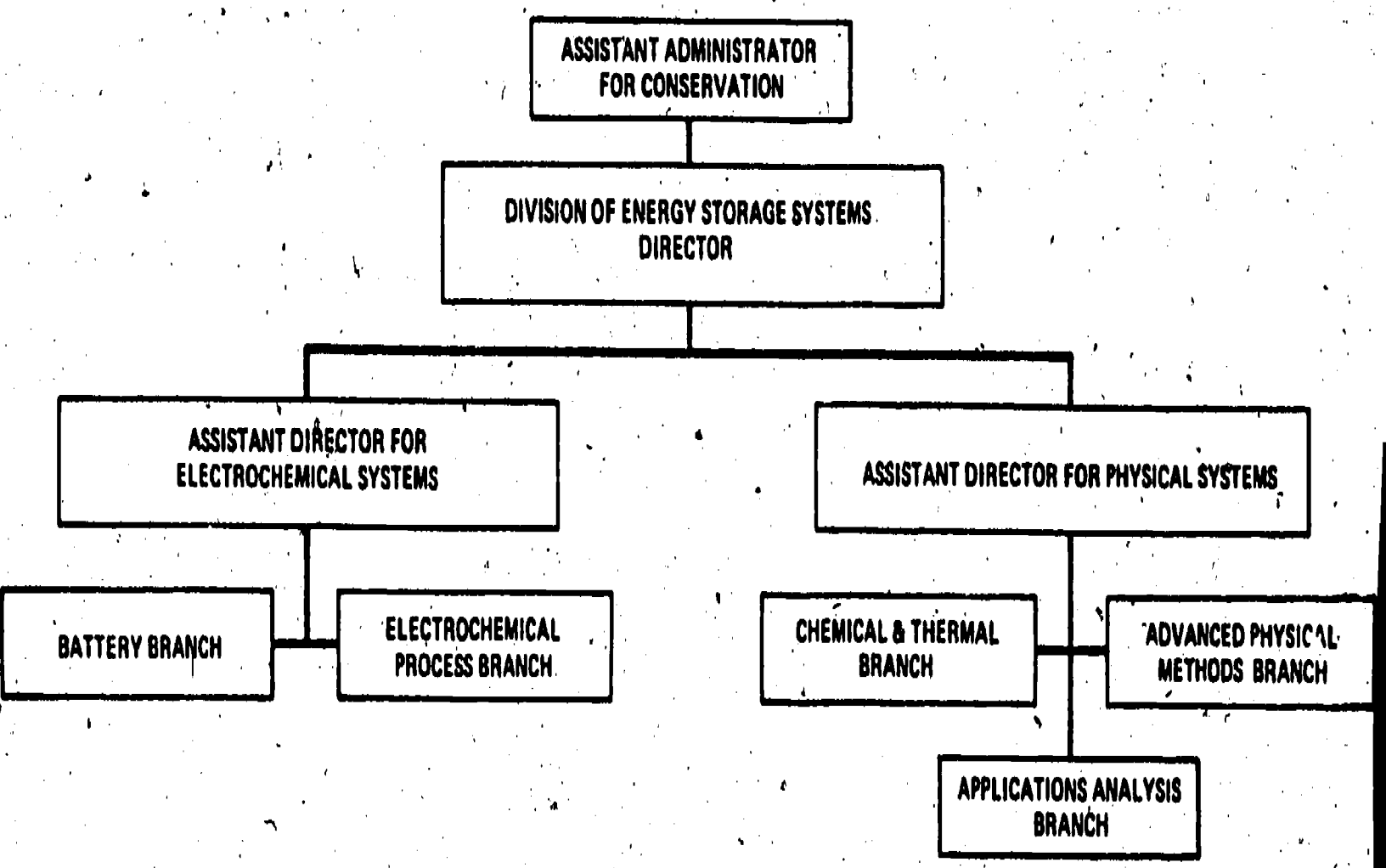
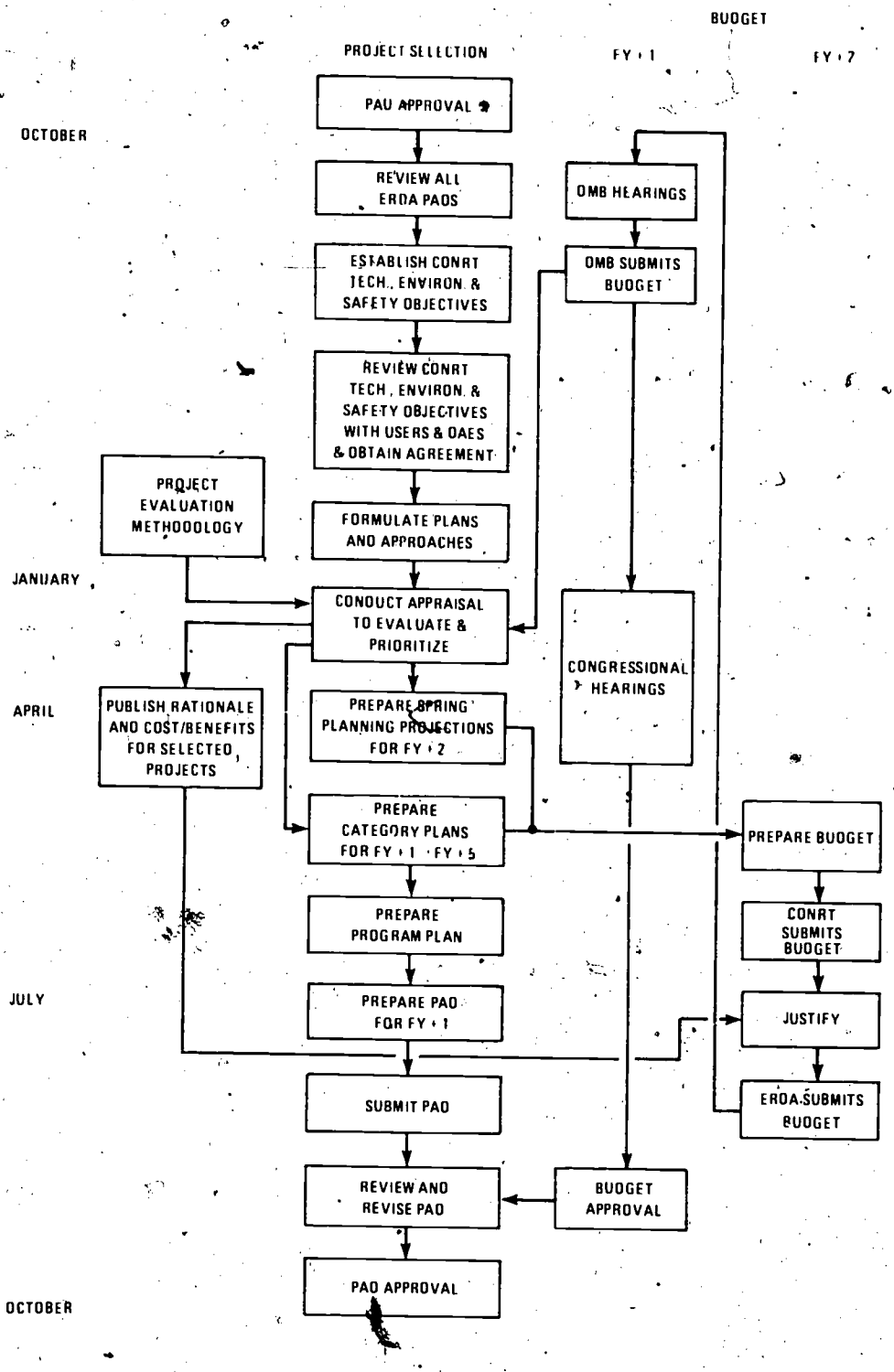


