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THE WHITE HOUSE  
WASHINGTON

Mr. Cheyenne Coal:  
See said;

to recall not  
(the next step: actual)  
approval ~~money~~ needed

N.C. & Companies  
and together >

No movement

(EIS & money)



A PROPOSAL

To

DEVELOP A PRELIMINARY BUSINESS PLAN

For

THE DEVELOPMENT OF COAL RESERVES AND RELATED  
INDUSTRY ON TRIBALLY OWNED AND CONTROLLED  
LANDS

On

THE NORTHERN CHEYENNE RESERVATION

Submitted By

THE NORTHERN CHEYENNE TRIBAL COUNCIL  
Lame Deer, Montana

February, 1974

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## PROJECT OBJECTIVES

The objectives of the proposed project are to develop alternative plans for the management of the Northern Cheyenne Tribe's coal resources, evaluate these alternatives and to prepare a preliminary business plan in sufficient detail to obtain additional funds for business development purposes. The Northern Cheyenne Tribe is facing a situation which could, if not managed intelligently, cause the destruction of its tribal community and the effective desolation of the Northern Cheyenne Reservation. Geologist Joseph B. Rollins of Billings, Montana estimates that the 433,434 acre Northern Cheyenne Reservation contains one of the largest deposits of coal in the United States.

Mr. Rollins estimates that a minimum of three to four billion tons of mineable low sulfur coal are contained within the reservation boundaries. Several coal companies have conducted extensive exploration on 227,733 acres of the reservation and have indicated a strong interest in entering into coal production leases. However, the proposed leases do not provide adequate protection for the tribal community or sufficient land restoration guarantees to insure that the tribe will not be victimized by commercial exploitation without regard for its long run social and economic interests.

The tribe recognizes its obligation to facilitate the orderly development of its coal resources in light of the country's continuing energy needs. Its leaders further recognize that uncontrolled exploitation of these resources would result in the destruction of their community and people as has been the case with many tribes whose lands were developed by petroleum interests and money paid to tribes and individuals who did not have sufficient preparation or guidance to realize any lasting benefits.

The Tribal Council proposes to explore alternative development plans for its coal resources without regard to the particular organization or group which may participate in this development. In particular, it proposes to explore the water, transportation and power requirements implied by the orderly development of its coal reserves. Based upon these evaluations it will develop a business plan for tribally owned and operated coal mining, electric power generation, transportation and coal conversion operations which may be situated on the approximate 205,701 acres not presently encumbered by exploratory permits or coal leases. These development plans will be evaluated in terms of their immediate social and economic impact as well as their long run implications for the tribe's continued growth and development as a potentially significant economic and cultural entity in the otherwise isolated and economically depressed southeastern area of Montana.



The proposed study will contain the following major elements:

An analysis of the socio-economic characteristics of the Northern Cheyenne Tribe.

A preliminary survey of the water and other natural resources situated on and around the reservation.

A preliminary development plan for a strip mine, an electric generation plant, coal conversion plants and alternative transportation systems.

After the Tribal Council has reviewed the relevant data and evaluated the alternate plans, a "Plan of Action" will be developed for use by the tribe in pursuing the development of its coal resources.

The tribal Council believes that it has assembled an outstanding project team to perform the proposed studies and to assist in developing and eventually executing a viable business plan which will enable the Northern Cheyenne Tribe to attain a quality of life commensurate with its resources and heritage.

The Northern Cheyenne intends to change Indians' historic roll of passive subservience to agencies who are charged with the administration of trust responsibility for the benefit of the Indian tribes and who in the past have evidenced little more than apathy toward this responsibility. In Montana, North Dakota and South Dakota there are six reservations which are home for approximately 25,000 Indian people and encompass approximately 5.6 million acres of trust land. If the Northern Cheyenne are successful in the proposed undertaking the tribe intends to share their experience and to work with other Indian tribes to assist them in implementing the Federal Government's presently announced policy of "self determination" for Indians and Alaska natives.



## DURATION

The proposed project is planned for completion within a three month period commencing on or about April 1, 1974. This schedule assumes that a majority of the data required presently exists and that the project team possesses the necessary expertise to assemble and analyze these data along with relevant construction, production and market information. To this end, the Tribal Council has solicited the engineering and management services of The M. W. Kellogg Company, Gilbert & Associates, Community Development & Construction Corporation and The Big Eagle Energy Company, an Indian owned and controlled management company, to perform the required work. Appendix A presents a brief description of these companies and their senior personnel who are available to the proposed project.

## PROJECT AREA

The regional map on the following page locates the 433,434 acre Northern Cheyenne Reservation in relation to the states of Montana, Wyoming and South Dakota.

Table I on Page 6 summarizes the reservation population and labor trends. The economic plight of the reservation is reflected by the 25 percent unemployment rate. This factor is compounded by the under employment of the 780 residents who perform seasonal work. The magnitude of the under employment is further evidenced by the low per capita income of \$1,819. The major employment sectors are:

Government	40%
Industrial	15%
Agricultural	10%
Logging	6%
Miscellaneous	29%

Fifty-five percent of the reservation population is less than 19 years of age. This compares with a Montana population distribution of individuals less than 19 years of age of less than 40 percent. Consequently, the presently high 25 percent unemployment rate will increase or the reservation youth, after graduation, must migrate from the reservation in quest of gainful employment opportunities. Unless the coal resources of the reservation are developed the future employment outlook for the youth of the reservation is bleak.

Educational attainment is another indicator of the relative problems facing the tribe. The median education attainment by the reservation resident 25 years of age or older is 9.4 years compared with 12.3 years for the average Montana resident. The low educational attainment is not a severe handicap for the majority of the jobs needed for the development and distribution of the coal. However, the cost of training these individuals to the skill level necessary to maintain and safely operate complex and sophisticated equipment would be increased significantly.

The closest major retail market is Billings, Montana with a population of 63,000. The 105 miles to Billings effectively precludes the majority of the tribal population from frequent visits to the only major retail center within a reasonable distance of the reservation.

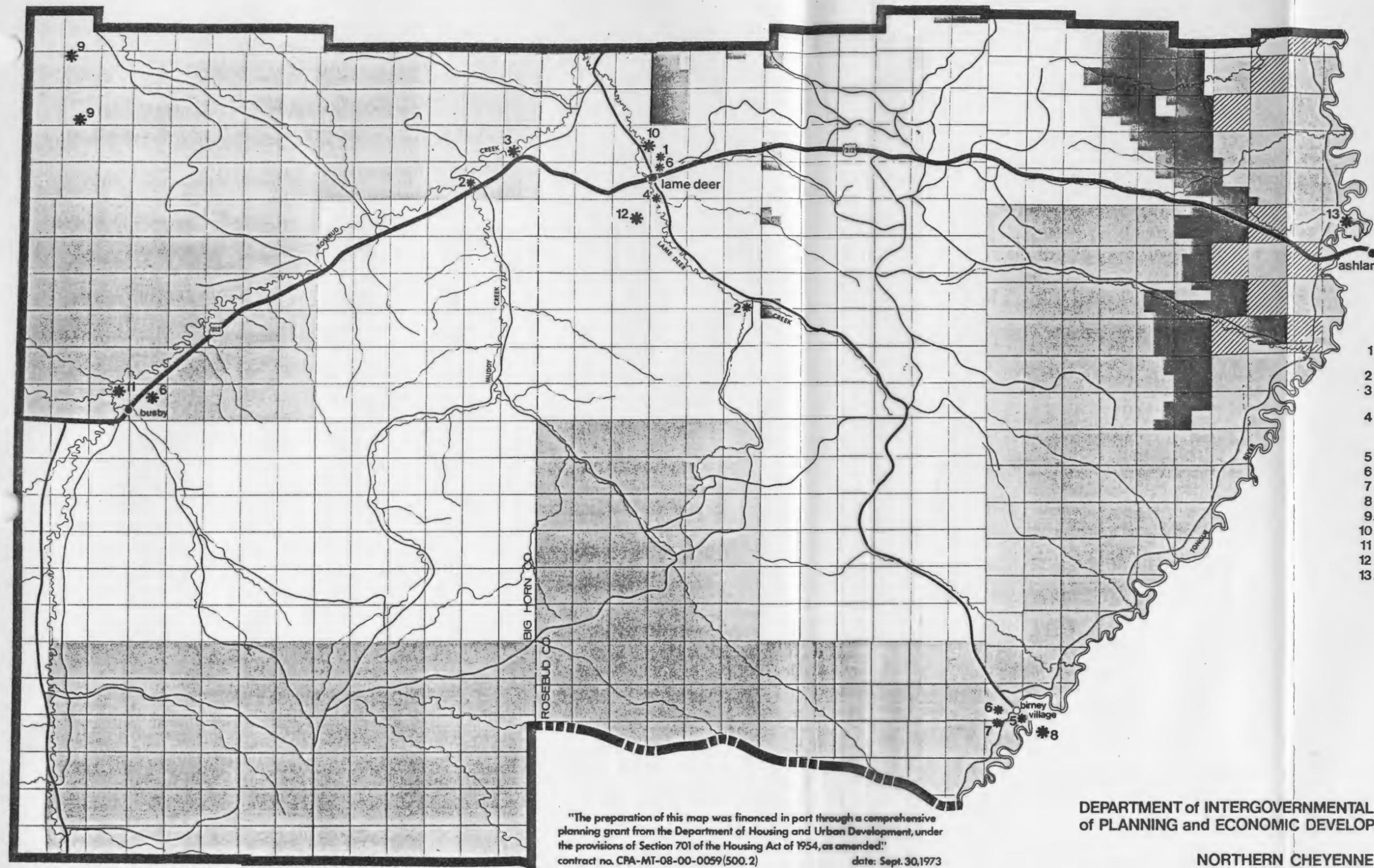
The reservation is landlocked with the nearest railroad terminal located at Coal-strip which is 22 miles from Lame Deer. Lame Deer, the Tribal Headquarters

# POTENTIAL COAL PRODUCTION IMPACT

- PRODUCTION LEASE AREAS 
- MINERAL OWNERSHIP AREAS 
- EXPLORATION AREAS 

# HISTORIC AND CULTURAL

- 1 ..... SITE OF HEADCHIEF - YOUNGMULE FIGHT (HISTORIC MARKERS BY CHEYENNES)
- 2 ..... IMPORTANT EARLY CAMPSITES
- 3 ..... EARLY TRADING POST AND BEEF ISSUE CORRAL SITE
- 4 ..... BATTLE SITE - NELSON MILES, TROOPS AND CHEYENNE SCOUTS, FIGHT LAME DEER'S BAND OF SIOUX
- 5 ..... BIRNEY DAY SCHOOL
- 6 ..... CEMETERIES
- 7 ..... MENNONITE MISSION
- 8 ..... IMPORTANT FASTING PLACE
- 9 ..... POSSIBLE BLACKFEET RAIDER FORTIFICATIONS
- 10 ..... CAMP MERRITT
- 11 ..... CUSTER EXPEDITION CAMPSITE
- 12 ..... CHIEF LAME DEER'S GRAVE
- 13 ..... ST. LABRE MISSION



"The preparation of this map was financed in part through a comprehensive planning grant from the Department of Housing and Urban Development, under the provisions of Section 701 of the Housing Act of 1954, as amended." contract no. CPA-MT-08-00-0059(500.2) date: Sept. 30, 1973

DEPARTMENT of INTERGOVERNMENTAL RELATIONS • DIVISION of PLANNING and ECONOMIC DEVELOPMENT state of montana and NORTHERN CHEYENNE TRIBAL COUNCIL

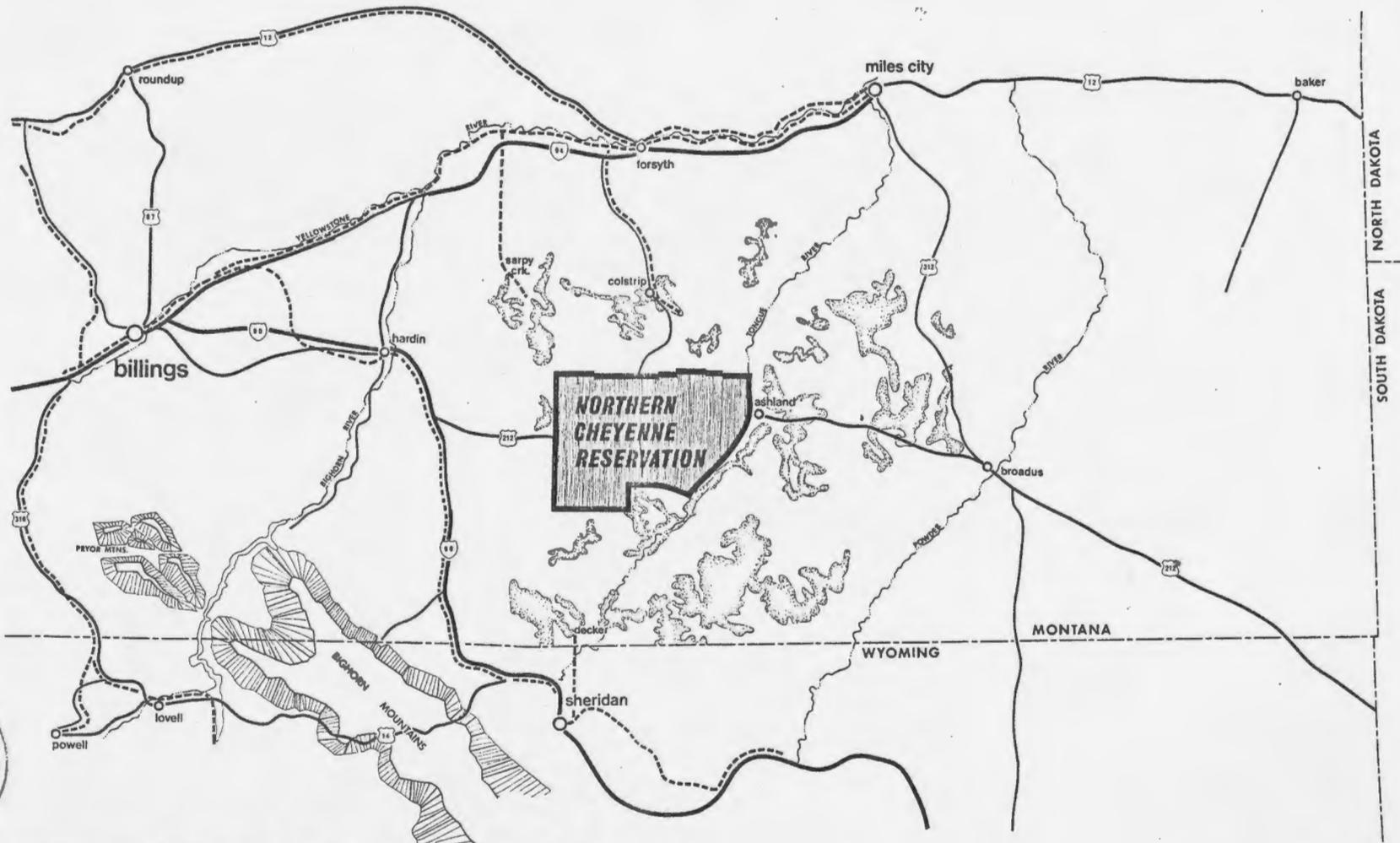


prepared by WIRTH ASSOCIATES billings, montana associate consultant INTERMOUNTAIN PLANNERS billings, montana

# NORTHERN CHEYENNE PLANNING STUDY

## socio-economic analysis of potential coal development





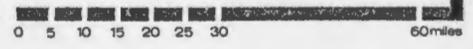
# REGIONAL MAP

- areas of potential strip mining
- railroads

\*The preparation of this map was financed in part through a comprehensive planning grant from the Department of Housing and Urban Development, under the provisions of Section 701 of the Housing Act of 1954, as amended; contract no. CPA-MT-08-00-0059 (500.2) Sept. 30, 1973

# NORTHERN CHEYENNE PLANNING STUDY

## socio-economic analysis of potential coal development



NORTHERN CHEYENNE - PAST & PRESENT POPULATION & LABOR TRENDS

	<u>1965</u>	<u>1966</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>
Total Resident Indian Population	2219	2292	----	2534	----	2564	2486	2683	2926
Total Under Age 16	867	1089	----	1043	----	1169	1058	1176	1322
Total 16 and Over	1352	1203	----	1491	----	1395	1428	1507	1604
Not in Labor Force - 16 and Over	912	603	----	811	----	608	563	563	559
Available Labor Force	440	600	----	680	----	787	865	944	1045
Employed	284	456	----	504	----	509	557	691	780
Unemployed	156	144	----	176	----	278	308	253	265
Unemployment Rate	35.5	24.0	----	25.9	----	35.3	35.6	26.8	25.3

The total number of enrolled Northern Cheyenne Tribal members as of April 1973 was 3,644.

Source: Northern Cheyenne Tribal Office

and population center for the reservation has a resident population of 650. Currently there is no public transportation serving Lame Deer even though Highway 212 bisects the reservation. The nearest scheduled bus service is 45 miles away and the nearest scheduled air service is at Billings. A private airstrip is located adjacent to the reservation at Ashland which is situated 22 miles from Lame Deer. There was no paved road access to the reservation prior to 1955.

New community and recreation centers, housing, water and waste treatment facilities, schools, arts and crafts centers and library have been constructed since 1969 and have helped to ease the almost complete lack of public facilities.

Until a solid economic base is generated, the tribe will continue to lag in the availability and access to educational, social, cultural and recreational amenities and the public facilities generally expected as part of our American life. Many of the public facilities and social amenities taken for granted in other areas of the nation are non-existent on the Northern Cheyenne Reservation.

The reservation is encompassed within the confines of the Big Horn Economic Development District. By virtue of its reservation status, its unemployment rate (25%) and low per capita income (\$1,819) it is classified as a Title IV Redevelopment Area.

The reservation economy is inextricably effected by the geography of the region. Distances, sparse population, limited rainfall, topographical barriers and complete lack of public transportation have all contributed to the isolation and lack of economic vitality faced by the reservation residents. The vast tribal coal resources in this era of a national energy crisis could be the means by which the historical stagnation could be reversed and permanent job opportunities created.

## AREA PROBLEMS

The development of the Northern Cheyenne Reservation has historically been isolated from the economic activity of the region. The sparseness of the region's population, the distance from any wholesale or retail market centers, geographical and topographical barriers and lack of any significant industrial base has prohibited the development of a viable industrial economy. The lack of transportation facilities, high freight rates for both raw material and finished goods and the inadequate transportation network have also inhibited industries from locating on or near the reservation.