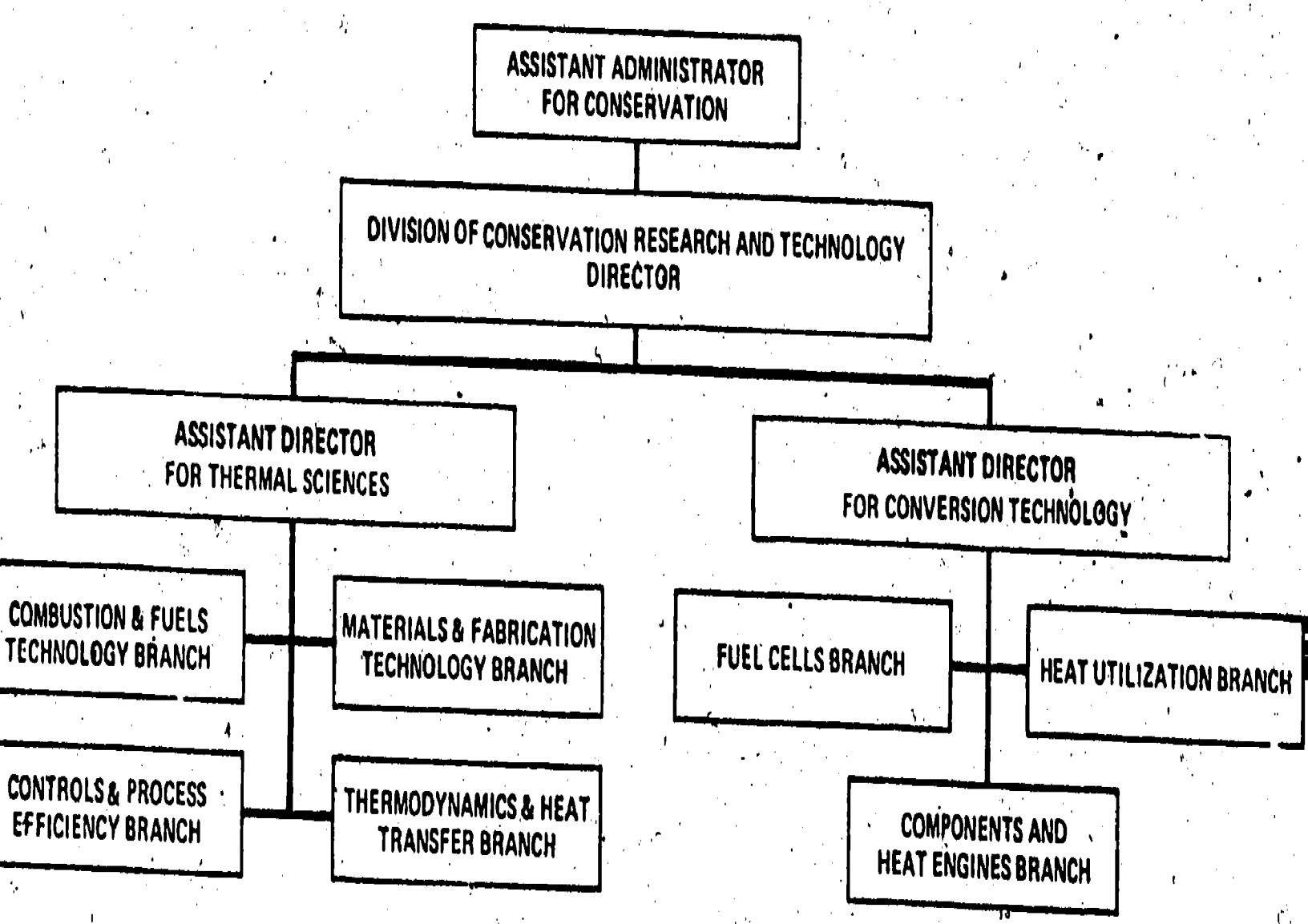
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION



APPENDIX D

CONRT Planning Process




ASSISTANT ADMINISTRATOR FOR CONSERVATION
DIVISION OF CONSERVATION RESEARCH AND TECHNOLOGY DIRECTOR
ASSISTANT DIRECTOR FOR THERMAL SCIENCES
ASSISTANT DIRECTOR FOR CONVERSION TECHNOLOGY
COMBUSTION & FUELS TECHNOLOGY BRANCH
MATERIALS & FABRICATION TECHNOLOGY BRANCH
CONTROLS & PROCESS EFFICIENCY BRANCH
THERMODYNAMICS & HEAT TRANSFER BRANCH
FUEL CELLS BRANCH
HEAT UTILIZATION BRANCH
COMPONENTS AND HEAT ENGINES BRANCH

DIVISION OF CONSERVATION RESEARCH AND TECHNOLOGY

OFFICE OF THE DIRECTOR

Develops, plans, organizes and manages applied research, experimental, and prototype development programs in the areas of thermal sciences and energy conversion in support of ERDA end use divisions. These programs will be directed toward developing innovative technologies for improved efficiency and reliability in applicable systems. Responsible for the transfer of technology to user divisions at the earliest possible time.

ASSISTANT DIRECTOR FOR THERMAL SCIENCES

Plans, directs and manages applied research and exploratory development directed toward the solution of specific technical problems in the thermal sciences area. Research varies from fundamental applied research to sophisticated experimental hardware development and includes studies, investigations and experimental efforts. This effort is directed toward specific technical problems and the evaluation of the feasibility and practicability of proposed solutions and determination of their parameters.

COMBUSTION AND FUELS TECHNOLOGY BRANCH

Plans and directs projects relative to the fluid dynamic design of practical combustion systems and to the characterization and utilization of fuels. Conducts projects to develop and apply advanced instrumentation to characterize combustion processes and alternate fuels. Conducts projects to develop advanced design methods for combustion and aerodynamic components of energy conversion equipment. Responsible for identification and coordination of supporting research conducted in other organizations within ERDA. Provides technical advice and assistance to other organizations within ERDA on matters related to assigned responsibilities. Coordinates ERDA research in combustion, fuels, and fluid mechanics with analagous programs in other government agencies.

MATERIALS AND FABRICATION BRANCH

Plans and directs projects or programs relative to the development, evaluation, and application of materials for components and systems. Examines various methods of fabrication of materials in order to reduce cost or total energy consumption, or to improve reliability. Initiates and conducts studies and investigations on the reclamation and reuse of energy intensive materials. Provides technical advice and assistance to other organizations within the division and other divisions in ERDA on materials and fabrication programs.

THERMODYNAMICS AND HEAT TRANSFER BRANCH

Responsible for the development of the heat transfer and thermodynamics technology base required for the successful development of advanced energy systems. Includes the design, fabrication, and testing of heat exchangers with improved efficiency and heat exchangers which operate at higher temperatures than previously possible. Also includes analysis of advanced thermodynamic cycles in energy conversion and the evaluation and thermodynamic characterization of working fluids. Provides technical advice and assistance to other organizations within ERDA on matters related to assigned responsibility.

CONTROLS AND PROCESS EFFICIENCY

Responsible for conducting automated control technology projects leading to more efficient use of energy in (1) industrial processes, (2) space heating and cooling of residential and commercial buildings, (3) load management to avoid costly peak demands. In addition, this branch is responsible for the physical, chemical, and electrochemical process technology encountered in the industrial sector from the standpoint of improving the energy utilization efficiency of these operations as well as the development of alternative operations which are inherently more efficient.

ASSISTANT DIRECTOR FOR CONVERSION TECHNOLOGY

Plans, directs, and manages prototype development of all advanced conversion technology projects which have progressed to the development of hardware for experimental or operational tests. Plans and implements programs to involve appropriate end-use divisions in later phases of prototype development to assure appropriate technology transfer into full-scale development.

HEAT UTILIZATION BRANCH

Responsible for prototype development of more efficient and reliable low and high grade utilization systems, such as organic Rankine Bottoming Cycles for application to large diesel engines and industrial gas turbines and waste heat recovery systems for industrial waste heat streams.

FUEL CELLS BRANCH

Responsible for the development and administration of the ERDA fuel cell technology research and development program and the coordination and integration of this program with the Nation's energy needs. This includes the demonstration of a prototype first generation fuel cell for electric utilities and other applications as well as prototype efforts leading to second and third generation fuel cells.

COMPONENTS AND HEAT ENGINES BRANCH

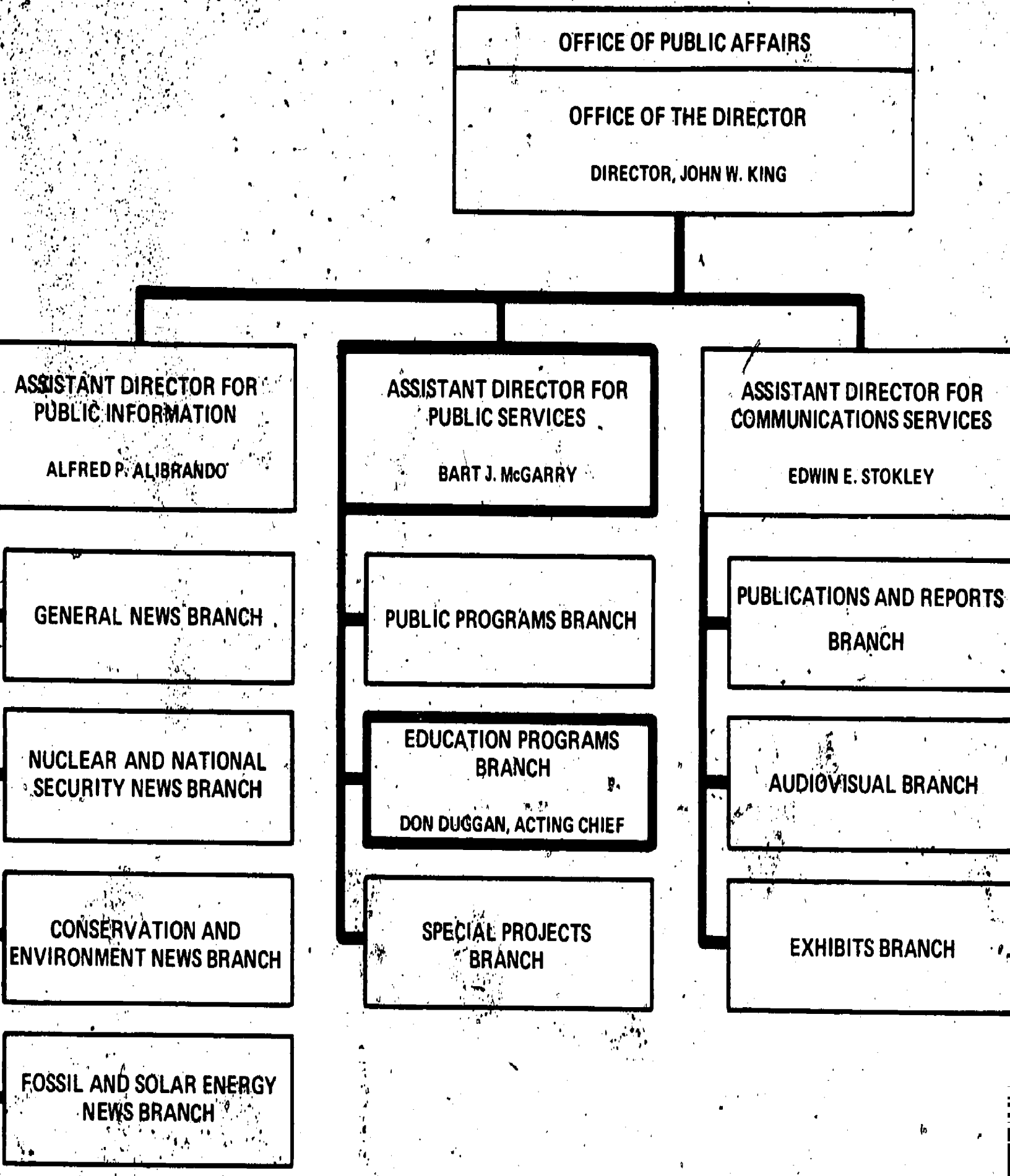
Responsible for the development of new energy conversion equipment based on advanced heat engine cycles which will be highly efficient and cost effective. Conducts programs to increase the efficiency and reliability of the components and subsystems used in energy conversion and delivery systems.

APPENDIX E

ERDA PUBLIC SERVICES PROGRAM

Public Awareness, Outreach, Education

In order to fulfill ERDA's legislated mandate, the Office of Public Affairs, through the AD for Public Services, conducts a number of public awareness/outreach programs which complement the media, audio-visual and technical information activities of the agency. Most of the public awareness programs are based on the principle of leverage: working with existing public interest groups, through available mechanisms, to accelerate and broaden national discussion of energy RD&D options.


OFFICE OF PUBLIC AFFAIRS
OFFICE OF THE DIRECTOR
DIRECTOR, JOHN W. KING
ASSISTANT DIRECTOR FOR PUBLIC INFORMATION
ALFRED P. ALIBRANDO
ASSISTANT DIRECTOR FOR PUBLIC SERVICES
BART J. McGARRY
ASSISTANT DIRECTOR FOR COMMUNICATIONS SERVICES
EDWIN E. STOKLEY
GENERAL NEWS BRANCH
NUCLEAR AND NATIONAL SECURITY NEWS BRANCH
CONSERVATION AND ENVIRONMENT NEWS BRANCH
FOSSIL AND SOLAR ENERGY NEWS BRANCH
PUBLIC PROGRAMS BRANCH
EDUCATION PROGRAMS BRANCH
DON DUGGAN, ACTING CHIEF
SPECIAL PROJECTS BRANCH
PUBLICATIONS AND REPORTS BRANCH
AUDIOVISUAL BRANCH
EXHIBITS BRANCH

PUBLIC SERVICES

EDUCATION PROGRAMS BRANCH

- ELEMENTARY AND SECONDARY SCHOOLS
- TECHNICAL-VOCATIONAL SCHOOLS
- APPRENTICE TRAINING PROGRAMS
- MINORITY SCHOOLS
- UNDERGRADUATE AND COMMUNITY COLLEGES
- SCIENCE FAIR
- EDUCATIONAL TV
- ESSAY CONTESTS
- TEACHER TRAINING

EDUCATIONAL PROGRAM ACTIVITIES

Programs and materials on energy education are being developed for teachers and students of various levels and disciplines. This work is being done in cooperation with the schools themselves, as well as other Federal agencies.

a. Elementary and Secondary Schools. Teaching units for K-12 are being developed which will be applicable in existing science, social studies, math, civics, home economics and other classes. These materials fill an unserved need in U.S. education, both in terms of content and broad availability.

These materials and projects present an objective, extensive profile of current and potential energy sources; domestic energy prospects; national RD&D objectives and strategies including conservation, environment and safety technologies; and the need for long-term energy planning including balanced energy development and wise use.