Consequently, the economy of the reservation and the region have been dependent upon its agrarian and forest resources and the transient tourist. The employment opportunities and wage rates associated with these seasonal industries have had a significant depressive effect on the economic development of the reservation. The number of employment opportunities associated with these industries has not been sufficient to provide enough job opportunities for the tribal population. These factors account for the 25 percent unemployment rate and the under-employment which is reflected in the tribe's low per capita income.

Development of the vast coal reserves on the reservation could alleviate the economic plight of the Northern Cheyenne.

Area problems cannot be eliminated unless a rational development program is initiated which is compatible with the heritage and culture of the people. It will be possible to develop a stable economy by developing tribal coal resources. Unless this development and the economic activity generated is compatible with the needs and desires of the Cheyenne people, future problems and repercussions could be worse than those presently experienced. Therefore, careful planning and evaluation of viable alternatives is essential to the survival and healthy growth of the Northern Cheyenne community.



## RELATED STUDIES AND PROJECTS

Several concurrent "overview studies" are underway to evaluate the social and environmental impact of coal development on or near the reservation. These studies were initially directed toward evaluating the environmental impact of power generating developments being constructed and planned immediately adjacent to the reservation.

The bulk of these studies have been undertaken under OEO and HUD grants to the Tribal Council. OEO funded the Northern Cheyenne Indian Project on July 8, 1973. The project objective is to gather basic data under the auspices of the Tribal Council to permit evaluation of the social and environmental impact of the region's coal development on the tribe. These data will assist the Tribal Council with their determination of policies, programs and projects to mitigate the impact of these developments on the Cheyenne community.

A progress report was issued on June 21, 1973, which summarized the status of the HUD financed Northern Cheyenne Planning Study - A Socio-Economic Analysis of Potential Coal Development. The basic thrust of this study is also concerned with projecting the "effects" of regional coal resource development. This study was confined to a broad-based "macro" analysis of the potential impact of coal development.

Neither of the studies has addressed itself to defining development plans and the potential costs and benefits associated with various alternatives whereby the Tribal Council could rationally select a plan of action. This proposed study would define the costs and benefits associated with various alternative means of developing the Northern Cheyenne coal reserves. The existing OEO and HUD studies will be beneficial in the Tribal Council's assessment of the social and environmental aspects of the proposed plans. However, the financial and return on investment data that will be compiled and analyzed in the proposed study is an absolute prerequisite for the Tribal Council to proceed with the intelligent development and management of the Cheyenne coal reserves.

## RELATIONSHIP TO ECONOMIC PLANNING

As is described in the related studies and project coordination sections, the proposed project will assemble and analyze relevant social and economic data and engineering, production and market information, and with policy guidance from the Tribal Council, prepare a specific "Plan of Action" which will enable the Northern Cheyenne Tribe to evaluate its opportunities and obtain the necessary development funds. The studies previously described along with public documents, including environmental impact studies prepared for nearby coal development projects, and a review of the extensive work being performed by the Office of Coal Research, administered by the Department of the Interior, should enable the project team to effectively coordinate its findings with overall economic planning efforts in the region. As was previously indicated; the reservation status, high unemployment (25 percent) and low per capita income has caused the area to be designated as a Title IV Redevelopment Area.



## PROJECT PROCEDURES

The proposed project will be coordinated by the Tribal Council through its office in Lame Deer, Montana. A member of the Council will be appointed as Project Coordinator. He will be responsible for making available all of the data available to the tribe through the previously mentioned related studies, reports released by the Bureau of Indian Affairs, and other commercial and economic data available to the tribe by virtue of the extensive coal exploration and watershed studies conducted on or near the reservation.

The project will be organized into two major work efforts. The social, legal, environmental and policy issues will be explored and documented for review by the Tribal Council under the direction of Mr. George Crossland (Osage; L.L.B., University of Chicago). After the Tribal Council has reviewed the alternative plans, Mr. Crossland will supervise the preparation of the final report which will embody the recommended plan of action for the development and management of the Northern Cheyenne's coal reserves.

The engineering, production and market studies necessary to evaluate alternative plans for coal mining, power generation, coal conversion and transportation will be conducted under the direction of Mr. Jack Nutting, Executive Vice President, Community Development & Construction Corporation. In this undertaking, Mr. Nutting proposes to utilize the engineering and management services of The M. W. Kellogg Company, and Gilbert & Associates, along with select experts in the field of geology, transportation, marketing and economic planning.

Mr. Nutting has over thirty years of experience in the design, construction and operation of major mining, power generation and transportation projects, including the Wabush Mines in Labrador. This project was commenced in 1959 and completed in 1964. It contains an iron ore mine, a crushing and concentration plant, a town for 3,000 people, an airport, 67 miles of railroad, a harbor, storage and handling facilities, the "Twin Falls" hydro-electric plant, 117 miles of high voltage transmission lines and was completed at a cost of approximately \$265 million.

The Erie Mining Company project in Hoyt Lakes, Minnesota, a new town developed for the project, contains 100 miles of railroad, a 22 million ton production iron ore mine, a 150 MW coal fired steam generating electrical power plant, and a harbor facility, with a completion cost of approximately \$365 million. In addition to these projects Mr. Nutting had major responsibility in the design and development of a significant portion of two new towns, Columbia, Maryland, and The Woodlands. The Woodlands is approximately 28 miles north of Houston, Texas, and is planned to be home for approximately 150,000 people, provide jobs for 40,000, and represent a \$3 billion investment when completed.

A more complete description of the experience and capabilities of the proposed project organization is presented in Appendix A.

## COORDINATION

The basic responsibility for the coordination of this study will be the Tribal Council. The Council presently has representation on the Economic Development District Board of Directors. It also sponsors and has administrative control over several programs under the O E O, Department of Labor, H E W and H U D which are concerned with the overall socio-economic development of the reservation.

In a letter dated November 9, 1973, Governor Thomas L. Judge stated:

I have directed all state agencies to assist the Northern Cheyenne Tribe in its efforts to thoroughly research all of the ramifications of coal developments on the reservation. The executive departments of state government will make available to you all technical assistance requested by the Northern Cheyenne Research Project, subject only to the manpower budgetary limitations.

Consequently, no lack of coordination is anticipated in undertaking this study based upon the commitment of the Tribal Council, the Governor and his respective control over all agencies which will be involved in the analysis and evaluations of the proposed study.

## DEVELOPMENT IMPACT

The gross value of the reservation agricultural and forest products produced by tribal members on the reservation in 1972 was approximately \$1,460,000. An additional \$1,487,000 was generated by non-Indians residing on the reservation. Forty-three of the resident reservation Indian population were categorized as farm or ranch operators. Three were classified as managers of an agricultural enterprise while 210 were classified as part-time operators or laborers.

An indication of the beneficial effect of coal development on the local economy can be seen by comparing the employment impact at similar coal operations. For a nominal sized operation, approximately 150 personnel would be employed with an average salary of \$10,500 per annum. This employment would generate a payroll of about \$1.4 million per year, assuming 90 percent of the employees live on the reservation.

The addition of 135 workers, earning an additional \$1.4 million per year, would increase the average per capita income of the tribe by \$478 to \$2,297. These 135 new jobs would be almost totally male employment and would for all practical purposes eliminate the present 25 percent unemployment.

The following table describes the economic impact of 100 new industrial jobs in a typical economy as computed by the United States Chamber of Commerce. Obviously the same multiplier effects cannot be expected in the reservation economy; however, the economic benefit will be significant.

### Economic Impact of One Hundred New Industrial Jobs

- 359 more people
- 91 more school children
- \$710,000 more personal income per year
- 100 more households
- \$229,000 more bank deposits
- 3 more retail establishments
- 97 more cars registered
- 65 more employed in secondary services
- \$331,000 more retail sales per year

The proposed study will estimate the potential income which could be derived from the orderly development and sale of the tribe's coal resources. The form

of the product taken to market will significantly effect the potential economic gain. The full range from selling bulk coal to selling electricity, petroleum substitutes and ammonia-fertilizer will be explored. In any event, it is safe to assume that sufficient income to raise the standard of living to our national norm could be easily achieved with minimal development of the tribe's estimated \$15 billion of low sulfur coal reserves.

Coal bearing formations underlie all the Northern Cheyenne Reservation. Coal beds crop out on the Tongue River and Wibaux shale members of the Fort Union Formation. Coal also occurs in the underlying Lance formations, but does not crop out within the boundaries of the reservation. Total thickness of the formations exposed on the reservation is about 2,000 feet. Within this zone there are probably ten significant coal beds that vary in thickness from a few inches up to 40 feet or more, see Potential Coal Production Impact & Land Ownership map on the following page.

The predonimant use for coal in Montana at the present time is for fuel in the generation of electric power. Federal Power Commission forecasts an increase in power demand in Montana from 1,460 megawatts to 2,590 megawatts in 1980, and to 4,700 megawatts in 1990. It is also apparent that Montana coal is an excellent prospect for export. There are three distinct reasons which make the strippable coals of Montana particularly attractive. First is the relative low cost of coal recovery. Information received from the State Department of Intergovernmental Relations indicates that the cost of a ton of coal mined in eastern Montana averages out to about two dollars per ton. The second reason is the low sulfur content of Montana coal which makes it attractive for burning as fuel in locales where the burning of high sulfur coal is prohibited. The low sulphur advantage offered by Montana coal may, however, diminish in years to come.

At present there are three producing coal mines in the Northern Cheyenne area. The following table presents the estimated annual tonnage exported from the respective mines to markets outside of Montana:

Annual Volume Exported

Colstrip	4.3 Million Tons
Kleenburn	1.0 Million Tons
Decker	3.5 Million Tons

Based upon the above coal production exports and the projected continuing increase in electrical power demands, it is obvious that the approximate 5 billion ton reserve of low sulfur coal situated on the Northern Cheyenne Reservation could have a significant and lasting economic benefit to the regional economy if developed in an orderly and non-destructive manner.

## FOLLOW UP AND NEED FOR EDA FUNDING

To the extent possible, the Tribal Council has selected a project organization which collectively has the technical and management expertise to assist it in the following-up and implementing the proposed project's plan of action. However, it is expected that during the proposed project, additional needs and resources will be identified to assist the Northern Cheyenne Tribe to organize to pursue the resultant business plan. Even though the tribe currently has limited funds, it has demonstrated its willingness and ability to pursue projects and activities which its leaders believe are in the best interests of the tribe and the preservation and development of its human and natural resources.

The Tribal Council is requesting 100 percent funding of the proposed project. This request is necessary because of the limited money available to the Council to conduct the tribe's business and the increasing demand for service and assistance voiced daily by members of the tribe in need. As can be seen from the description of the Northern Cheyenne, provided in this proposal, the tribe does not have sufficient funds to pursue the proposed project on its own. However, it will make available all existing data and personnel who are not otherwise committed for the furtherance of the proposed project.

## APPENDIX A EXPERIENCE AND CAPABILITIES

The enclosed materials provide a brief description of the experience and capabilities of the proposed project organization.

The Community Development & Construction Corporation brochure describes the current activities being supervised by Mr. Jack Nutting.

The M. W. Kellogg Company's experience and capabilities are presented along with their letter proposal describing the proposed work to be performed jointly with Gilbert Associates, Inc. Gilbert Associates, a process and power engineering and consulting company, is briefly described in the enclosed annual report and brochure.

The Big Eagle Energy Company is a Texas corporation formed by its President and Director, George Crossland, Esq., to provide planning, management and financial advisory services to Indian tribes and Alaska native organizations interested in preserving and developing their human and natural resources.

Mr. Crossland (Osage; L.L.B, The University of Chicago) has extensive experience in assisting tribes to protect and enforce their rightful claims to land and resources held in trust by the United States Government for their benefit. As a water resources attorney for the Bureau of Indian Affairs and later as an independent consultant, Mr. Crossland has observed the need of tribes for assistance in planning, financing, developing and managing their own resources. He, therefore, formed Big Eagle along with his associate, Gene A. Keluche, to assemble and direct the efforts of a multi-disciplinary team of specialists on an as-needed basis to provide assistance under contract with Indian tribes and Alaska native organizations.

Mr. Keluche (Wintun; M.B.A., Harvard Graduate School of Business Administration) has extensive experience in the financing, development and direction of business enterprises engaged in education, community planning and real estate development. In addition to his duties as a Director and Consultant to Big Eagle, he is President of Terradevco, Inc., a firm specializing in the design, development and operation of conference and resort communities. Terradevco is currently a co-venturer in the development and operation of conference and resort communities valued at \$25 million in Houston, Texas, and Colorado Springs, Colorado.

As indicated in the Project Performance Section, senior project personnel will be provided by the above companies to perform the proposed work under the direction of the Northern Cheyenne Tribal Council.

# THE M.W. KELLOGG COMPANY

A Division of *Pullman Incorporated*  
1300 THREE GREENWAY PLAZA EAST  
HOUSTON, TEXAS 77048

TELEPHONE  
(713) 626-5600

CABLE ADDRESS  
MONOLOGG-HOUSTON

February 21, 1974

TELEX: 76-2656

E. H. HOFFING  
COMMERCIAL VICE PRESIDENT

Mr. Jack Nutting  
Community Development &  
Construction Corporation  
1919 Two Shell Plaza  
Houston, Texas 77002

Dear Mr. Nutting:

During meetings in your office on February 18 and 19, 1974, you explained your interest in undertaking a study of means whereby coal deposits located in the Cheyenne Indian Reservation near Ashland, Montana, might be utilized to the optimum benefit of the Cheyenne people. You have further explained that you are developing a plan under which several concepts for coal utilization would be reviewed from a technical viewpoint, following which definitive feasibility studies could be undertaken for certain selected options.

We understand that it is your intent to identify a project, or projects, over which the Cheyenne Tribe will maintain dominant control, which will enable the Cheyenne people to attain a higher quality of life, and which will tend to preserve the characteristic of the Cheyenne land.

We have discussed with you several means by which this resource might be developed to achieve the stated aims. In view of the present problems relating to supply of domestic fuels, there is no doubt that the coal located on this Reservation is a valuable resource. The task you are undertaking is that of determining a suitable plan by which the Cheyenne might receive optimum benefit from utilization of this resource.

In our discussion we have considered the possibility of coal production by surface mining plus land restoration; we have considered the possibility of on-site electric power generation; and we have also considered the possibility of "up-grading" the coal by conversion to ammonia, a chemical fertilizer. We have recognized that the question of water supply might be a dominant consideration in evaluation of the various alternative possibilities.



# THE M. W. KELLOGG COMPANY

Mr. Jack Nutting  
Community Development  
& Construction Corp.

- 2 -

February 21, 1974

We understand that it is your interest that Kellogg and Gilbert Associates undertake the task of determining the dimension of the water supply problem, and also that we undertake the task of conducting a technical review of the power generation concept and of the coal conversion concept. Accordingly, we propose a preliminary study program to include the following:

A. Water Supply - By Kellogg or Gilbert Associates

1. Conduct a review of documents already in the Tribal Council's possession concerning water supply.
2. Conduct a review of information available from State and Federal authorities concerning water supply.
3. Prepare a report which would summarize the results of these reviews.

B. Power Generation (Approximately 50 MW) - by Gilbert Associates

1. Determine the raw material requirements (coal and water) for a power generation plant.
2. Determine manpower requirements for construction and operation.
3. Estimate the overall plot requirement, including on-site coal storage.
4. Review environmental aspects, to include air and water pollution control.
5. Prepare a brief description of the facility.
6. Prepare an "order-of-magnitude" cost estimate.

C. Coal Conversion to Ammonia (Approximately 1000 Tons Per Day) - by M. W. Kellogg

1. Determine the approximate raw material (coal and water) requirements for a coal conversion plant (plant capacity to be mutually agreed upon).

THE M. W. KELLOGG COMPANY

Mr. Jack Nutting  
Community Development  
& Construction Corp.

February 21, 1974

C. Coal Conversion to Ammonia (Approximately 1000 Tons Per Day) -  
by M. W. Kellogg - (Continued)

2. Determine other operating and construction requirements, - man-  
power, catalysts, chemicals, etc.
3. Estimate the overall land requirements for such plant, including  
on-site storage requirements.
4. Review air and water pollution control aspects.
5. Prepare a brief description of the facility envisioned.
6. Prepare an "order-of-magnitude" cost estimate.

Kellogg and Gilbert Associates are prepared, upon receiving your authorization, to proceed with studies A, B and C; we believe that all studies could be completed in three months. We are prepared to undertake these studies on a "Lump Sum" basis as follows:

for Study A.....	\$ <u>10 000</u>
for Study B.....	\$ <u>10 000</u>
for Study C.....	\$ <u>30 000</u>



This proposal is contingent upon agreement on terms and conditions to be included in a mutually acceptable contract.

It should be emphasized that the scope of this proposed study is limited to a preliminary review of the subjects itemized above, and that more definitive studies will be required before final determinations are made concerning the utilization of this resource.

This proposal is valid for your acceptance by May 21, 1974 after which date it may be subject to review.

We sincerely appreciate the opportunity to present this proposal, and we hope that we will have the pleasure of working with you on this project.

Very truly yours,

*E H Hoffing*  
E. H. Hoffing

## PART I – INTRODUCTION TO KELLOGG

The M. W. Kellogg Company, a division of Pullman Incorporated with headquarters in Houston, Texas, offers worldwide services in process and engineering design, procurement, financing arrangements and construction – individually or in combination – to the oil-refining, petrochemical, chemical, biochemical, waste-control, power and other industries.

Kellogg's achievements and capabilities include:

The first integrated, multi-process refining unit, a forerunner of today's modern refineries.

A major role in the initiation and development of the fluid catalytic cracking (FCC) process – a process of high merit in today's refineries. Kellogg has maintained a predominant position in the FCC process, as evidenced by more than half of the world's FCC capacity being based on Kellogg technology.

Development of process and mechanical designs for economical, large-scale production of ammonia. The innovative integration of process and mechanical designs resulted in significant changes in ammonia manufacturing and distribution practices the world over. Kellogg added to its overall fertilizer capabilities with the Kellogg-Lopker phosphoric process.

The world's largest single-train, natural gas liquefaction plant using a cryogenics process for helium recovery. Kellogg also has capabilities in the transportation, storage and revaporization of liquefied natural gas (LNG).