Investments in education programs and materials accrue benefits both in the short-term (educating today's teachers, students and their families about the need for a balanced energy development and conservation program) and in the long-term (integrating energy technology subjects and an understanding of energy issues into the school curricula.)

To actively involve students and teachers in the consideration of energy problems and energy technologies, national and regional conferences and local seminars will be conducted at both the high school and college levels. Special programs on energy-related information will be developed on a pilot basis. These programs may include mini-courses on energy and teacher training activities.

b. Technical-Vocational Schools. Elements of these same materials will be prepared for use in vocational and technical high schools and union apprentice training programs, with emphasis on craft and blue collar energy-related trades.

The ERDA National Plan has pointed out that a lack of trained manpower may become a serious constraint for the commercialization of RD&D programs. As the Office of Manpower Assessment develops a clearer picture of energy-related manpower needs, we propose to develop and encourage programs which will promote skills important in areas of energy extraction, development, conservation and energy-related service industries. First targets include solar heating technicians and home insulation installers. Close cooperation with labor unions is anticipated in course development, dissemination and use.

c. Undergraduate and Community Colleges. Materials including survey course material will be prepared for undergraduate non-degree students, to provide a broad understanding of energy technology, energy research, environment and safety issues, and career opportunities in energy technology fields.

APPENDIX F

ENERGY EXTENSION SERVICE

OBJECTIVE

- ENHANCE PUBLIC AWARENESS AND INDIVIDUAL CAPABILITIES TO USE CONSERVATION OPPORTUNITIES AND ALTERNATIVE ENERGY TECHNOLOGY
- IDENTIFY MOST EFFECTIVE IMPLEMENTATION APPROACHES

TARGET AUDIENCES

- SMALL ENERGY END USERS
  - RESIDENTIAL, COMMERCIAL, AGRICULTURAL, SMALL BUSINESS, STATE AND LOCAL GOVERNMENTS
- INFLUENCING ORGANIZATIONS
  - BUILDERS, BANKERS, ARCHITECTS

ENERGY EXTENSION SERVICE

MAJOR FEATURES

- INITIAL PROGRAM – FIRST YEAR
- MINIMUM OF 10 STATES BY COMPETITIVE SOLICITATION
- ALL STATES STARTING SECOND YEAR
- STATE GOVERNMENTS DESIGN/IMPLEMENT OWN PROJECTS
- FEDERAL MANAGEMENT BY OPERATIONS OFFICES/REGIONAL CENTERS FOR TWO STATES
- USE OF EXISTING ORGANIZATIONS
- SUPPORT AND COMPLEMENT PRIVATE SECTOR ACTIVITIES
- ENERGY CONSERVATION, SOLAR AND OTHER ALTERNATIVE ENERGY TECHNOLOGIES
- COORDINATION WITH OTHER FEDERAL AGENCIES
- INDEPENDENT EVALUATION OF PROGRAM IMPACT
- TECHNICAL SUPPORT INSTITUTES

ENERGY EXTENSION SERVICE

RATIONALE

- NEED TO TRANSFER ENERGY R&D RESULTS TO POTENTIAL USERS
- SERVICE IS ONE APPROACH TO TECHNOLOGY TRANSFER
- INVOLVES PERSONALIZED TECHNICAL ASSISTANCE TO ENERGY CONSUMERS
- PATTERNED AFTER AGRICULTURE EXTENSION SERVICE

APPENDIX G

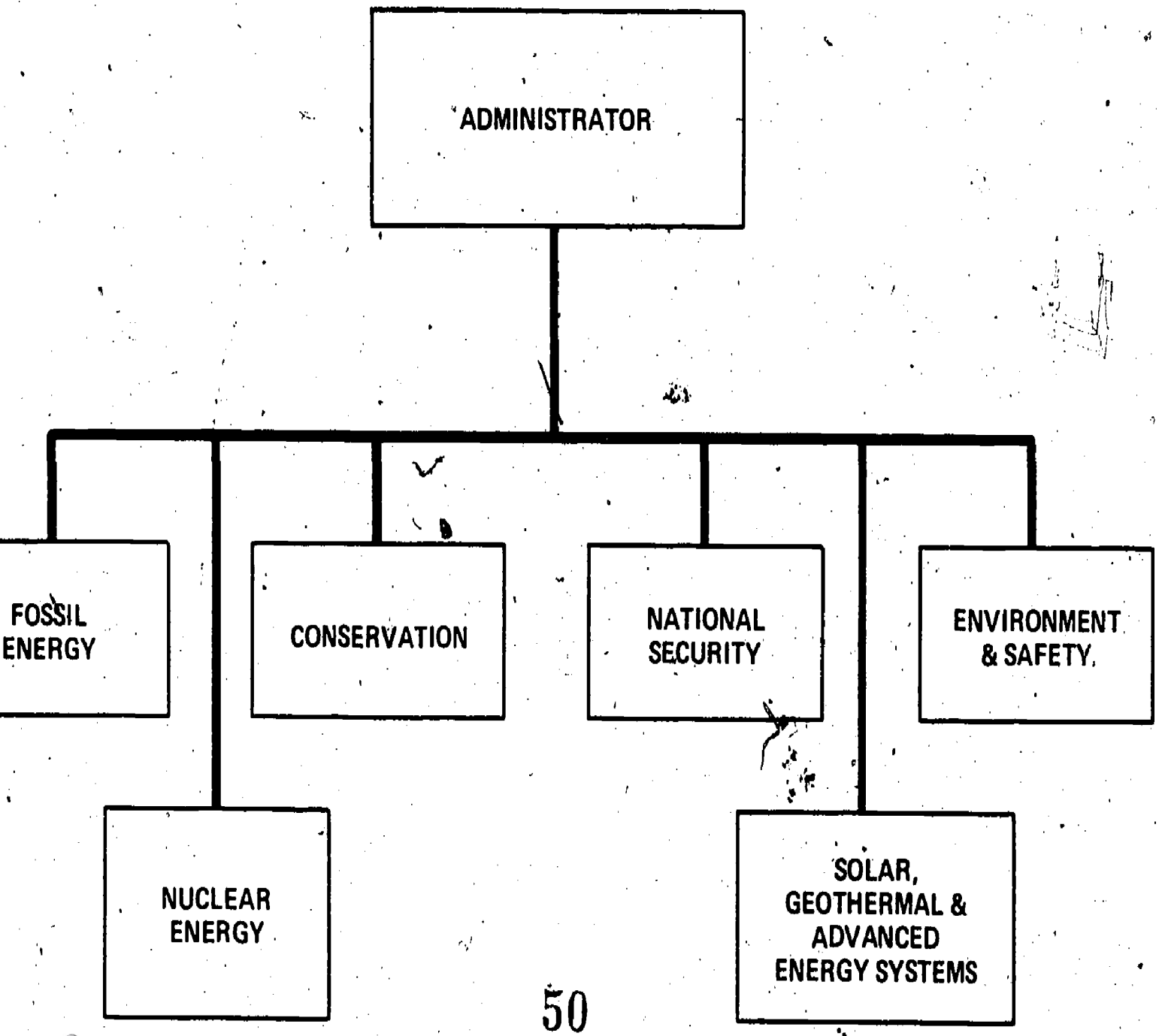
GENERAL ORGANIZATION

THE ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION (ERDA) IS ORGANIZED ALONG A VERTICAL STRUCTURE THAT HAS THREE DISTINCT LEVELS:

- HEADQUARTERS
- FIELD OPERATIONS OFFICES
- MULTIPROGRAM LABORATORIES, ENERGY RESEARCH CENTERS (ERC), PRODUCTION FACILITIES AND SPECIALIZED LABORATORIES

HEADQUARTERS: The ERDA Headquarters organization was mandated by the "Energy Reorganization Act of 1974" which created the Office of the Administrator and six Assistant Administrators for the major program areas.

ENERGY RESEARCH & DEVELOPMENT ADMINISTRATION



- FIELD OPERATIONS OFFICES

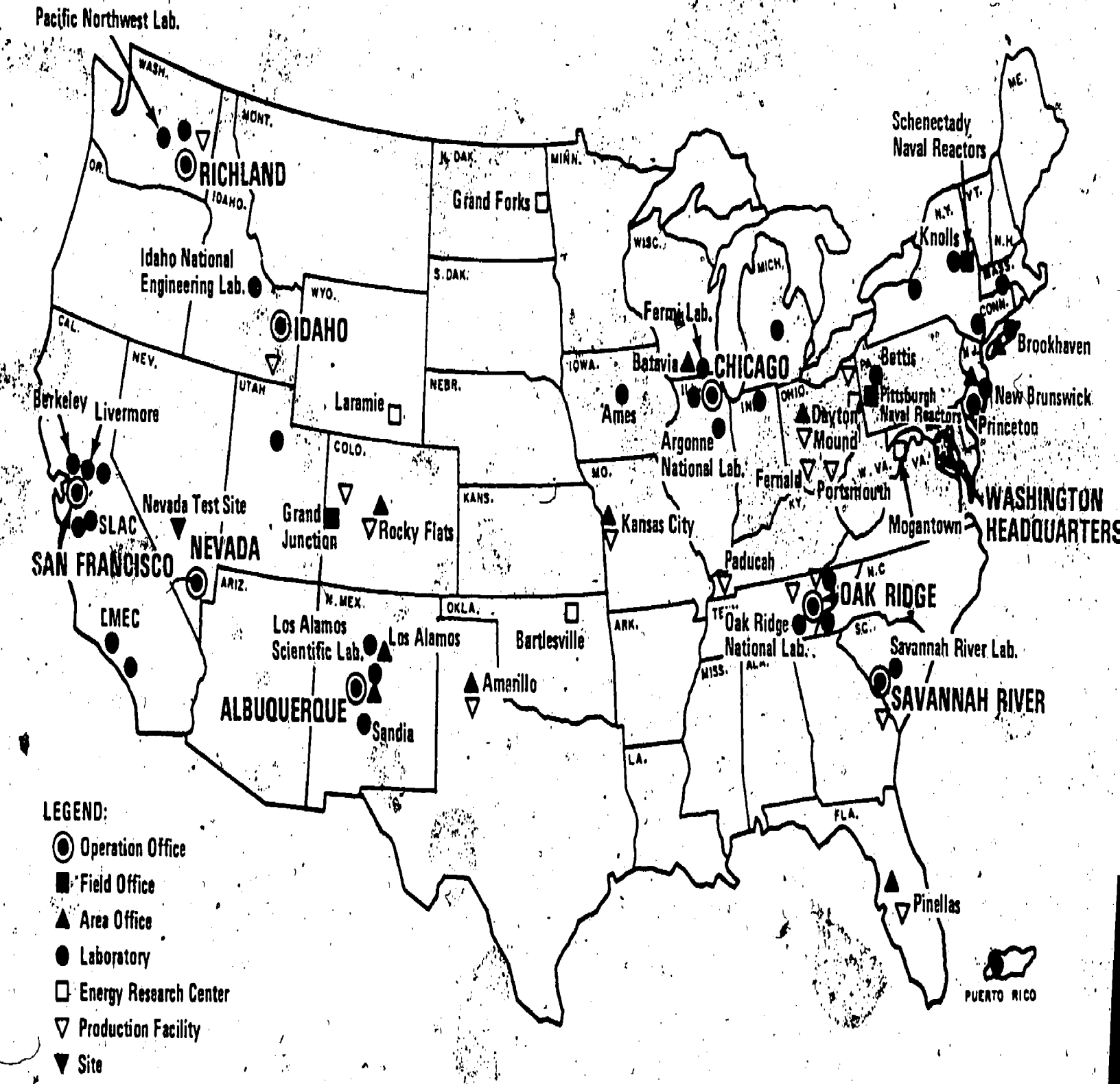
  - The Atomic Energy Act of 1954 prohibited the AEC (predecessor to ERDA) from directly running their laboratories.