The world's largest ethylene plant and total naphtha cracking centers (which crack naphtha to give ethylene and provide a base for other petrochemicals).

The Kel-Chlor® process for economic production of chlorine from waste hydrogen chloride without production of by-product caustic.

Development of new processes for supplementing the world's dwindling energy supplies. Substitute natural gas (SNG) production from naphtha, molten-salt coal gasification and the fuels-refinery concept based on heavy oil cracking are examples of such processes developed by Kellogg.

Licensing of Kellogg process technology in basic engineering-design packages for use by other contracting firms. These packages provide detail on critical features of design to insure proper interpretation of the process, mechanical, safety and operational requirements.

KELPLANS (Kellogg Planning and Analysis Systems), a linear-programming technique to select the design alternative that maximizes return on investment.

Utilization of third-party technology through the licensing of others' processes.

Development of management capability to process, engineer, procure and construct complex projects, which cost, in total, as much as \$1 billion. This overall project

management capability includes broad experience in multi-national financing and worldwide procurement.

## **KELLOGG INTERNATIONAL CORPORATION**

Kellogg International Corporation (KIC) was established in 1949 to serve the chemical, petrochemical and petroleum refining industries in the United Kingdom, on the Continent and in the Middle East and Africa.

Located in Kellogg House, London, KIC is a major member of the Kellogg group of companies. KIC performs the same engineering, procurement and construction functions in the United Kingdom that The M. W. Kellogg Company handles in the United States.

## **KELLOGG CONTINENTAL**

Kellogg Continental (KC) is an Amsterdam-based affiliate with worldwide experience and capability in the engineering, procurement and construction of plants for the petroleum refinery, petrochemical and chemical process, fertilizer and related industries.

The name is derived from The M. W. Kellogg Company, under which KC functions, and Continental Engineering, from which the majority of KC personnel came.

KC is a world leader in fertilizer plant technology. Its engineers have had extensive experience and success in designing Stamicarbon urea plants and other processes, including the world's largest calcium ammonium nitrate plant.

The Kellogg companies worldwide employ over 3,000 people, primarily engineers and technical specialists.

## **PULLMAN INCORPORATED**

In 1944 Pullman Incorporated acquired The M. W. Kellogg Company. The acquisition strengthened both organizations and expanded Kellogg's economic base for its increasing worldwide activities.

Pullman Incorporated operates in two fundamental industrial areas: transportation equipment and engineering construction. Through Pullman-Standard, Trailmobile, Pullman Transport Leasing and Trailmobile Financing Company, Pullman Incorporated manufactures, sells and leases railroad and highway transportation equipment.

Through the Kellogg companies and Swindell-Dressler Division, Pullman handles various engineering and construction operations. Kellogg is concerned with the design, engineering and construction of complex installations, especially petroleum refining and petrochemical facilities. Swindell-Dressler and its affiliates serve the mining, metallurgical and ceramic industries and engage in civil and public works, including pollution control projects.

Pullman Incorporated also serves clients through its extensive solid-waste pollution control and sanitary-landfill and reclamation projects.

The Pullman Annual Report, included in Part VI, gives an overview of the organization's various services and financial strength.



## PART II – KELLOGG EXPERIENCE

Jobs executed by the Kellogg companies worldwide provide diversified experience which accounts for the company's reputation as a worldwide engineering and project-management contractor.

### RECENT MAJOR PROJECTS

#### PUSRI, Indonesia

Kellogg is designing an ammonia/urea project including offsites and solids handling facilities for P. T. Pupuk Sriwidjaja Industri Petrokimia (PUSRI) in Indonesia. As prime contractor Kellogg is responsible for the entire project, known as PUSRI II. The company is cooperating with various third-party licensors and utilizing worldwide procurement. The project has an approximate capital value of \$84 million, based on multi-national financing.

The project consists of a grassroots, 600-metric-ton-per-day ammonia unit, 1,150-metric-ton-per-day urea unit and offsites including extensive material handling, storage and marine-loading facilities. Kellogg is providing all engineering, procurement and construction supervision for the ammonia plant and offsites.

Kellogg, as project coordinator, is administering the subcontract for the urea unit, which employs the Mitsui Toatsu process.

Located near Palembang, Sumatra, the plant is adjacent to and integrated with an existing, smaller ammonia/urea facility known as PURSI I. The new complex will be self-sustaining in respect to all utilities, including electric power.

As general contractor Kellogg is providing the following additional services:

Direct maintenance and operation of the plant until performance guarantees are met.

Training of PUSRI engineers and purchasing representatives in Kellogg's home office.

Arrangements for training a number of PUSRI personnel in maintenance and operating problems in an operating ammonia plant.

Training of PUSRI maintenance personnel in vendors' shops.

Onsite training programs for PUSRI operators.

#### Bandar Shahpur Fertilizer Complex

Kellogg set many precedents as managing contractor for Iran's first petrochemical/fertilizer complex. Kellogg designed, engineered and constructed the 1,000-metric-ton-per-day ammonia plant within the six-plant facility. The company also had responsibility for the following: procurement of all bulk materials for all units; transportation of all identifiable materials purchased by process vendors; design, procurement and construction of all plants and offsites (except the 108-mile pipeline); and overall coordination of all design activities.



In order to take advantage of competitive worldwide markets, Kellogg helped the client spread financing for the complex among six nations: United States, United Kingdom, Germany, Italy, France and Japan.

Owned by Shahpur Chemical Company Limited, the grassroots complex is located at Bandar Shahpur on the Persian Gulf. Besides the ammonia plant, the complex includes a 1,500-metric-ton-per-day sulfur recovery plant, a 1,320-metric-ton-per-day sulfuric acid plant, a 500-metric-ton-per-day urea plant and a diammonium phosphate/triple superphosphate plant.

The construction site was on 80 acres of reclaimed tidal flats. Site preparation required \$4.2 million worth of fill and 6,700 92-foot concrete piles. Kellogg built a dock system to accommodate the freighters which bring in raw materials and carry away end products. The company prepared living quarters for the workers and trained construction personnel. The job required over 5,000 employees and took more than 12 million man-hours to complete.

#### **IVP (Instituto Venezolano de Petroquimica) El Tablazo**

Kellogg is handling two major contracts for Venezuela's huge, \$1.2-billion petrochemical complex on Lake Maracaibo. One contract names Kellogg overall general contractor for all offsite facilities. This represents the largest single contract ever awarded Kellogg. The other contract is for complete design and construction of the basic feed unit for the petrochemical complex, a 245,000-metric-ton-per-year olefins plant.

Kellogg is providing the support facilities for a multitude of process units at the project site. These include a port facility, with liquids and solids handling and loading systems; an electric-power and steam plant with a 110-megawatt capacity; and a utility distribution system. Waste disposal, water treatment, cooling towers and pollution control will be provided. Kellogg also will build roads, buildings and other general facilities. The massive, \$100-million support system is designed not only to serve the process units being built at the present time, but also to permit 100-percent expansion for service to future developments on the project site.

Kellogg-designed support facilities will serve the following process units:

- Natural gas liquids plant
- Olefins plant
- Caustic chlorine plant
- Ammonia and urea facilities
- Low-density polyethylene plant
- Polystyrene plant
- Monovinyl and polyvinyl chloride plant
- Polyisoprene/methanol plant

Additional units now in planning stages will produce ammonia, high-density polyethylene, propylene derivatives, ethylene oxide and integrated aromatics.

#### **Korea Oil Corporation, Wulsan, Korea**

Kellogg was managing contractor for Korea's major petrochemical complex, which went into operation in 1972. The company designed the key feed unit, a naphtha cracker having a capacity of 150,000 metric tons per year of ethylene. Kellogg also had responsibility for mechanical design,

procurement and construction of four other process units and for all offsite facilities. The four additional process units, which were licensed from others, were as follows:

- Butadiene extraction
- Toluene dealkylation
- Cyclohexane extraction
- Pyrolysis gasoline hydrotreatment.

Local labor, working under Kellogg's control, constructed the petrochemical complex. While utilizing worldwide procurement, Kellogg purchased much of the equipment and materials in Japan.

#### **Transco Terminal Company, South New Jersey**

Among Kellogg's recent cryogenic experience is a current design project for a liquefied natural gas (LNG) receiving terminal in South New Jersey. Owned by Transco Terminal Company, the grassroots facility will include the following process units:

- LNG receiving and unloading system
- LNG storage
- Fractionation to remove heavy hydrocarbons
- Substitute natural gas (SNG) production
- LNG vaporization
- Blending of LNG vapor, fractionation and SNG product
- Send-out facilities

Support facilities include:

- Steam boiler plant
- Control house
- Water wells and water treatment
- Administration and service buildings
- Compressor house
- Power generation

Kellogg is responsible for design, engineering and engineering procurement for the project. This terminal will be the first in the United States to deliver standard pipeline gas from an LNG facility. A Kellogg-designed fractionation unit will reduce the LNG Btu content to that of gas used in homes. Blending of LNG fractionator overhead gas, LNG vapor and SNG will produce the final product.

## **KELLOGG OPERATIONS**

Kellogg operates on a concept of individual profit centers. Each center is accountable by results and has authority for decision-making within its area of activity. These centers, each of which is directly responsible to the president of the company, are Western Hemisphere, Eastern Hemisphere, Far East and the power piping and chimney operations.

The M. W. Kellogg Company (Western Hemisphere operations) and Kellogg International Corporation (Eastern Hemisphere operations) have the same operating philosophy. Each department of either company can and does handle complete projects by itself. When desirable, one office can execute part of the project for the other. In addition to complete project execution, Kellogg also is involved in design-only, research-only and construction-only projects. It is equipped to procure project materials on a worldwide basis and to assist clients in arranging multi-national financing for projects Kellogg intends to execute.

These strong areas of discipline are welded together efficiently and effectively by project management to complete total projects and complexes.

Often Kellogg is chosen overall manager of a project – coordinating the efforts of other contractors involved – but also is selected to design and construct a portion of the project.

### **A GENERALIZED PROJECT**

The following section discusses Kellogg's operating procedures. It mentions the various departments' contributions within the context of a generalized project.

#### **Research and Development**

When Kellogg utilizes its total facilities, it begins with research and development of a process.

The company's Research and Engineering Development (R&ED) personnel include chemists as well as chemical and mechanical design engineers. These people develop new processes, optimize known processes and design, build and operate pilot plants to test their findings.

#### **Sales and Proposals**

Kellogg's Sales Department is decentralized to better serve its clients. Sales offices are maintained in four North American cities to provide closer contact and greater convenience to client organizations. Through frequent contact, sales representatives ascertain client requirements and respond to client requests for assistance. Throughout the bidding phase of a project, Sales is the primary contact with the client organization.

Kellogg markets its processes through proposals to potential client companies. Proposals – and subsequent contract brochures – are developed in the Proposals Management Department. This central material-gathering and writing effort assures the quality presentation that is standard at Kellogg.

## **Project Management**

The key to Kellogg's organization is project management. The Project Department is designed to give direct senior management support to the project manager, the company's primary contact with the client. The project manager is responsible for satisfactory execution of the project in accordance with the contract. He is selected for an assignment based on his background, experience and availability.

Kellogg generally assigns a project manager during the proposal or study phase of a project and keeps him in charge through final acceptance. This system provides continuity between the pre-contract phase and actual project execution.

At Kellogg, job execution is project oriented. Using the task force concept, the company calls on personnel from all the various departments and disciplines necessary for the type of project and scope of Kellogg's work. The project manager, who has overall responsibility for the job, is supported by a responsible manager assigned to the project for each major function – engineering, procurement and construction. These managers are the key members of the task force and remain assigned to the team until work is completed.

Shortly after he is assigned to a project, the project manager prepares a detailed project plan and coordination procedure. This document specifies each task-force participant and his responsibilities. The plan, based on Kellogg's standard procedures, is modified to suit the client and particular job conditions.

Upon award of a contract, the project manager presents his plan at a "kickoff" meeting, which is attended by client representatives and Kellogg personnel who have significant responsibility on the project. During this meeting, the basic operating philosophy is established. This discussion also insures complete understanding between the client and Kellogg.

## **Scheduling**

The project manager's prime responsibility is to complete his project on time and within budget.

Kellogg uses the Critical Path Method (CPM) for planning and scheduling. CPM is a management tool that allows comprehensive planning. It also gives realistic information for overall completion dates of the activities involved in each project. This tool enables management to take corrective action at the appropriate time.

CPM gives a graphic representation of all activities required to complete a project. Kellogg's scheduling methods are centered about this "Management Control Logic Network" diagram. The diagram is updated continuously to reflect current information received from the line organizations. The project manager uses this diagram for overall control and forecast of project objectives and performance. Issued monthly, the updated diagram is accompanied by a written analysis.

A schedule engineer, functionally reporting to the project manager, is assigned to each project. He reviews plans and schedules with the line organizations and project management. He also integrates manpower availability, materials deliveries and construction requirements, in accordance with the overall project schedule. Since the schedule engineer analyzes performance for effect on established objectives, he is the logical person to forecast potential trouble areas which might affect the overall schedule.

## **Cost Control**

Technical and cost control responsibility at Kellogg is vested in the individual performing the work. However, his concentration on a limited segment of the job may limit his ability to recognize and interpret the significance of a change in terms of the overall project or objectives of the client. Kellogg uses the cost engineer to provide this interpretation.

Kellogg places responsibility for cost control with the project manager. The cost engineer, as a member of the project team, coordinates the overall cost-control and reporting activities; performs the technical audit of key documents; maintains detailed up-to-date records of estimated, committed and projected costs; and prepares all cost reports on the project.

## **Process Phase**

The process phase is the first activity on most Kellogg projects. Simultaneous with this comes detailed planning within outlines developed in the proposal phase. At this point, the task force is in full operation, as management, engineering, construction and other personnel contribute their talents and knowledge to achieve project ends.

Process Engineering prepares designs for all Kellogg processes and performs economic studies, licensing investigations, estimates, new process development, start-up and operating procedures and consulting services. Many of the staff have spent their careers working with certain processes. These specialists, who have made many major contributions in their specialties, closely follow process development in their fields.

Among its duties, Process Engineering develops process flow diagrams, process heat and material balances and other critical data. It releases critical data for equipment that must be delivered early in the construction phase on a priority basis to Design Engineering.

## **Analytical Engineering**

When Process Engineering completes its job, a "process release" marks the beginning of the planning/analytical cycle of design. Engineers from the Project Systems Department convert process data into complete engineered systems, recorded on Piping & Instruments (P&I) Diagrams. Skilled in the fields of fluid mechanics, thermodynamics and control, they also develop, optimize and engineer all utility (such as steam and water) and auxiliary (such as relief valve and blowdown) systems. They develop these systems from the standpoints of economics, operability, safety and maintenance. Systems engineers also are responsible for insuring that the effluent-liquid, solid, vapor and noise levels of the complete project fall within established environmental limits.

During this phase, personnel from Operating's Technical Services group review the analytical designs. This review insures a successful start-up and operation. They then develop an operating philosophy and write the Operating Instructions Manual. This manual and other reports issued by Technical Services personnel help all design groups keep abreast of operating problems and resultant design and operating changes. Full operating services are utilized at the end of construction.

Equipment engineers insure that operating conditions fit the commercially available equipment and materials. They integrate process and utility requirements, considering, for example, utility balances and waste-heat recovery. Systems engineers consider information such as line size or pressure drop, changes in which may allow use of more economical pipe or exchangers.

A procurement manager is assigned to each project. He has total responsibility for the procurement program and reports directly to the project manager. Having established specific project plans for purchasing, inspection, expediting and traffic, the procurement manager administers both budget and schedule control relative to procurement activities for all materials. He follows shop progress on critical equipment and, where necessary, exerts pressures to maintain vendor-promised deliveries.

## **Design**

Kellogg uses its engineering know-how to optimize plant layout design. With early issues of P&I Diagrams, Kellogg initiates its layout effort. Equipment location and layout of civil, piping and instrument engineering are done on scale models.

Kellogg uses models as a design tool. These models, built to scale, establish the geography of a plant and include every significant physical detail. Also, the models provide the basis for important integration of engineering and construction specifications and requirements.

Remote computer terminals and a drawing "Digitizer" also are employed to help Engineering use its time and personnel to the fullest. The Digitizer, which makes drawings by computer from rough isometrics, eliminates human keypunch errors and generates summaries and bills of materials, which previously had to be done by hand.

## **Final Engineering**

Completed models are used at "planning release" for detailed engineering, primarily piping, civil and electrical. This final engineering cycle produces detail drawings that are used for the supply, fabrication and field erection of bulk items, such as foundations, structures, pipe, instrumentation and electrical.

Engineering prepares preliminary and final requisitions, which are sent to Procurement. Purchasing personnel order bulk commodities, select qualified subcontractors and administer subcontracts.

Expediting, Inspection and Traffic personnel monitor vendor progress, either at a fabricator's shop or from home office. These people assure delivery of materials in advance of specific construction requirements. Traffic specialists are responsible for economical routing of materials and equipment for vendor's plants to job sites. Meanwhile, inspectors make regular checks of vendor's performance, techniques and quality control, as well as handling physical inspection of equipment.

Throughout the project, Kellogg maintains a series of controls: budgets for dollar control; schedules for time control; and design and material specifications for quality control. The project manager oversees project coordination and control.

## **Construction**

Both Engineering and Procurement provide their services to Construction. Delivery to Construction of drawings, budgets and material listings initiates home-office construction efforts. Equipment and material deliveries accelerate field activities. Construction personnel strive for thorough pre-planning and scheduling, experience supervision in the field and detailed cost control.

Field performance is checked continuously. Construction supervisors periodically compare predicted costs with schedules and budgets to insure that the project is completed on time, within budget and without sacrificing quality.

Construction management selects key personnel to build the plant. This takes place at the project's beginning, since these persons are an essential part of the task force. Drawn from Kellogg's pool of seasoned resident construction managers, engineers, superintendents and administration personnel, these key men form a closely knit team. The resident manager and part of his team report to Houston for briefing. Here they participate in the thorough planning job that allows Kellogg to complete preliminary work well in advance of its actual need. They review the construction plan in detail, contributing their personal experience and knowledge of construction practices.

Preliminary schedules and plans are formulated using the latest information on predicted material and equipment deliveries. The planning phase, including detailed construction schedules, is completed. After the project starts, the resident construction manager and home-office Construction management continuously evaluates the field's performance in the areas of progress, cost and work quality.

In establishing construction methods, the Construction Department develops a complete action plan, using both general requirements for sound construction and its own specific techniques. Every aspect of the construction job is considered. Rigging studies help in selecting equipment and in planning derrick foundations, guy line deadmen and vessel lifting lugs. Construction personnel establish the degree of field assembly and lay out field fabricating shops to provide production-shop economy. Construction roads, utilities and temporary buildings are planned to optimize traffic. Liaison with Design groups is maintained to assure cognizance of construction requirements. Installation procedures applicable to the quantities and types of materials employed are developed. This planning, completed long before it is needed, helps Kellogg organize highly its construction jobs.

Construction Engineering develops new techniques and adapts new equipment to field needs to reduce construction costs. This group prepares recommendations for ASA and ASME code committees. It also establishes the criteria for training and qualifying craft personnel.

The participation of the Tool and Equipment Section of the Construction Department in any project may be three-fold: Advisory, through planning and technical assistance; functional, through tool and equipment recommendations and purchases; and operational, through its custodianship of Kellogg's construction equipment.

Data gained from previous projects and knowledgeable personnel are used by Construction management in formulating a program for new projects.

Kellogg and its subsidiaries throughout the world own over \$4 million of construction equipment at new cost value. The facilities for repairing and storing equipment between assignments are maintained at South Houston, Texas and Wigan, England.

The technique of using field man-hours as its basic cost-control mechanism was developed by Kellogg for its lump-sum business. The method proved so valuable, it now is used on all jobs. It provides an accurate picture of labor costs and construction progress at any date. Each construction job is analyzed in terms of unit functions. From feedback from many construction projects, the man-hours required for each function have been established as "budget units." The quantities

associated with each of these units multiplied by the budget-unit value make up the total man-hour requirement for each such aggregation of units. Budget units are assigned to all measurable units of work in order to develop a man-hour budget for the entire job, thus providing an objective basis for assessing costs and progress at any point in time.

After field activity starts, Construction management predicts total man-hours and costs, which are measured against established budgets at weekly intervals. These totals are published monthly. Before any predictions are made, the job is studied thoroughly to determine the effect of actual site conditions on labor conditions and costs to complete the project.

During the engineering phase, a "Path of Construction" is developed based on anticipated material and equipment delivery lead times and erection time of major items. When the Path of Construction has been formulated, a Preferred Delivery Sequence List is prepared to assist the Engineering and Procurement Departments in scheduling their work to best suit construction objectives. Thereafter, inter-departmental liaison is continuous to insure efficient progress.

Job schedules are based on the man-hours required to accomplish each task. Construction maintains a staff that breaks down schedules developed by Kellogg's Scheduling Department into separate units. Construction's staff assigns man-hours and calculates time spans for each unit job. These specific schedules depend in part on field deliveries, handled by Procurement, and drawing deliveries, from Design Engineering.

### **Labor**

Kellogg maintains a high work-continuity rate. The company has labor agreements, covering the United States and Canada, with international offices of all major unions concerned with construction. Kellogg also negotiates labor agreements for individual projects, when the situation warrants.

At the local level, labor relations are a major function of the resident managers. Kellogg's labor relations group in Houston provides experience, advice and assistance in reaching quick agreements on potential jurisdictional and labor practice problems.

The labor relations manager holds a pre-job conference, attended by the resident manager and by both local and national union representatives, to prevent potential problems.

### **Start-up**

Near the end of construction, Operating personnel make a "built-as-per-design" check at the construction site. They assist Construction personnel in pre-commissioning including such unit-preparation activities as line and vessel flushing, catalyst loading and rotating-equipment checkout.

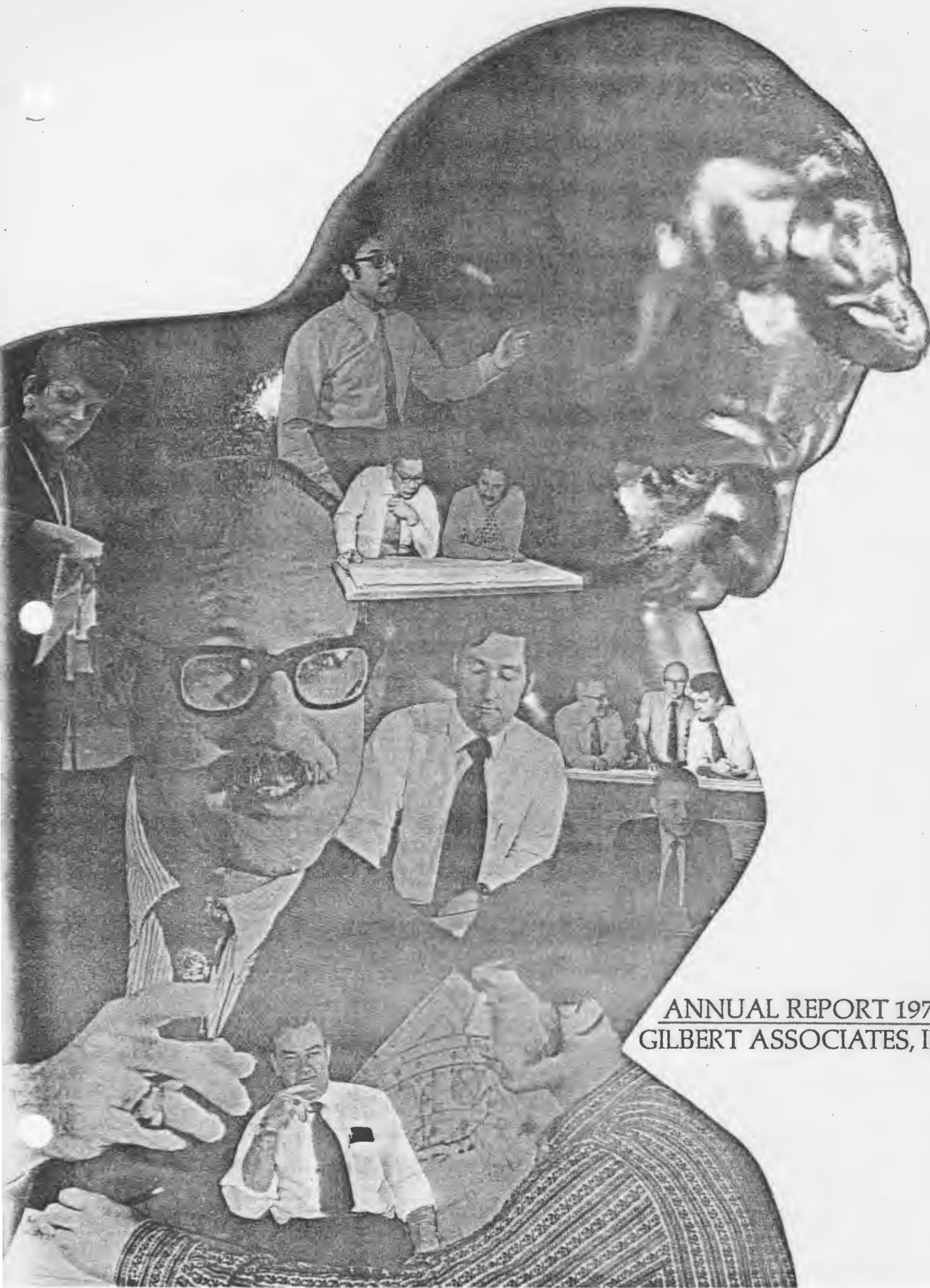
Commissioning, or start-up, of a plant is the primary responsibility of Operating personnel. They turn on the plant circuit by circuit, bringing in all utilities (air, electricity, steam and water). Slowly, they bring the unit up to specifications and to capacity.

Kellogg Operating personnel develop and conduct training programs for client operators. These programs include both formal and on-the-job training, including emergency procedures. Also, if operating problems arise on completed projects, Kellogg provides assistance when requested by clients and former clients.

Technical Services personnel act as "watchdogs" during start-up, as field Operating personnel handle the actual commissioning.

When the end product is being produced to specifications and in quantity, the plant is turned over to the client.





ANNUAL REPORT 1972  
GILBERT ASSOCIATES, INC.



## Financial Highlights

Gilbert Associates, Inc. and Subsidiary

	1972	1971
Total Revenues	\$35,259,986	\$27,921,730
Net Income	2,413,265	1,974,822
Earnings per Share	1.44	1.19
Dividends per Share	.338	.325
Book Value per Share	7.49	6.24
Long-Term Debt	4,414,844	2,138,026
Shareholders' Equity	\$12,561,767	\$10,396,833
Return on Average Shareholders' Equity	20.9%	20.5%
Return on Average Total Capital	16.8%	17.3%



## GILBERT ASSOCIATES, INC.

### Mailing Address

P.O. Box 1498, Reading, Pennsylvania 19603

### Offices

525 Lancaster Avenue, Reading, Pennsylvania

Telephone (215) 376-3873

Morgantown Road, Green Hills, Pennsylvania

Telephone (215) 775-2600

1700 Market Street, Philadelphia, Pennsylvania 19103

Telephone (215) 564-0832

439 Cottage Street, Springfield, Massachusetts 01104

Telephone (413) 785-1954

PMB 5259, Ibadan, Nigeria

### Subsidiaries

#### GAI-Tronics Corporation

340 Morgantown Road, P.O. Box 31

Reading, Pennsylvania 19603

Telephone (215) 376-2848

#### Commonwealth Services Inc.\*

300 Park Avenue

New York, New York 10022

Telephone (212) 935-2700

#### Commonwealth Associates Inc.\*

209 E. Washington Avenue

Jackson, Michigan 49201

Telephone (517) 787-6000

\*Acquired February 1973; Not included in financial statements

Annual Meeting—May 4, 1973, 11:00 A.M. E.D.T.

at Gilbert Associates, Inc. Green Hills Building,  
Morgantown Road, Green Hills, Pennsylvania.

Transfer Agent and Registrar—Irving Trust  
Company, One Wall Street, New York, New York.

In past years it has been customary to illustrate our photographs of major projects engineered and designed. But our projects are really the products of the talented employees. The illustrations on the pages which follow on Gilbert's greatest resource . . . its people. Rodin's background for our people to exemplify their thoughtful contribution to the success of our Company.

## To our Shareholders

1972 can best be described as a very busy, event-filled year of continued growth and prosperity. Consolidated revenues increased 26% from \$27,921,000 in 1971 to \$35,260,000. Earnings rose from \$1,974,800 to \$2,413,200; up 22% resulting in a per share increase from \$1.19 to \$1.44 (adjusted for the 2 for 1 stock split of May, 1972.)

The backlog of work under contract increased from \$43,600,000 at year-end 1971 to \$67,800,000 at December 31, 1972. Significant new commitments are reviewed in the brief division reports which follow.

The second building at our Green Hills location was fully operational by late summer, relieving the crowded conditions imposed by our continued growth in personnel. The permanent staff increased during the course of the year from 1426 to 1685 (18%). Recruiting continues to be a major effort with outstanding requests for personnel averaging over 150 in recent months.

Negotiations with Computer Sciences Corporation in late fall resulted in the signing of a memorandum of understanding on December 21 for the purchase of Commonwealth Services, Inc. and its subsidiaries. Closing took place on February 28, 1973. The combined family of companies as of that date was comprised of approximately 2700 personnel.

Those familiar with the engineering fraternity serving the utility industry will recognize

Commonwealth as a long established firm with an excellent reputation in the design of conventional power plants and transmission and distribution systems. The primary engineering group, Commonwealth Associates, Inc., located in Jackson, Michigan, serves the east-central area of the United States, adding geographic diversity to the other basic advantages of increased size and capability of the combined firms.

A joint marketing effort resulted in a commitment for the initial design phases of an 1100 MW nuclear plant for Commonwealth quite recently; an excellent example of the synergism we envision as resulting from the joining of the two firms.

Continued growth is the key phrase describing the outlook for 1973. Commonwealth has begun a 50,000 sq ft addition to the 195,000 sq ft Jackson, Michigan office. Gilbert's subsidiary, Gai-Tronics is rapidly outgrowing its facility in Reading. A new 17 acre site is currently under negotiation and plans are underway to complete a new 40,000 sq ft plant within a year. It also appears likely that a further expansion of corporate headquarters at Green Hills must be committed before the end of 1973.

Our opportunities for service are numerous and many-faceted. The management of our combined companies, with the continued support of our shareholders and the dedication of our employees, is committed to making the most of them.



J. R. Stoudt  
May, 1973



## Utilities Division

The electric utility industry trend toward nuclear generation as a prime means to meet increasing world-wide demands for electrical power is reflected in a review of our major projects during 1972.

Under design were six domestic nuclear units totaling 5,910,000 KW (kilowatts) and four overseas nuclear units comprising 3,615,000 KW, which in total amounted to over 70 percent of our design workload. During the year, the Division began work on its first two BWR (boiling water reactor) designs and, as part of a balance of plant optimization study, its first HTGR (high temperature gas-cooled reactor) design. All other nuclear units in design or under construction are the PWR (pressurized water reactor) type.

Although utilities will be placing greater reliance on nuclear power, fossil units will continue to be required for some time. Six domestic fossil fueled units, including a combined cycle unit, were under design in 1972. These fossil units totaled 3,640,000 KW and were all oil fired. Due to the balance of payment problems and the rapidly rising price of oil, the Division expects a resurgence of coal fired plants and intends to be active in the design of such facilities.

Nuclear and fossil, domestic and foreign generation projects under design totaled more than 13,000,000 KW (13,000 MW).

Plant startups in 1972 consisted of two units whose ratings totaled 1000 MW, both of which were domestic and fossil fueled. In addition, a 240 MW combustion turbine plant began operation, providing peaking power to the client company. Five other combustion turbine units, all rated at about 20 MW, were also installed.

A highlight of the Utilities Division's Transmission/Distribution activities during the year was completion of construction on the new double circuit 500 KV (kilovolts) transmission towers designed by the Division, the first of their type in the nation. Connecting our client with an adjacent utility, these towers carry pairs of lines that previously had to be carried on two separate towers. As a result, land requirements for rights-of-way were significantly reduced.



## Construction Services Division

Since environmental regulations are encountered at the earliest stages of design, changes in the regulations can affect a project beginning construction or even when construction is well underway. Three major projects which were scheduled to begin construction in 1972 are experiencing licensing delays. They are two 600 MW fossil units, one 260 MW combined cycle unit and a 2½ mile EHV transmission line spanning the Delaware River. Construction of all three projects is tentatively scheduled to begin in mid-1973.

Environmental regulations delay some projects and give impetus to others. Construction management of air pollution control projects for several electric utility clients increased in 1972, a trend which is expected to continue.

Four major Construction Management projects were completed during the year: a 400 MW fossil unit, a 600 MW fossil unit, a 240 MW combustion turbine station consisting of four 60 MW units, and a transmission project consisting of three 500 KV lines and a 230 KV line.

In order to better assist clients in cost control on capital projects, a Computerized Construction Management System was developed in 1972 in conjunction with the Computer Applications Division. This system combines a number of separate computer routines, such as construction accounting, cost estimating, scheduling, and cash flow, into a comprehensive management system.

The Division's Safety Services Department, involved primarily with electric utility clients, is proceeding to penetrate the remainder of the industrial market. Strict enforcement of the Occupational Safety and Health Act (OSHA) should spur a demand for the wide range of safety consulting and engineering services offered by the Division.



## Industrial Division

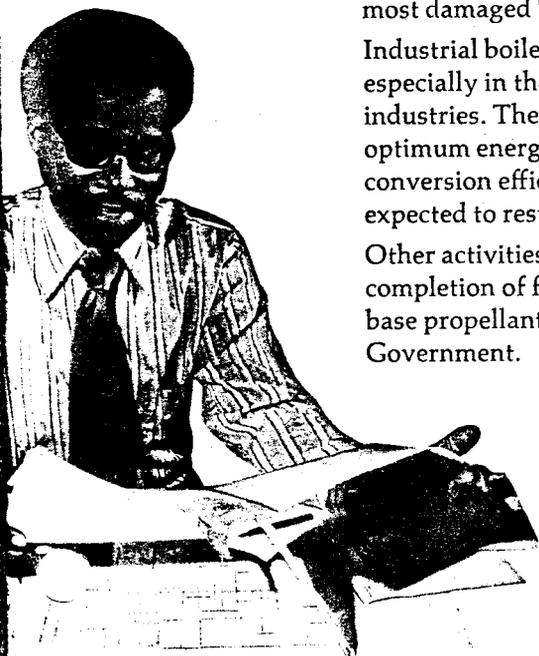
Industrial environmental protection projects continued to increase during 1972 in the areas of both wastewater treatment and air pollution control. The projects were initiated for a full range of manufacturing industries, including non-ferrous metals, food processing, automotive, pulp and paper, and chemical processing. Wastewater treatment projects during the year numbered 38 and air pollution control assignments 21.

With rising industrial concern about fuel shortages and rapidly increasing energy costs, the division completed several major energy conversion studies that are expected to lead to design projects during 1973 in the steel, automotive and paper industries. The energy conversion projects include resource recovery and utilize industrial solid or gas wastes, such as packing wastes, wood chips and by-product gases for fuel in a combination disposal and steam/electric generation facility.

The Division received two of the five U. S. Army Corps of Engineers' contracts awarded to Gilbert following the flood caused by Tropical Storm Agnes. These involved engineering to restore the 18 miles of Wyoming Valley levee system to pre-flood condition. The Valley includes Wilkes-Barre, Pennsylvania and some of the other communities most damaged by the flood.

Industrial boiler projects remained a strength, especially in the steel, chemical and food processing industries. The Division's proven ability to achieve optimum energy balance (maximum fuel to energy conversion efficiency) in boiler system design is expected to result in continuing project assignments.

Other activities of the Division included the completion of final design for an automated single base propellant plant contracted for the U. S. Government.