  - The field structure that developed from this statutory limitation consisted of Government Owned Contractor operated (GOCO) laboratories, staffed by contractor personnel and a series of eight regional field operations offices, staffed with AEC (now ERDA) personnel, that administer the operating contracts for those GOCO labs in their region.

  - ERDA also inherited six Energy Research Centers (ERC's) from the Department of Interior, which are government owned and operated Labs.

  - The field operations offices, in their role as contract administrators of the national laboratories, also provide contract support to the program divisions at Headquarters for research and development contracts placed with university and industrial contractors within their region.

ERDA FIELD ORGANIZATION



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APPENDIX H

BUILDINGS AND COMMUNITY SYSTEMS
OFFICE OF CONSERVATION

OVERALL PROGRAM OBJECTIVES

- RESEARCH, DEVELOPMENT AND DEMONSTRATION TO INCREASE THE EFFICIENCY OF ENERGY UTILIZATION IN COMMUNITY SYSTEMS, BUILDINGS AND CONSUMER PRODUCTS
- ACCELERATE/COMPLEMENT PRIVATE SECTOR EFFORTS
- FOSTER ACCEPTANCE OF ENERGY SAVING TECHNOLOGY
- MAXIMIZE THE EFFECTIVENESS OF ENERGY USE
- MINIMIZE ADVERSE SOCIO-ECONOMIC AND/OR ENVIRONMENTAL IMPACTS

DIVISION:
BUILDINGS AND COMMUNITY SYSTEMS

THRUSTS:

1. COMMUNITY ENERGY UTILIZATION

   (WILL DETERMINE THE COMMUNITY FORMS AND DEVELOPMENT PATTERNS MOST AMENABLE TO EMPLOYMENT OF INTEGRATED SYSTEMS.)

2. BUILDING DESIGN AND STRUCTURES

   (WORK WITH ENTIRE BUILDINGS INDUSTRY TO UNDERTAKE ACTIVITIES NECESSARY TO DEVELOP AND COMMERCIALIZE ENERGY EFFICIENT MATERIALS, STANDARDS, FOR RETROFIT/NEW CONSTRUCTION.)

3. TECHNOLOGY AND CONSUMER PRODUCTS

   (IDENTIFY TECHNOLOGY OPPORTUNITIES FOR IMPROVED PERFORMANCE OF CONSUMER PRODUCTS.)

4. TECHNOLOGY DISSEMINATION AND TRANSFER

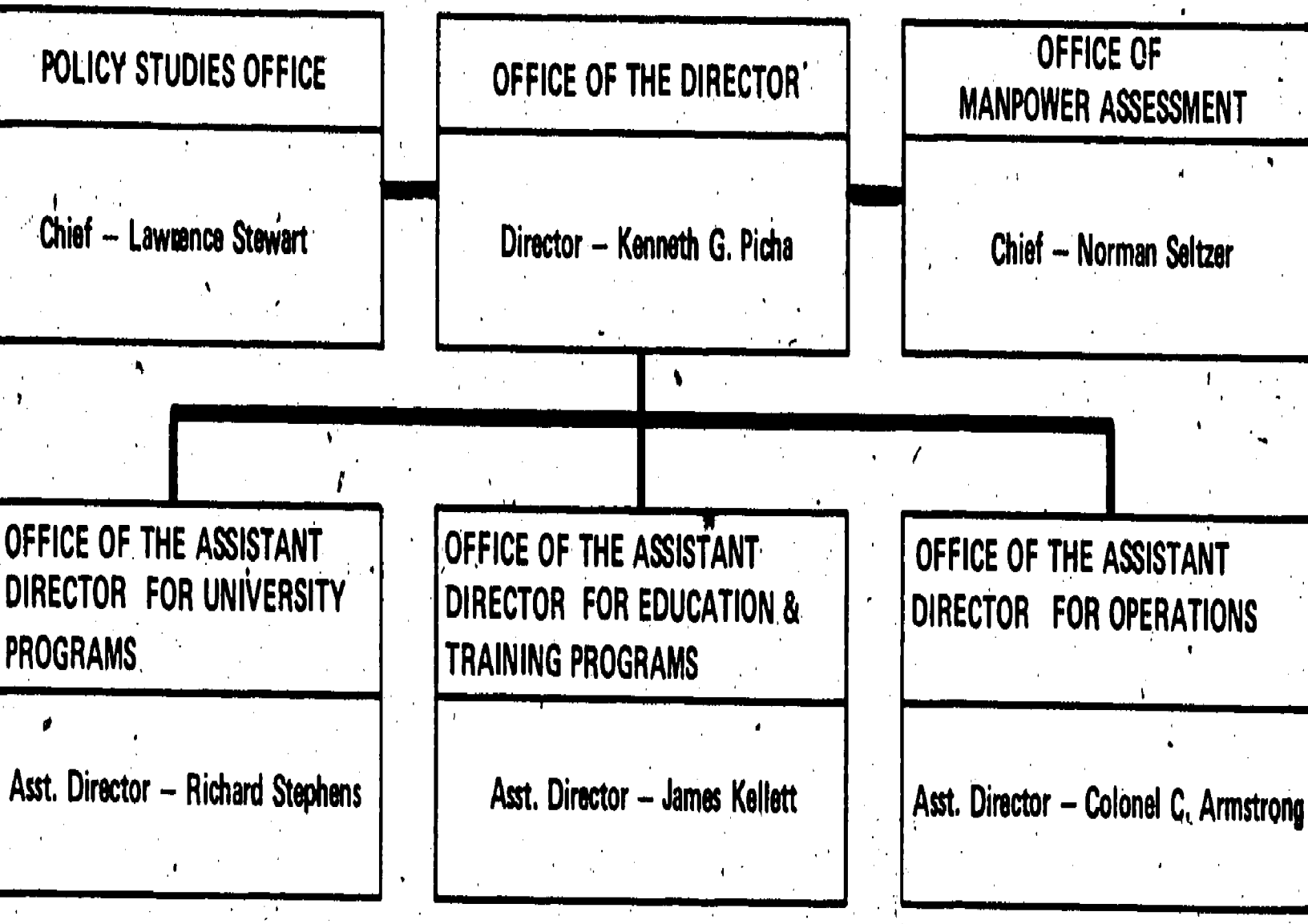
   (PRESENTATION OF RESULTS WILL INCLUDE MANUALS AND GUIDELINES FOR USE BY ALL SEGMENTS OF BUILDING INDUSTRY.)

DIVISION OF BUILDINGS AND COMMUNITY SYSTEMS
PROGRAM ACTIVITIES

- ARCHITECTURAL AND ENGINEERING SYSTEMS
- COMMUNITY SYSTEMS
- URBAN WASTE TECHNOLOGY
- CONSUMER PRODUCTS AND TECHNOLOGY
- CONSUMER MOTIVATION AND BEHAVIOR
- PLANNING ANALYSIS AND EVALUATION
- TECHNOLOGY AND INFORMATION TRANSFER
- ENERGY EXTENSION

APPENDIX I

OFFICE OF UNIVERSITY PROGRAMS



OFFICE OF UNIVERSITY PROGRAM FUNCTIONS

I. MANPOWER ASSESSMENTS

II. LEAD ROLE IN EDUCATION & TRAINING FOR ENERGY RD&D

III. INTERFACE BETWEEN ERDA AND UNIVERSITIES

- WINDOW INTO ERDA FOR UNIVERSITIES
- ASSIST ERDA TECHNICAL PROGRAMS MATCH NEEDS WITH UNIVERSITIES' CAPABILITIES
- STIMULATE INTEREST IN ENERGY ISSUES AND RESEARCH AT UNIVERSITIES
- STIMULATE MULTI-DISCIPLINARY RESEARCH ON PRINCIPAL ENERGY TECHNOLOGIES
- STIMULATE INTERACTION AMONG UNIVERSITY-INDUSTRY-GOVERNMENT ON REGIONAL AND LOCAL ENERGY PROBLEMS

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APPENDIX J

INDUSTRIAL ENERGY CONSERVATION

THE OVERALL PROGRAM OBJECTIVE IS:

- UNDERTAKE RD&D ACTIVITIES TO ACCELERATE AND COMPLEMENT PRIVATE SECTOR ACTIVITIES IN ENERGY CONSERVATION
- PROMOTE ENERGY SAVING TECHNOLOGY FOR
  - INDUSTRIAL PROCESSES
  - AGRICULTURE
  - FOOD INDUSTRIES

INDUSTRIAL ENERGY CONSERVATION SUBPROGRAM ACTIVITIES

- WASTE ENERGY REDUCTION
- INDUSTRIAL PROCESS EFFICIENCY
- MATERIALS OPTIMIZATION
- AGRICULTURAL AND FOOD PROCESS EFFICIENCY
- TECHNOLOGY TRANSFER
- INDUSTRIAL IMPACT ANALYSIS

APPENDIX K

FACT SHEET ON TWO-YEAR COLLEGES

INSTITUTIONS

There are approximately 1,230 two-year institutions in existence today in the United States and outlying areas. Among the 1,230 are public and independent community and junior colleges, separate campuses of individual colleges, technical institutes, and two-year branch campuses of four-year colleges and universities. Set in rural, suburban, and urban areas, these institutions can be found in every state in the U.S. as well as in the District of Columbia, Puerto Rico, the Canal Zone, American Samoa, Canada, and in some other foreign countries.

ENROLLMENT

Last fall 4,069,279 students were enrolled for credit courses given by these institutions. This represents 35.6 percent of the total undergraduate enrollment in this country. The number of "first-time" students in two-year colleges was equal to 53.6 percent of the total number of students enrolled for the first time in all types of postsecondary institutions.

STUDENTS

Women made up 45.7 percent of last fall's enrollment at two-year colleges. The Office for Civil Rights reports that minorities account for approximately 16 percent of the total full-time enrollment in these colleges. Data from the U.S. Bureau of the Census show that in 1974, 42 percent of two-year college students were over age 21; approximately one-fourth of all two-year college enrollees were over 21 years old and attending part-time.

FACULTY AND ADMINISTRATION

In order to serve the diverse group of students enrolled in two-year institutions a reported 181,260 faculty members and 15,488 administrators were employed for the 1975-76 academic year, as of October 1975. In addition, 11,537 other professionals including librarians and counselors are reported. Three out of four two-year college faculty members have a master's degree. Other five percent have the doctorate.

TUITION AND FEES

While rates vary from campus to campus, and from state to state, two-year college tuition remains generally low. Average charges for tuition and required fees were estimated at $1,380.00 per year at independent colleges and $310.00 at public colleges for the academic year 1974-75. It is estimated that tuition and fees at both public and private two-year colleges increased 5 percent between the 1974-75 and 1975-76 academic year.