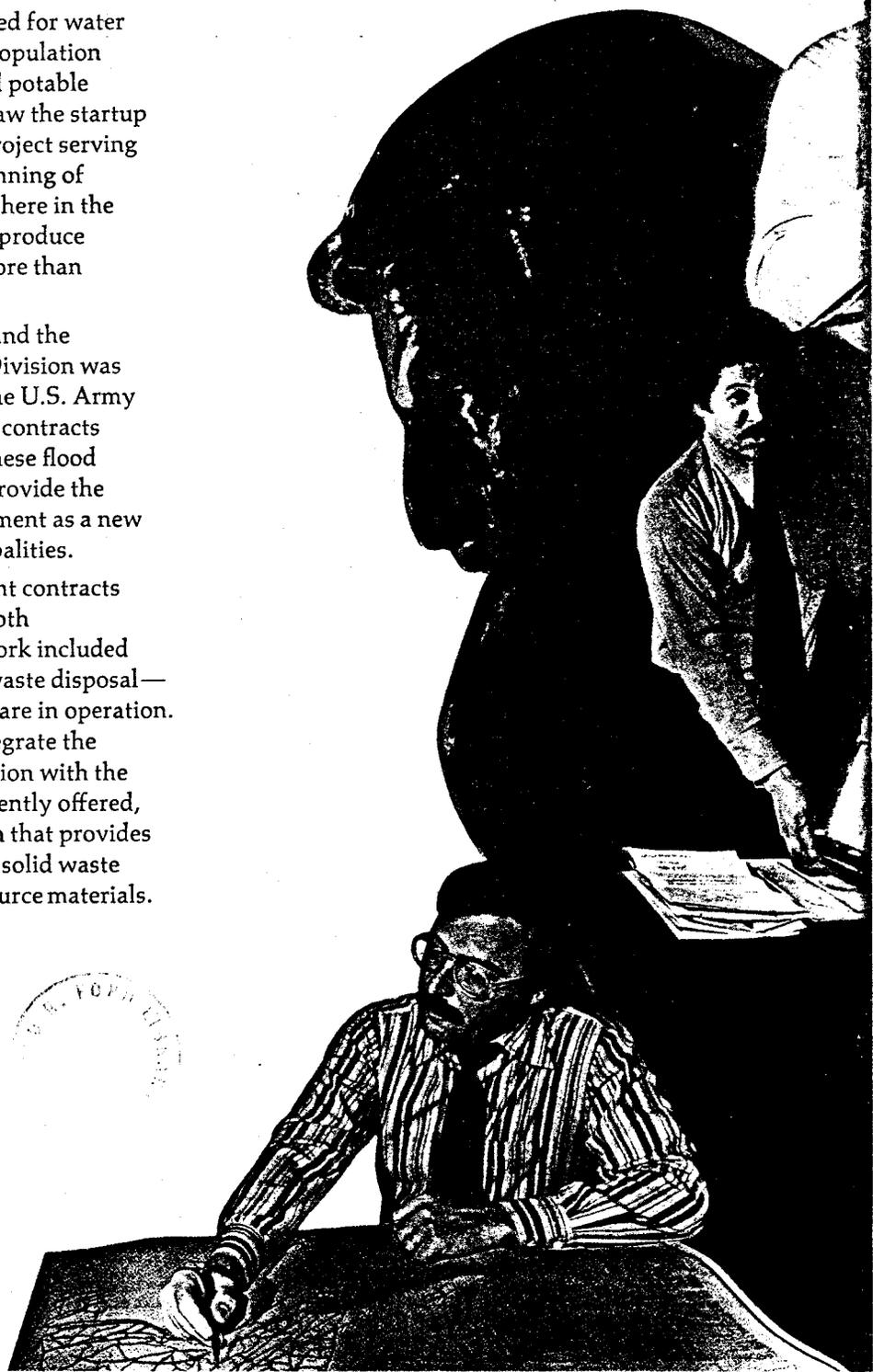
Sewage system design work increased in 1972 as municipalities began to comply with the Federal and State Governments' higher sewage treatment standards. The division is working on expansion or upgrading of facilities in 12 communities and new facilities for 4 others, which, when totaled, will be capable of serving 250,000 people. The new facilities under design are characterized by a trend towards tertiary treatment and regionalization, where a group of municipalities join to more effectively use their available resources and to gain priority for federal funding.

While most Federal money is designated for water pollution control projects, continued population increases will require new or expanded potable water supply systems. The past year saw the startup of our Ibadan, Nigeria water supply project serving a population of 2 million, and the beginning of construction of a water supply system here in the United States, which could ultimately produce 20 MGD (million gallons a day) for more than 100,000 people.

In the wake of Tropical Storm Agnes and the resulting "Great Flood of 1972," the Division was awarded three separate contracts by the U.S. Army Corps of Engineers, in addition to two contracts received by the Industrial Division. These flood damage and flood protection studies provide the basis for offering Flood Plain Management as a new service available to concerned municipalities.

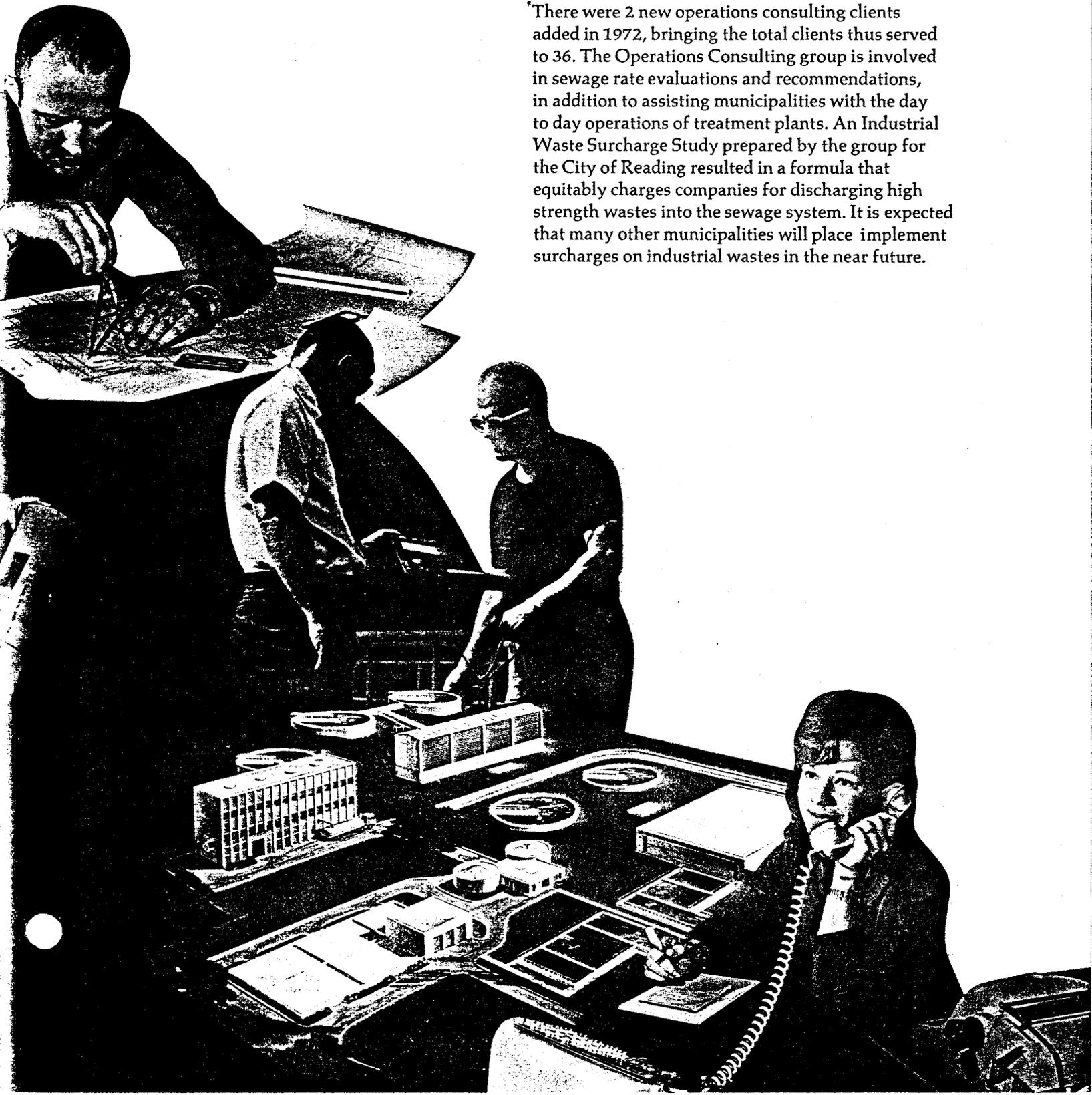
The Division's solid waste management contracts during 1972 involve the concepts of both regionalizing and recycling. Design work included 4 regional sanitary landfills for solid waste disposal—2 of which have received permits and are in operation. Presently, efforts are underway to integrate the boiler expertise of the Industrial Division with the solid waste management services presently offered, resulting in an energy recovery system that provides electricity or steam as a by-product of solid waste disposal, while recycling valuable resource materials.

## Environmental Division



Since site selection has become an environmental issue, the Division's Planning Group has received increasing work from industrial and utility clients for site selection studies and preparation of environmental impact statements. In addition, the group currently has 11 comprehensive plans for communities in Pennsylvania in various stages of completion.

There were 2 new operations consulting clients added in 1972, bringing the total clients thus served to 36. The Operations Consulting group is involved in sewage rate evaluations and recommendations, in addition to assisting municipalities with the day to day operations of treatment plants. An Industrial Waste Surcharge Study prepared by the group for the City of Reading resulted in a formula that equitably charges companies for discharging high strength wastes into the sewage system. It is expected that many other municipalities will place implement surcharges on industrial wastes in the near future.



GILBERT ASSOCIATES, INC. AND SUBSIDIARY COMPANY

**CONSOLIDATED STATEMENTS OF INCOME AND RETAINED EARNINGS**

for the years ended December 31, 1972 and 1971

	1972	1971
Income:		
Engineering and consulting revenue	\$32,062,377	\$25,309,772
Communication equipment sales	3,197,609	2,611,958
	<u>35,259,986</u>	<u>27,921,730</u>
Costs and expenses:		
Engineering and consulting costs	20,332,438	16,297,334
Communication equipment costs	1,634,436	1,369,614
Selling, general and administrative expenses	6,996,468	5,105,158
Depreciation and amortization	293,240	176,703
Interest expense	200,322	119,400
	<u>29,456,904</u>	<u>23,068,209</u>
Income before provision for taxes on income and minority interest	<u>5,803,082</u>	<u>4,853,521</u>
Provision for taxes on income, currently payable:		
Federal (Note 1)	2,346,319	1,976,554
State	670,603	584,340
Foreign	16,331	44,328
	<u>3,033,253</u>	<u>2,605,222</u>
Income before deduction for minority interest	2,769,829	2,248,299
Minority interest in subsidiary's income (Note 1)	356,564	273,477
Net income	<u>2,413,265</u>	<u>1,974,822</u>
Retained earnings, January 1	5,884,180	4,449,754
	<u>8,297,445</u>	<u>6,424,576</u>
Cash dividends (per share of Class A and Class B common stock: 1972, \$.338 and 1971, \$.325)	565,465	540,396
Retained earnings, December 31	<u>\$ 7,731,980</u>	<u>\$ 5,884,180</u>
Net income per average number of shares of Class A and Class B common stock outstanding during the year (Note 5)	<u>\$1.44</u>	<u>\$1.19</u>

The accompanying notes are an integral part of the financial statements.

GILBERT ASSOCIATES, INC. AND SUBSIDIARY COMPANY

**CONSOLIDATED STATEMENTS OF CHANGES IN FINANCIAL POSITION**

for the years ended December 31, 1972 and 1971

	1972	1971
Source of funds:		
From operations:		
Net income	\$2,413,265	\$1,974,822
Items not requiring funds:		
Depreciation and amortization	293,240	176,703
Minority interest in subsidiary's income	356,564	273,477
Funds provided from operations	<u>3,063,069</u>	<u>2,425,002</u>
Net proceeds from sale of common stock	320,534	112,878
Increase in long-term debt	2,442,054	1,300,000
Other, net	5,894	16,478
	<u>\$5,831,551</u>	<u>\$3,854,358</u>
Use of funds:		
Expenditures for property, plant and equipment	3,711,492	1,574,988
Decrease in long-term debt	165,236	105,867
Cash dividends (including dividends paid by subsidiary to minority stockholders)	691,700	661,776
*Increase in working capital	1,263,123	1,511,727
	<u>\$5,831,551</u>	<u>\$3,854,358</u>
*The increase in working capital is accounted for by the following:		
Increase in cash and short-term investments	164,083	347,280
Increase in accounts receivable and unbilled revenue	970,359	1,181,918
Other changes, net	128,681	(17,471)
	<u>\$1,263,123</u>	<u>\$1,511,727</u>

The accompanying notes are an integral part of the financial statements.

GILBERT ASSOCIATES, INC. AND SUBSIDIARY COMPANY

**CONSOLIDATED BALANCE SHEET**

December 31, 1972 and 1971

<b>ASSETS</b>	<b>1972</b>	<b>1971</b>
<b>Current Assets:</b>		
Cash	\$ 1,108,003	\$ 1,096,542
Short-term investments, at cost and accrued interest (approximates market)	753,534	600,912
Accounts receivable	4,839,519	3,882,898
Unbilled revenue	3,470,679	3,456,941
Inventories, at lower of average cost or market:		
Finished goods	150,195	129,056
Work in process	138,436	95,183
Materials and parts	376,407	293,268
Other current assets	209,581	252,434
Total current assets	<u>11,046,354</u>	<u>9,807,234</u>
<b>Property, plant and equipment, at cost (Notes 2 and 3)</b>		
Land	313,482	224,377
Buildings	6,714,213	3,437,534
Furniture and equipment	1,942,112	1,491,897
Leasehold improvements	10,818	286,538
	<u>8,980,625</u>	<u>5,440,346</u>
Less accumulated depreciation and amortization	1,005,873	874,552
	<u>7,974,752</u>	<u>4,565,794</u>
<b>Excess of cost of investment in subsidiary over equity in net assets at date of acquisition (Note 1)</b>	539,754	539,754
	<u>\$19,560,860</u>	<u>\$14,912,782</u>

The accompanying notes are an integral part of the financial statements.

**LIABILITIES**

	1972	1971
<b>Current liabilities:</b>		
Accounts payable	\$ 578,479	\$ 554,434
Federal, state and foreign income taxes	534,078	637,385
Accrued expenses	162,090	166,382
Contractual billings in excess of recognized revenue (Note 1)	117,874	131,421
Current maturities of long-term debt (Note 3)	155,025	81,927
Total current liabilities	<u>1,547,546</u>	<u>1,571,549</u>
<b>Long-term debt (Note 3)</b>	4,414,844	2,138,026
<b>Contingencies (Note 4)</b>		
<b>Minority interest in subsidiary (Note 1)</b>	1,036,703	806,374
<b>STOCKHOLDERS' EQUITY</b>		
Capital stock (Note 5):		
Class A common stock, nonvoting, par value \$1 per share:		
Authorized: 3,000,000 shares;		
Issued: 1972, 1,299,489 shares—1971, 629,492 shares	1,299,489	629,492
Class B common stock, voting, par value \$1 per share:		
Authorized: 3,000,000 shares		
Issued and outstanding: 1972, 377,829 shares—1971, 203,838 shares	377,829	203,838
Capital in excess of par value (Note 5)	3,155,869	3,679,323
Retained earnings	7,731,980	5,884,180
	<u>12,565,167</u>	<u>10,396,833</u>
Less 100 shares of Class A common stock held in treasury, at cost	3,400	—
	<u>12,561,767</u>	<u>10,396,833</u>
	<u>\$19,560,860</u>	<u>\$14,912,782</u>

The accompanying notes are an integral part of the financial statements.

## Notes to Consolidated Financial Statements

### 1. Accounting Policies:

*Principles of Consolidation:* The consolidated financial statements include the accounts of the company and its subsidiary. The company owns all of the outstanding Class A voting stock of Gai-Tronics Corporation, the subsidiary, and 20% of its outstanding Class B nonvoting stock. The excess of cost of investment in the subsidiary over equity in net assets at the date of acquisition is not being amortized since, in the opinion of management, there has been no decrease in value.

*Recognition of Revenue:* The company recognizes revenue on contracts entered into for engineering and consulting services as the work is performed. Costs and expenses are charged to operations as incurred. Losses, estimated to be sustained upon completion of contracts, are charged to income in the year such estimates are determined.

*Depreciation and Amortization:* The companies provide for depreciation principally on the straight-line composite method utilizing the guideline lives suggested by the U.S. Treasury Department. Amortization of leasehold improvements is over the lives of the leases or useful lives, whichever are shorter.

*Retirement Income Plan:* The company and its subsidiary maintain a noncontributory trustee Retirement Income Plan covering substantially all employees. Pension plan expense charged to consolidated income for the years 1972 and 1971 amounted to \$780,464 and \$637,350, respectively. These amounts include current service cost and amortization of prior service cost over a 30-year period. The company's policy is to fund pension cost accrued under this plan. The assets of the plan exceed the actuarially computed value of vested benefits under the plan at December 31, 1972. The consolidated unfunded prior service liability at December 31, 1972, was approximately \$1,020,000.

*Investment Tax Credits:* Investment tax credits are recorded as a reduction of the provision for federal taxes on income in the year allowable for tax purposes. Such credits were \$98,627 in 1972 and were immaterial in amount in 1971.

### 2. Acquisition of Assets of Gai Realty Corp:

In September 1972, the company purchased land and an office building from Gai Realty Corp. for \$650,000 in cash. All of the assets purchased were previously being utilized by the company under long-term lease agreements.

### 3. Long-Term Debt:

Long-term debt at December 31, 1972 consists of the following obligations for which land and buildings with a net book value of \$6,303,858 are pledged as collateral:

Gilbert Associates, Inc.:	
\$38,346 due monthly to 1987, with decreasing amounts payable to 1992, including interest at rates not exceeding 7¼%	\$4,531,397
Gai-Tronics Corporation, \$852 due monthly to 1977, including interest at 6½%	38,472
Total long-term debt	<u>4,569,869</u>
Less portion due within one year included in current liabilities	155,025
	<u>\$4,414,844</u>

### 4. Litigation

On May 3, 1972, the company was made a third party defendant in an action brought by an electric utility company against the manufacturer of equipment for a project for which the company provided engineering services. The utility is seeking approximately \$10,000,000 of actual damages and approximately \$20,000,000 of punitive damages from the manufacturer. In the Third Party Complaint, the manufacturer seeks to have the company made liable for whatever amount may be recovered by the utility from the manufacturer plus \$300,000. The company denies any negligence as engineer on the project and plans to defend the action by appropriate methods.

Local trial counsel for the company advises that the company's maximum exposure to liability under the Third Party Complaint is approximately \$10,517,000. The company has professional liability insurance in the amount of \$10,500,000 for personal injuries or property damage suffered as a result of an accident caused by any negligence on its part. The company's insurance carriers are providing a defense but reserving any rights they may have based upon matters which are not within the terms and provisions of the policies and endorsements. At this time, the company is unable to ascertain whether or not it could potentially have any material uninsured liability.

The company is involved in other pending litigation arising in the ordinary course of business as to which, in the opinion of management, no material liability affecting the company's financial condition or the results of its operations is expected to result.

## 5. Capital Stock and Capital in Excess of Par Value:

The changes in capital stock and capital in excess of par value during 1972 and 1971 were as follows (the number of shares of common stock is equivalent to the dollar amount changes since par value is \$1 per share):

	Common Stock				Capital in Excess of Par Value	
	Class A Nonvoting		Class B Voting		1972	1971
	1972	1971	1972	1971		
Balance at beginning of year	\$629,492	\$625,430	\$203,838	\$205,160	\$3,679,323	\$3,569,185
Sale of common stock			8,452	2,740	312,082	110,138
Conversion of stock, net	30,974	4,062	(30,974)	(4,062)		
Two-for-one stock split effected in the form of a 100% stock dividend	639,023		196,513		(835,536)	
Balance at end of year	<u>\$1,299,489</u>	<u>\$629,492</u>	<u>\$377,829</u>	<u>\$203,838</u>	<u>\$3,155,869</u>	<u>\$3,679,323</u>

No holder of Class B stock (Class B stockholders must be active employees of the company) may sell or transfer such stock until first having extended an offer of sale to the company. Except for the voting privileges, the Class A and Class B common stock are identical. On February 25, 1972, the authorized common stock of the company was increased to 3,000,000 shares of Class A common stock and 3,000,000 shares of Class B common stock, prior to a two-for-one stock split effected in the form of a 100% stock dividend. At no time may the combined issued and outstanding shares of Class A and Class B stock exceed 3,000,000 shares.



## 6. Subsequent Event—Acquisition of Commonwealth Services Inc.

On February 28, 1973 the company acquired all of the outstanding stock of Commonwealth Services Inc., a wholly-owned subsidiary of Computer Sciences Corporation, for \$15,000,000 in cash (proceeds of a bank loan) and a 6% convertible subordinated debenture in the principal amount of \$9,000,000. This acquisition will be accounted for by the purchase method whereby the purchase price will be allocated to the net assets acquired. The excess of cost of investment over net assets at date of acquisition will be ratably charged to operations over the succeeding forty years.

Commonwealth is a design engineering firm providing services principally in the electric utility field. Audited financial statements of Commonwealth reflected net assets of approximately \$7,768,000 at December 29, 1972, including working capital of \$2,662,000. Net assets of Commonwealth at the date of acquisition approximated \$7,096,000. For

the 52 weeks ended March 31, 1972, and the 39 weeks ended December 29, 1972, revenues were \$20,066,000 and \$16,308,000 and net income was \$1,405,000 and \$1,122,000 respectively.

In 1973 the company intends to issue additional shares of Class A common stock in order to repay the \$15,000,000 loan. Based upon the average market price of such stock during February 1973, approximately 400,000 shares would have to be issued to realize net proceeds equivalent to the bank loan. Had the acquisition been made as of January 1, 1972, and had the 400,000 additional shares of Class A common stock been outstanding, consolidated revenues and net income on a proforma basis (unaudited) would have approximated \$57,118,000 and \$3,510,000 (\$1.69 per share), respectively, for 1972. Had the debenture been converted to Class A common stock at January 1, 1972, the proforma net income per share (unaudited) would have approximated \$1.63.

Report of Independent Certified Public Accountants

To the Stockholders and Board of Directors  
Gilbert Associates, Inc.

We have examined the consolidated balance sheet of Gilbert Associates, Inc., and subsidiary company, as of December 31, 1972 and the related consolidated statements of income and retained earnings and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. We made a similar examination of the consolidated financial statements for the year ended December 31, 1971.

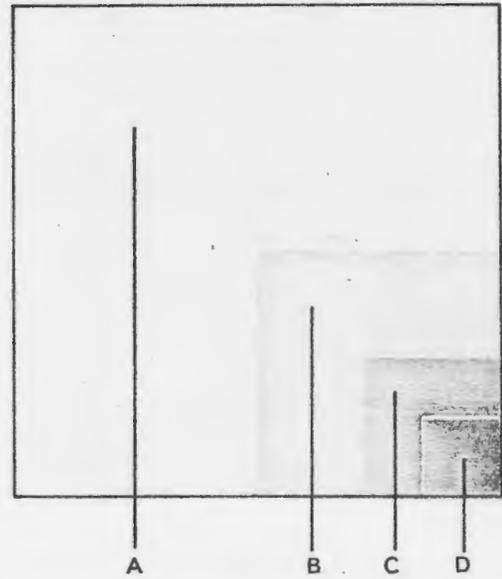
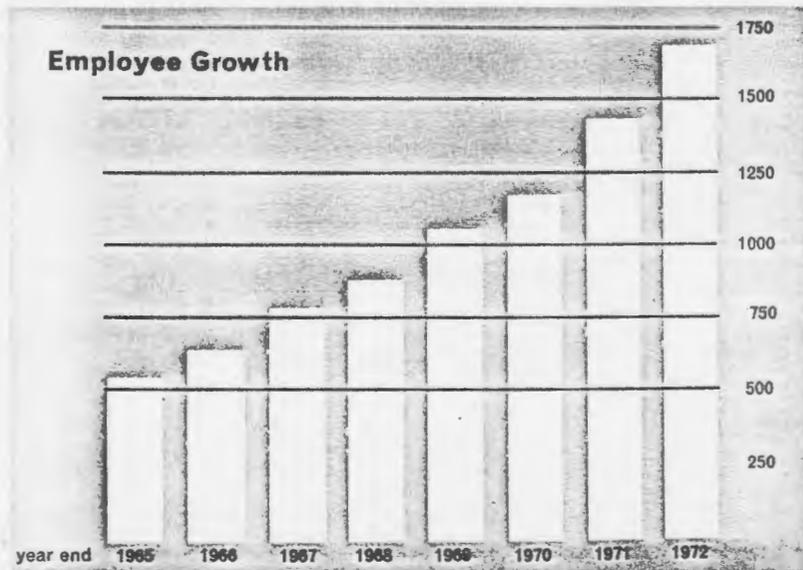
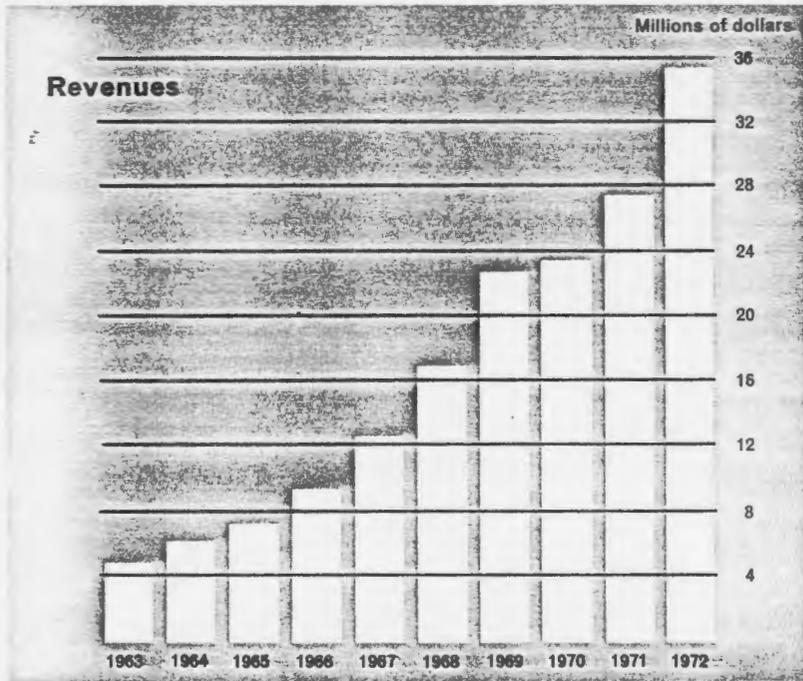
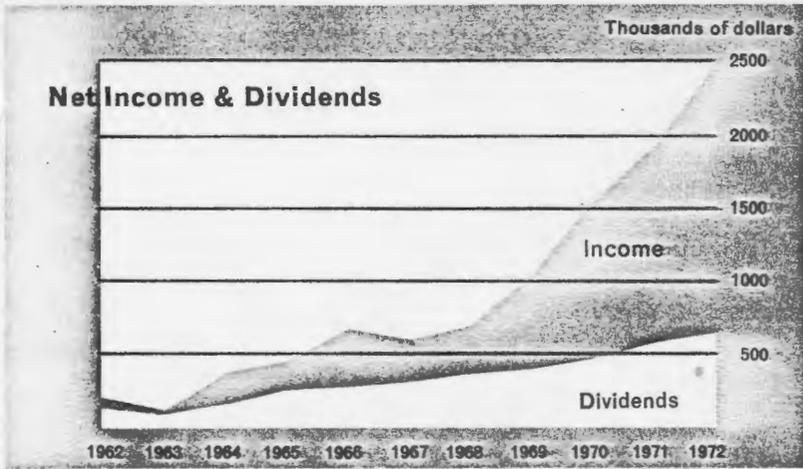
In our opinion, subject to the outcome of litigation described in note 4, the aforementioned statements present fairly the consolidated financial position of Gilbert Associates, Inc., and subsidiary company at December 31, 1972 and 1971 and the consolidated results of their operations and the consolidated changes in their financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.

*Lybrand, Ross Bros. & Montgomery*

Philadelphia, Pennsylvania

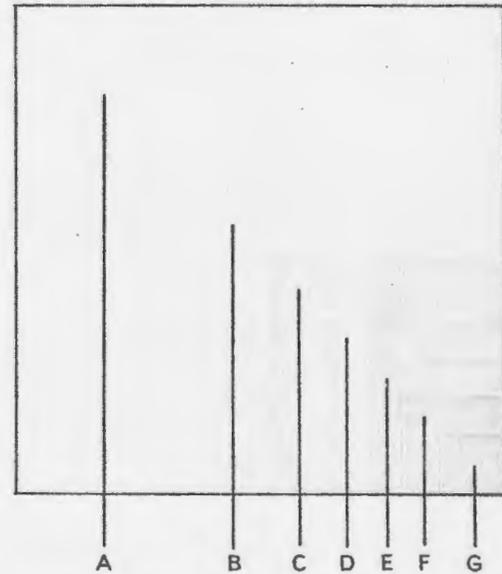
February 9, 1973

Note 6 as of February 28, 1973



**Source of Income in 1972**

- A Private Industry in the U.S.—73.7%
- B Foreign Industry and Foreign Governmental Agencies—17.6%
- C Municipal and Other Local Authorities in the U.S.—5.7%
- D Federal Governmental Agencies—3.0%



**Use of Income in 1972**

- A Payroll and Fringe Benefits—59.0%
- B Other Operating Expenses—17.8%
- C Taxes and Depreciation—10.1%
- D Retained Earnings—5.2%
- E Outside Services—3.7%
- F Rentals—2.6%
- G Dividends—1.6%



**TEN YEAR SUMMARY****GILBERT ASSOCIATES, INC. AND SUBSIDIARY**

	1972	1971	1970
<b>Results for the Years</b>			
Total Revenue	\$35,259,986	\$ 27,921,730	\$ 23,818,750
Income Before Income Taxes and Minority Interests	5,803,082	4,853,521	3,822,600
Federal, State and Foreign Income Taxes	3,033,253	2,605,222	2,057,784
Minority Interests	356,564	273,477	205,683
Net Income	2,413,265	1,974,822	1,559,133
Dividends Paid	565,465	540,396	456,825
<b>Year-end Position</b>			
Working Capital	9,498,808	8,235,685	6,723,958
Property, Plant and Equipment, Net	7,974,752	4,565,794	3,183,987
Long-term Debt	4,414,844	2,138,026	943,893
Retained Earnings	7,731,980	5,884,180	4,449,754
Shareholders' Equity	12,561,767	10,396,833	8,849,529
<b>Per Share of Common Stock</b>			
Income Before Income Taxes and Minority Interests	3.47	2.92	2.31
Federal, State and Foreign Income Taxes	1.81	1.57	1.24
Minority Interests	.21	.16	.13
Net Income	1.44	1.19	.94
Dividends to Shareholders	.338	.325	.275
Shareholders' Equity (Year-end)	\$ 7.49	\$ 6.24	\$ 5.33
<b>Miscellaneous Data</b>			
Number of Employees	1,685	1,426	1,200
Shares Outstanding (Year-end)	1,677,218	1,666,660	1,661,180
Shareholders of Record (Year-end)	1,146	834	875

1969	1968	1967	1966	1965	1964	1963
\$ 170,972	\$16,725,303	\$12,985,021	\$ 9,838,345	\$ 7,801,293	\$ 6,323,866	\$ 5,072,452
2,942,176	1,963,662	1,549,719	1,541,691	1,163,940	903,612	345,856
1,663,680	1,061,504	762,480	761,338	574,951	452,175	182,179
215,903	217,086	178,466	132,709	96,862	101,472	64,912
1,062,593	685,072	608,773	647,644	492,127	349,965	98,765
376,050	306,184	237,744	237,636	238,223	146,534	99,626
6,651,743	3,000,157	2,364,977	1,869,714	1,493,276	1,254,299	982,042
1,967,295	1,806,767	1,283,089	264,136	192,583	145,469	166,044
869,796	900,685	692,809	---	---	---	---
3,347,446	2,660,903	2,282,015	1,908,750	1,449,137	1,215,131	1,154,481
7,747,221	3,353,163	2,560,422	2,187,087	1,730,726	1,503,820	1,321,250
2.19	1.59	1.31	1.30	.98	.76	.32
1.24	.86	.65	.64	.48	.38	.17
.16	.18	.15	.11	.08	.09	.06
.79	.55	.51	.55	.42	.29	.09
.275	.24	.20	.20	.20	.125	.0835
\$ 4.67	\$ 2.58	\$ 2.16	\$ 1.84	\$ 1.46	\$ 1.26	\$ 1.20
1,099	934	816	674	547	440	394
1,661,180	1,302,180	1,188,720	1,188,720	1,190,520	1,194,720	1,105,956
955	469	279	219	209	193	182

## Management Consulting Division

As business decisions become more complex and involve increased financial commitments, this Division responds to high level corporate problems of client company management with a variety of specialized services, many of which are directed specifically to the electric utility industry.

The continuing trend nationally of utility rate regulatory and other commission problems has accelerated the development of key members of a portion of the Division's staff as professional witnesses to provide expert testimony on behalf of clients before court and regulatory agencies.

The Division has developed its depreciation, valuation and cost of service activities in depth. During the year it undertook both rate of return and antitrust assignments. Its expertise is being recognized by an increasing number of utility and industrial clients. Gilbert's client companies, through use of these services, participated in some 20 rate relief applications with state and federal commissions in the past year. To accomplish this, there were significant increases in the staffs of the five departments concerned.

In 1972 the Division continued its development and adaption of EDP systems designed to enhance its traditional services of providing client management with information upon which to make decisions. The key to these systems is speed and flexibility—enabling computer routines to be custom fitted to client needs, yet retaining sufficient standardization to minimize the cost to the client. EDP systems have been developed for depreciation and valuation analyses, financial modeling, cost of service studies and accounting systems.

Most services of the Division are available internationally, and, during 1972, those most active overseas were those relating to accounting systems and financial modeling. Projects in these areas were conducted during 1972 in Taiwan and the Philippines.

In addition to assistance provided utility and industrial clients, the Division, through its Transportation Services Department, is becoming involved with problems of municipal and regional transit systems in planning for the advent of the rapid transit and mass transit needs of urban centers and urban fringe areas.

## Advanced Development Projects

A recent addition to the corporation, this organization is charged with the responsibility of promoting corporate growth through the development of new engineering/consulting services, processes, products and markets. The initial effort has been in the development of advanced technology for economically converting coal energy into electric energy by means of environmentally clean processes.

As a result of this effort, the Fuels Technology Group received a contract to provide the U. S. Department of the Interior's Office of Coal Research (OCR) with technical and engineering services directed toward development of commercially attractive processes for the conversion of coal to electric power. Functioning as an extension to the OCR staff, the group is responsible for technical and economic review and evaluation of applicable work performed under OCR authorization, and for making recommendations for channeling efforts into areas holding greatest potential for success of the overall program. Emphasis presently is being placed on the areas of low Btu gasification systems, combined and advanced cycles, magnetohydrodynamics (MHD) and fuel cells.

## Computer Applications Division

The Computer Applications Division applies the systems approach to diverse industrial and environmental situations, utilizing the computer as part of the plant operating system or as a monitor of environmental conditions.

Two of the jobs received in 1972 apply the systems approach to steel production plants. The first is a power demand control and dispatch center real time computer system, and includes purchase of hardware, debugging, and supervision of installation. Approximately 300,000 KW of power will be economically apportioned by the computer among the various steel plant facilities.

The second project for the steel industry involves preparation of specifications for a real time billet tracking and identification system for a primary mill. It will involve operator cathode ray tube displays, keyboard inputs, billet marking and outputting of hard copy reports.

In the environmental systems area, the Division is developing services in batch and real time management and monitoring of water resources and supply systems, air basins and waste effluents.



## Central Division

Just as the service industries nationally are experiencing rapid growth, the service departments grouped within this Division are growing to serve the expanded needs of our engineering staff and clients.

Since quality assurance became mandatory for nuclear power plants several years ago, the responsibilities of the Division's Quality Assurance Department have increased at a tremendous rate. Charged with assuring that plant designs are constructed to specifications, the vigilance of the quality assurance function is helping our clients to assure that a high degree of safety and reliability is incorporated into the design and construction of nuclear power plants. The Division is performing quality assurance on all domestic nuclear projects designed by Gilbert. Similar work is being done on two 800 MW domestic fossil units that are currently under design.

Another rapidly growing area within the Division is the technical writing group, which is providing assistance to our engineering staff beyond the strictest sense of technical writing. Most of the assistance involves problems peculiar to nuclear power plants, such as licensing, test procedures and system descriptions.

During 1972, the Division's Laboratory performed many residential water analyses following the flooding conditions locally in the aftermath of Tropical Storm Agnes. In addition, it has been receiving an increasing amount of analysis work from the Industrial Division as part of various pollution control projects.

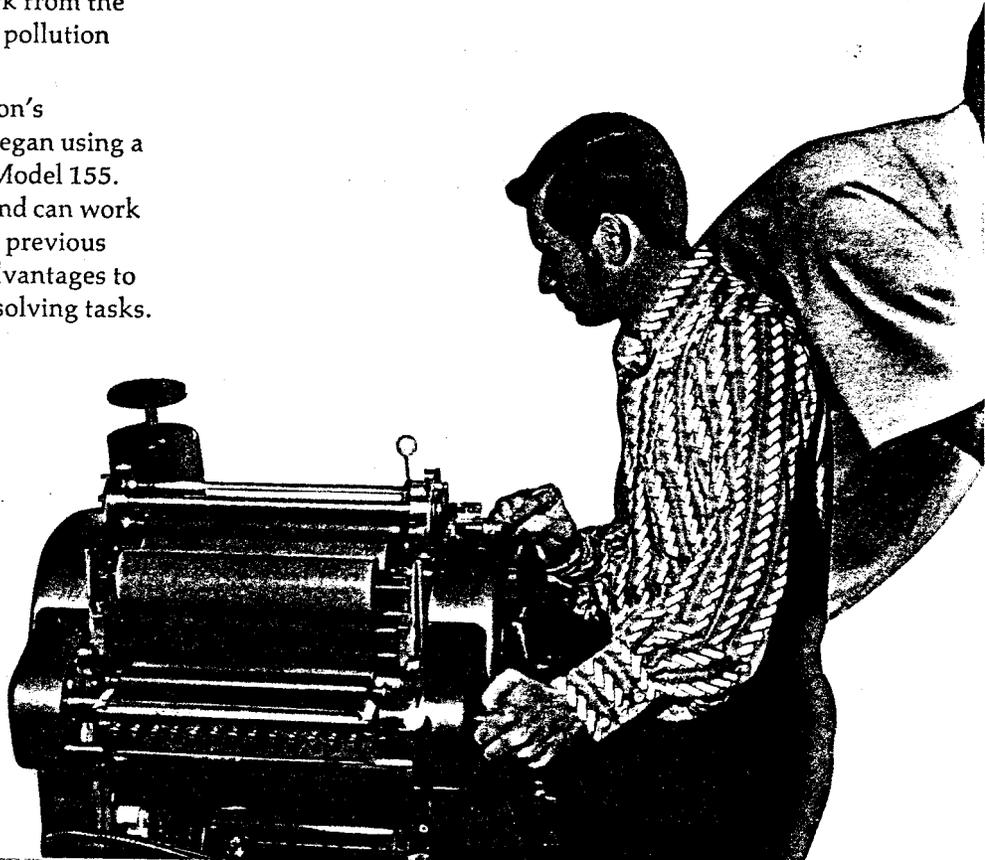
In another area of activity, the Division's Engineering Data Processing group began using a new computer in 1972, the IBM 370 Model 155. This computer has a larger memory and can work at three to four times the speed of our previous IBM computer, offering significant advantages to the group in its engineering problem solving tasks.

The Systems group, maintaining a separate computer center, continues to handle Gilbert's internal financial, accounting and production control services, and has been expanding its list of outside clients for retail merchandising, inventory control, and accounting services.

As design projects become more complex, Gilbert contracts are frequently including authorization to construct scale models for three dimensional visualization. During the past year the Division's Model Shop assisted the engineering staff with several such assignments, including structural assembly and piping layout models for generating plants.

Increased environmental concerns of regulatory agencies has initiated a trend toward use of topographic models, often detailing entire counties or larger geographic areas. As a result, the Model Shop was called upon to construct several regional topographic models for use in environmental planning work.

One of the most intriguing projects completed in 1972 was a full scale model of a reactor coolant pump motor, measuring 28 ft. high and weighing approximately one ton. Accurate in every detail, the model was used at a nuclear plant construction site to determine procedures for installation of the actual motors.



## GAI-Tronics Corporation

With increased industry-wide concern about improving safety, security and efficiency in operations, the ability to directly communicate by voice throughout work areas has rapidly gained importance.

To help meet industry's diverse requirements, GAI-Tronics Corp. continued to expand its product line of high performance voice communication equipment during the year. Principal additions consisted of a Mine Page Phone bearing U. S. Bureau of Mines Permissible Rating, a new five tone Multi-Tone Generator, and an Inductive Loop Paging System.

The Mine Page Phone is used principally as a communication device for underground mines. It consists of a self contained unit containing a handset, amplifier, speaker and battery combination using complete solid state circuitry. Large numbers of these units can be connected together by means of a two conductor cable thus permitting speaker paging of all units and separate voice communication via the microphone and receiver in the handset. This device is also being used at construction sites and within the plant complex where a self contained portable unit is desired.

The Multi-Tone Generator also uses solid state circuitry entirely and now embodies five separate and distinct alarm or signalling tones for use as an operational or alarm system.

The Inductive Loop Paging System is finding principal usage as a result of OSHA (Occupational Safety and Health Act of 1970) regulations that limit the amount of time that personnel may work in areas having noise levels exceeding 90 dB. The sound barriers associated with the headset reduce the noise level impinging on the user's ears and also have a small audio receiver built into them so that a paged signal can be heard.

### Corporate Philosophy

To consistently provide professional services of the highest quality in all areas of our competence.

To always serve with integrity, the best interests of our clients and society.

To seek fair compensation for services rendered but in no way permit profit or loss to influence the character or adequacy of the work performed.

To foster an atmosphere which permits employees to attain the highest degree of fulfillment consistent with their talents.

To merit and reward the confidence of our shareholders to the fullest extent possible within the framework of the preceding tenets of corporate philosophy.



## Officers and Directors

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Herbert C. Schweikart\*  
Executive Vice President

H. Leon Frantz\*  
Vice President and Treasurer

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Vice President

Alexander F. Smith\*  
Vice President

Bruce A. Berlin\*  
Staff Counsel and Assistant Secretary

Patrick M. Politz  
Controller

Dorothy M. Haas  
Secretary

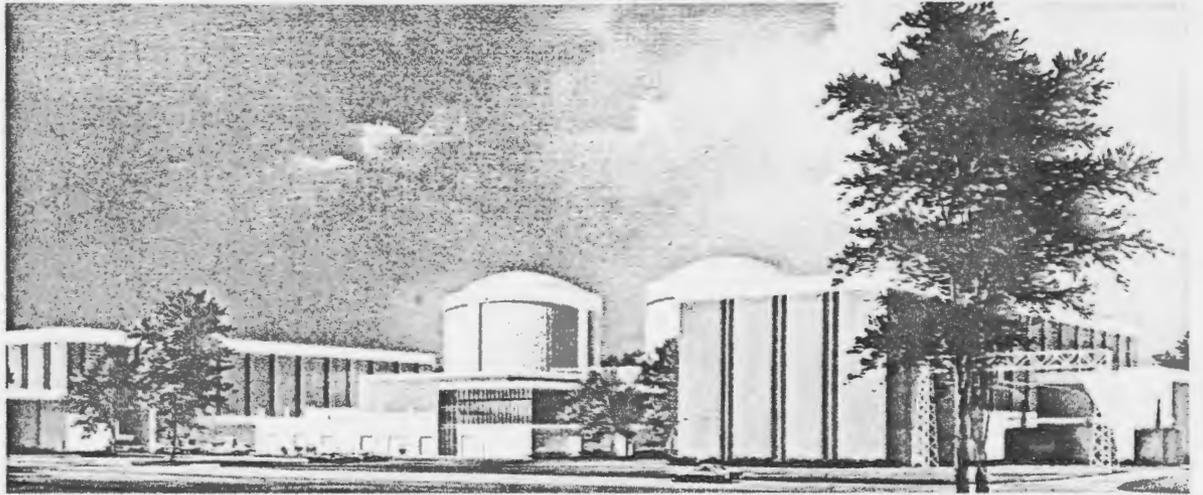
\*Board of Directors

Gilbert Associates, Inc. / engineers and consultants

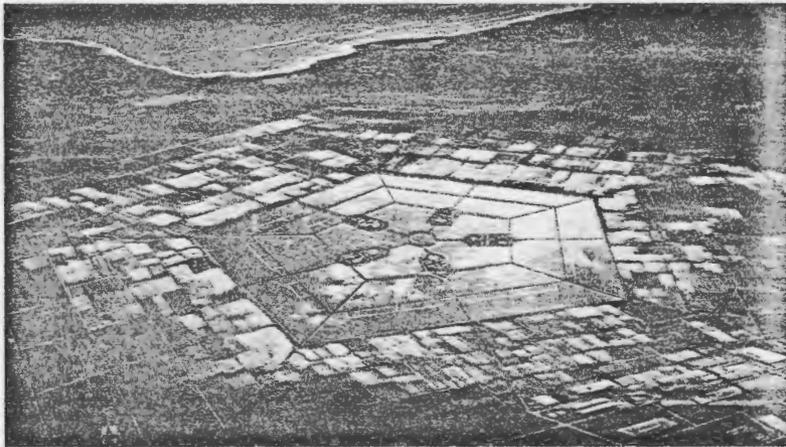
MAN  
AND HIS  
QUEST

services for  
the electric  
utility industry





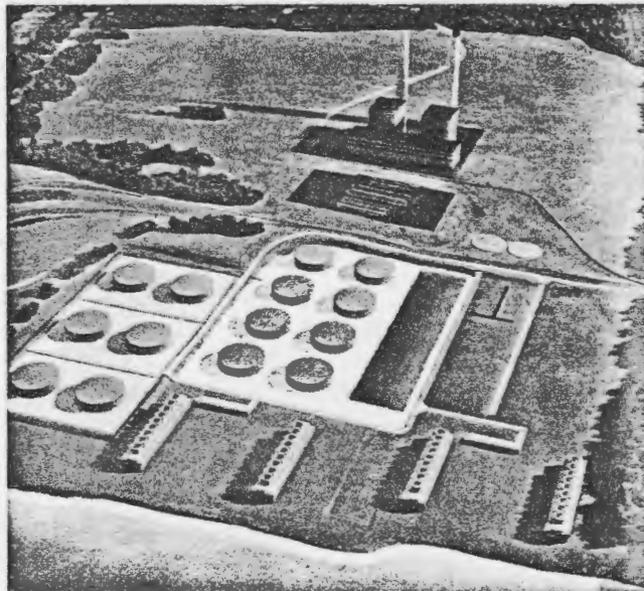
TWO 1100 MW NUCLEAR UNITS



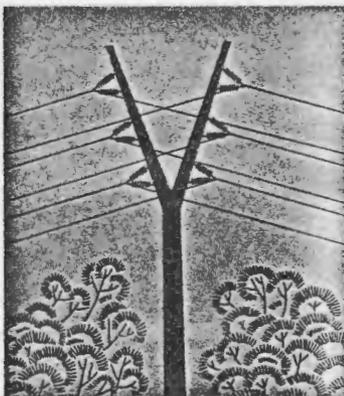
TEN 1100 MW NUCLEAR UNIT CONCEPTUAL STUDY



1100 KV TOWER



TWO 600 MW FOSSIL UNITS



500 KV TOWER



NOW AND IN THE FUTURE

## ...serving the electric utility industry

Man's quest frequently seems to point to impossibilities. But dreams develop into ideas, and ideas become the nucleus of designs which serve man's needs.

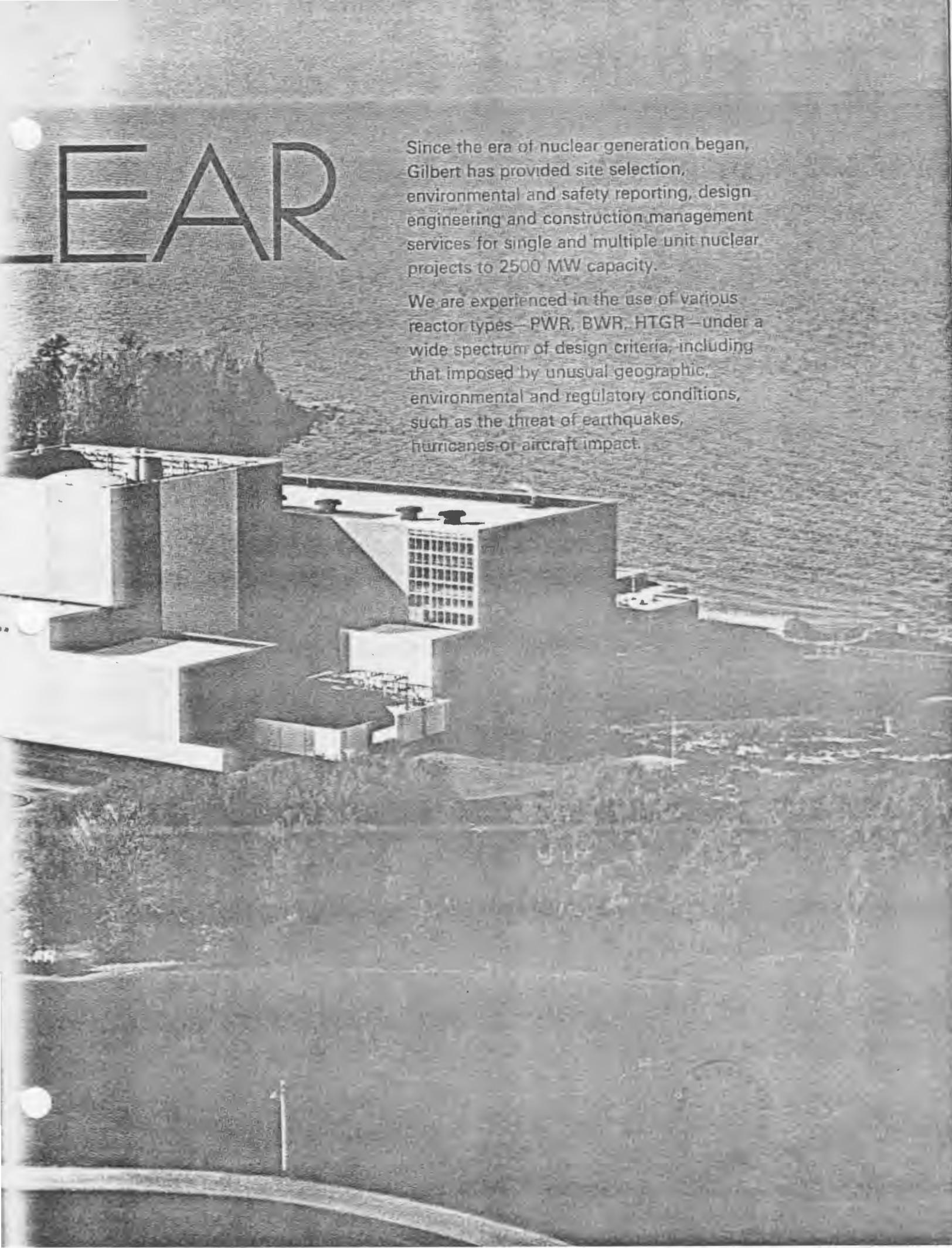
Gilbert Associates translates ideas into designs which serve man. Together with our subsidiaries, we are a group of professionally related engineering and consultant firms organized to provide planning, design, construction management, and management consulting services to the electric utility industry.

With assignments completed in every state and in more than 30 foreign nations, our project experience includes major power generation facilities, extensive energy transport systems, and complex service functions unique to the electric utility industry.

Established at the turn of the century and growing in scope and diversity, the combined Gilbert/Commonwealth Companies constitute one of the largest consulting engineering firms in the country.

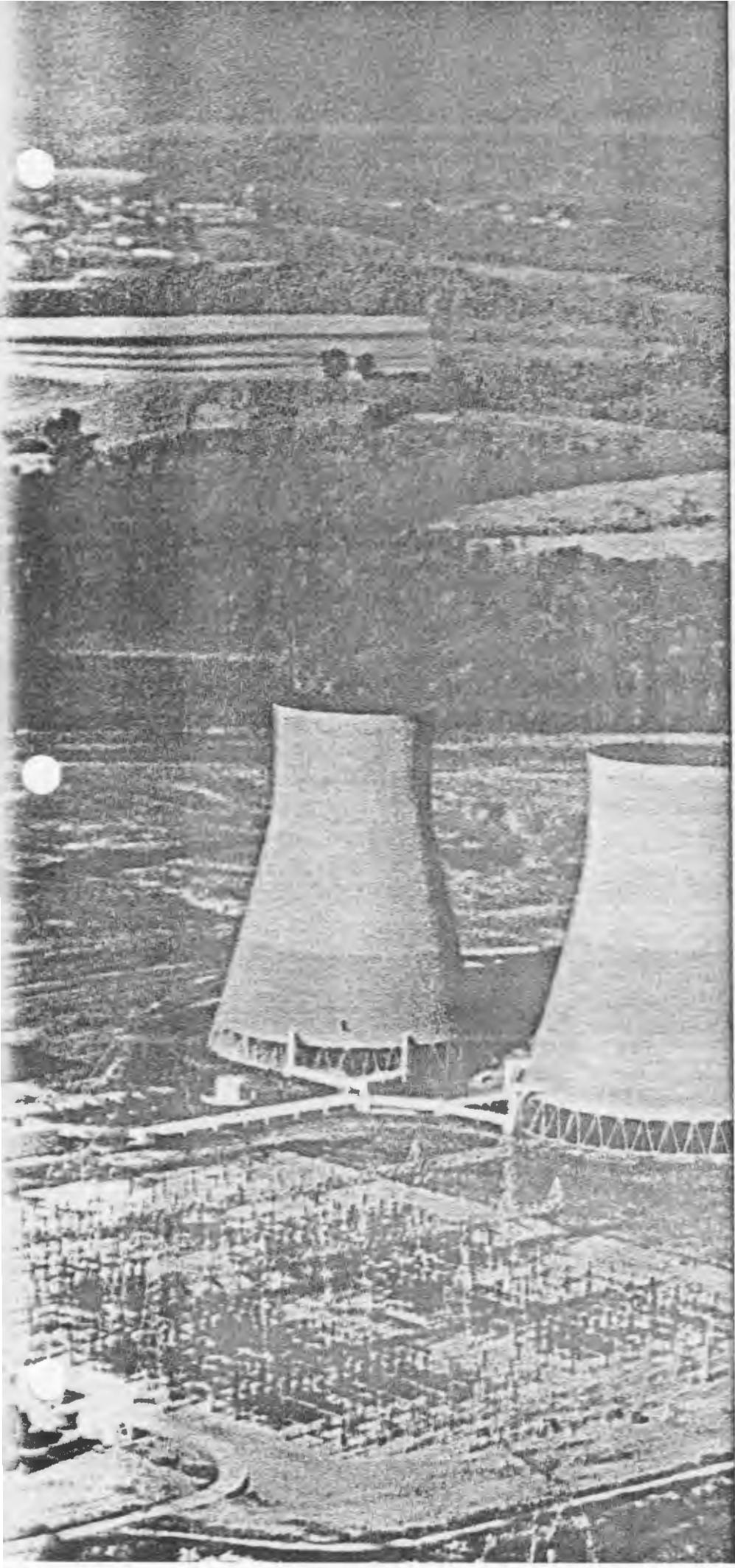


# LEAR



Since the era of nuclear generation began, Gilbert has provided site selection, environmental and safety reporting, design engineering and construction management services for single and multiple unit nuclear projects to 2500 MW capacity.

We are experienced in the use of various reactor types—PWR, BWR, HTGR—under a wide spectrum of design criteria, including that imposed by unusual geographic, environmental and regulatory conditions, such as the threat of earthquakes, hurricanes or aircraft impact.



# FOSIL

For almost 70 years Gilbert has contributed to the advancing technology of fossil-fuel generation. Our design experience includes mine mouth generating stations, oil/coal dual fueled systems, computerized controls and various cooling systems.

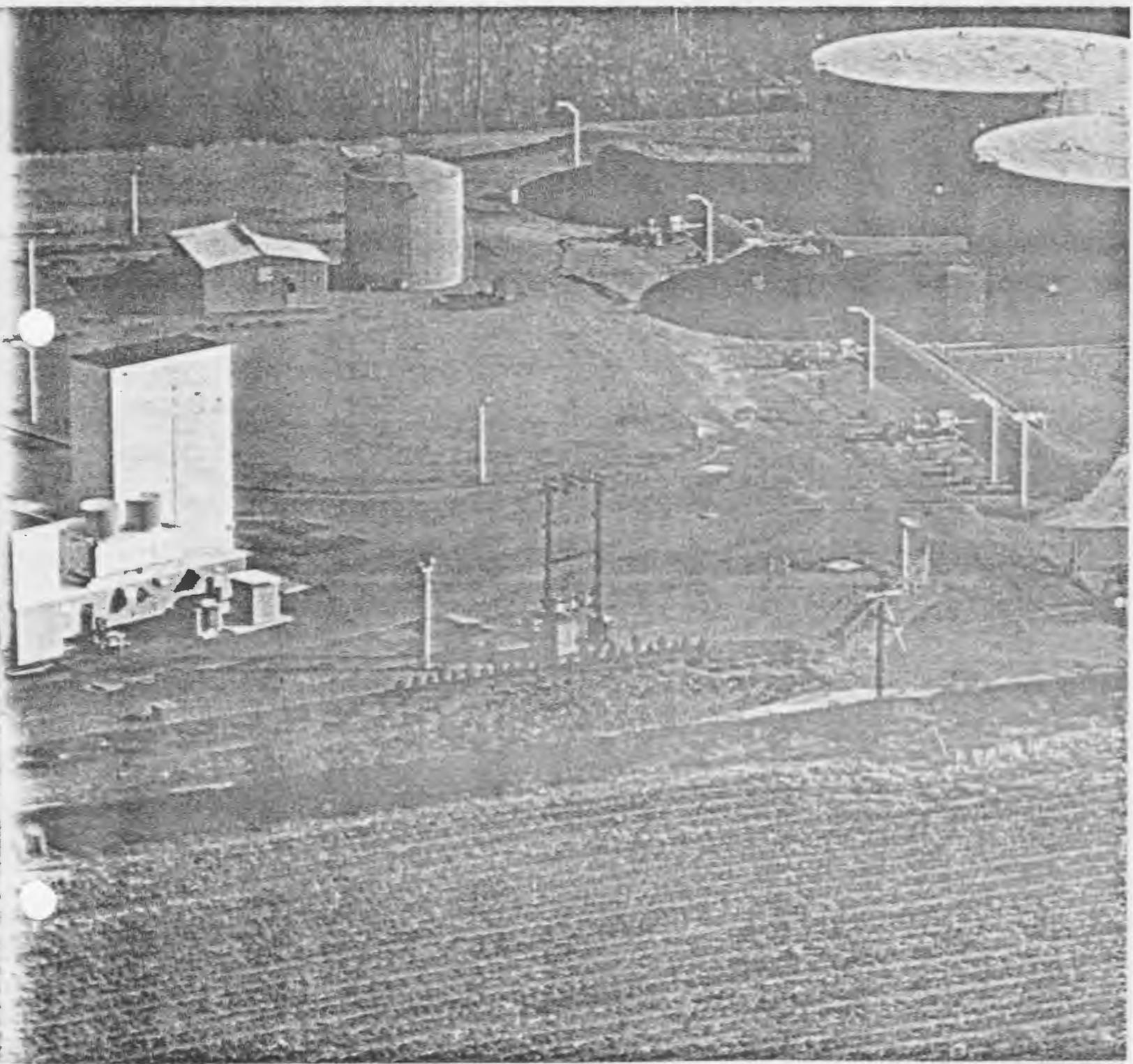
Services range from feasibility studies, site selection and environmental evaluations through engineering and design, to full construction management, with a complete scope of in-house supplemental services. Our total project capability is directed toward systems efficiency and reliability, with strong emphasis on environmental considerations.

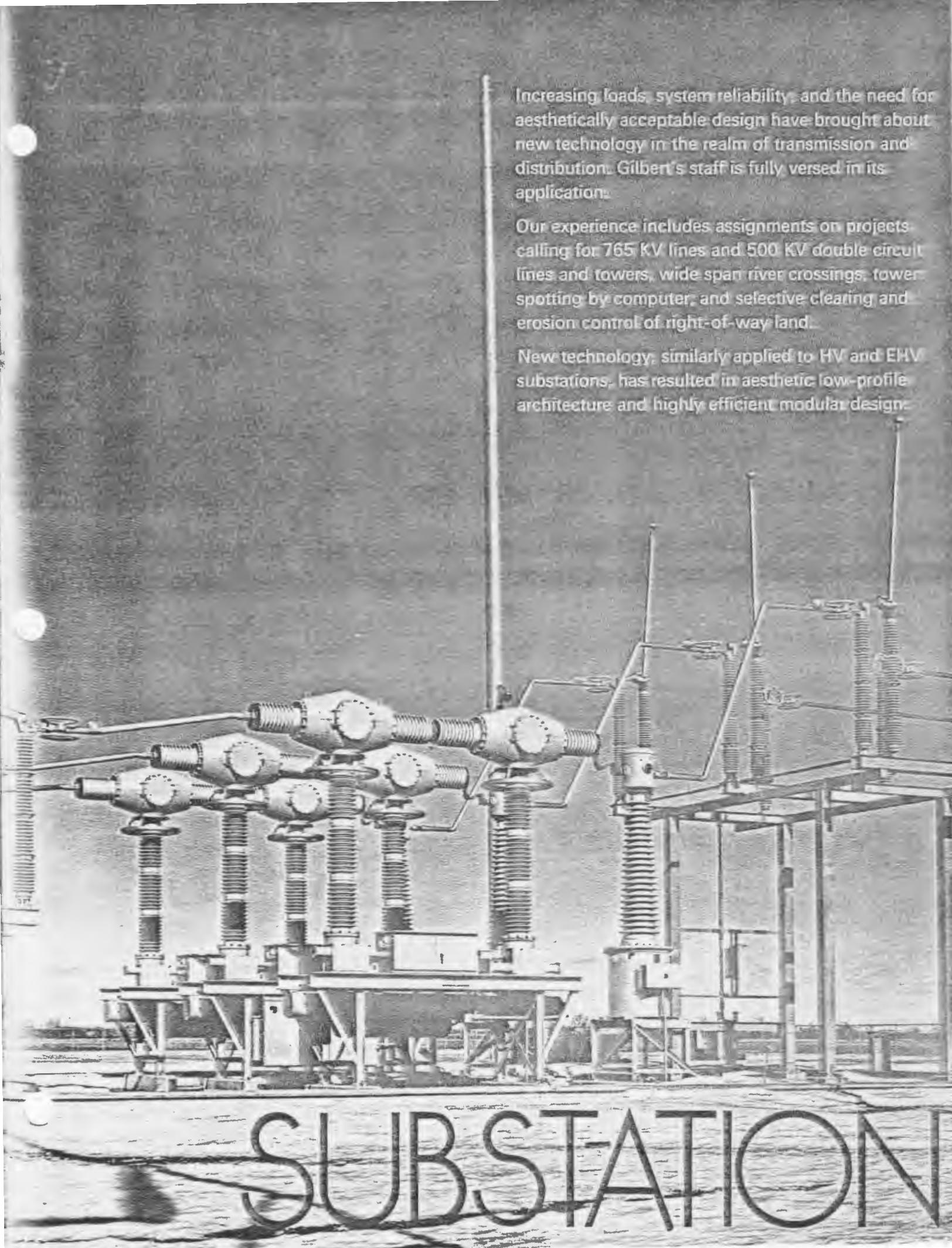


# ING

Gilbert has been involved in the engineering design and construction management of combined cycle units and combustion turbine installations. We are continuing to assist our clients in making optimum use of the units relatively quick installation time to provide peaking capacity and fill gaps caused by delays in base load plant construction, as well as to help lower transmission costs via decentralization and to lower reserve requirements.

In addition, we have been active in the planning and development of advanced cycle units to improve thermal efficiency.



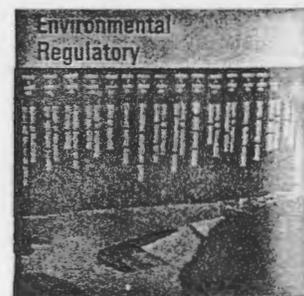
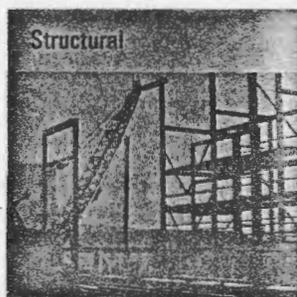
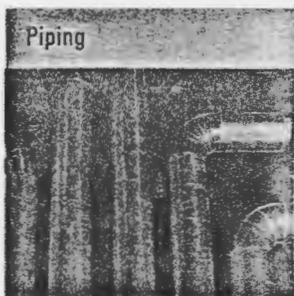
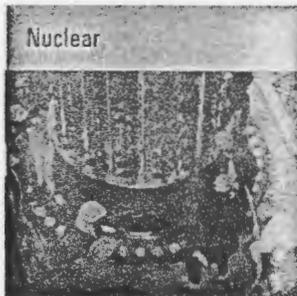


Increasing loads, system reliability, and the need for aesthetically acceptable design have brought about new technology in the realm of transmission and distribution. Gilbert's staff is fully versed in its application.

Our experience includes assignments on projects calling for 765 KV lines and 500 KV double circuit lines and towers, wide span river crossings, tower spotting by computer, and selective clearing and erosion control of right-of-way land.

New technology, similarly applied to HV and EHV substations, has resulted in aesthetic low-profile architecture and highly efficient modular design.

# SUBSTATION

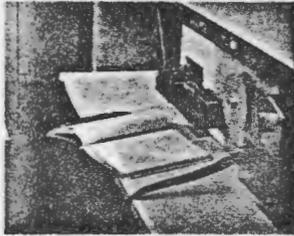


# ENGINEERING RESOURCES

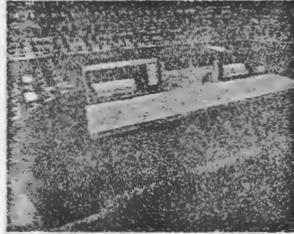
Flexibility in responding to the needs of our clients and their projects is accomplished by drawing upon our manpower reservoir of diverse engineering disciplines and specialties. Gilbert will select an optimum combination of technical and management skills to staff your project organization.



Computer Applications



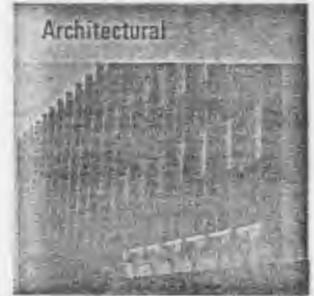
Instrumentation & Control



Civil/Hydraulic



Architectural



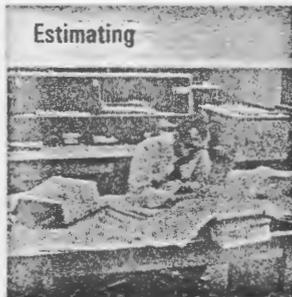
Heating, Ventilating and Air Conditioning



Quality Assurance



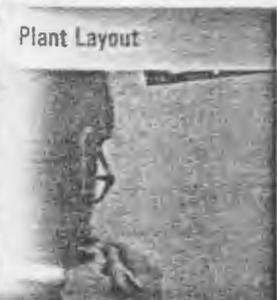
Estimating



Drafting



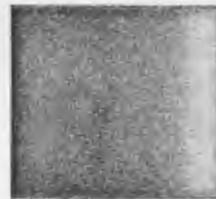
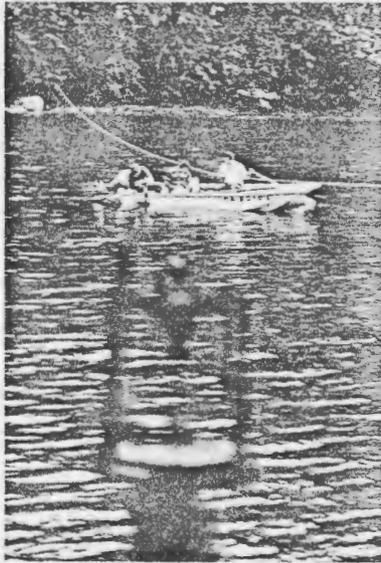
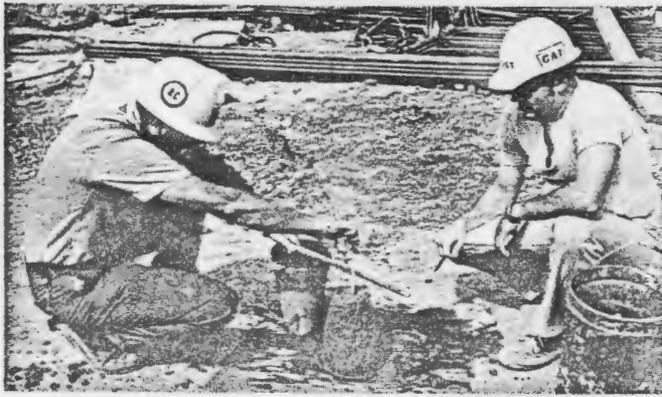
Plant Layout



Electrical



# SUPPORT SERVICES

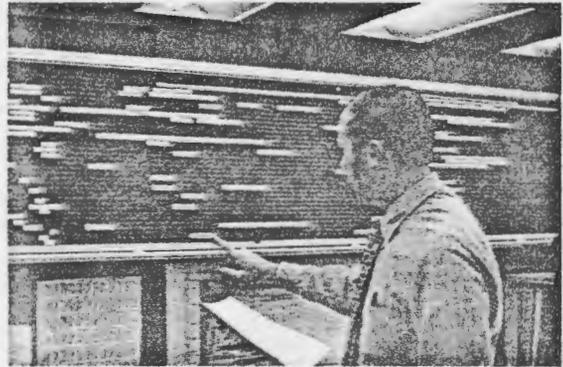


## Feasibility Studies

economic  
engineering  
ecological

## Site Evaluation

natural characteristics  
demography, access and land use  
site development cost estimates  
nuclear safety analysis  
public reaction considerations  
environmental impact  
heat disposal



**Architectural**

generating stations  
service centers  
substations  
dispatch/control centers  
aesthetic design alternatives

**Plant Service Systems**

water supply  
transportation access  
fuel handling  
waste treatment and disposal  
environmental protection

**Model**

pipng  
structural  
HVAC  
design checking  
architectural  
site plan  
topographic  
display/public relations

**Regulatory Agency Liaison**

environmental reports  
environmental impact statements  
licensing assistance  
PSAR/FSAR

**Quality Assurance**

design audit  
vendor inspection  
resident inspection  
administrative audit and documentation  
materials selection  
procurement audit  
metals joining consultation

**Procurement**

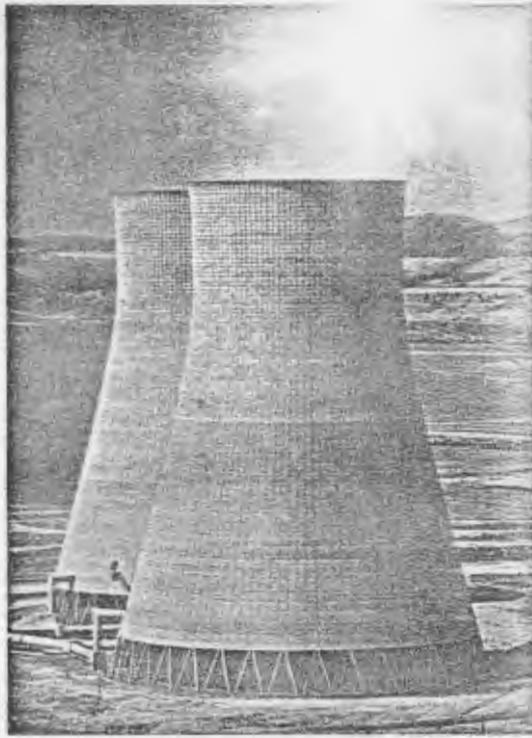
specifications  
quotation requests  
evaluation of proposals  
recommendations to client  
letters of intent  
bills of material  
purchase orders  
expediting

**Construction Management**

construction supervision  
resident engineering  
construction accounting  
resident inspection  
field liaison  
labor relations  
surveying  
estimating and cost control  
OSHA compliance  
contracts  
CPM scheduling

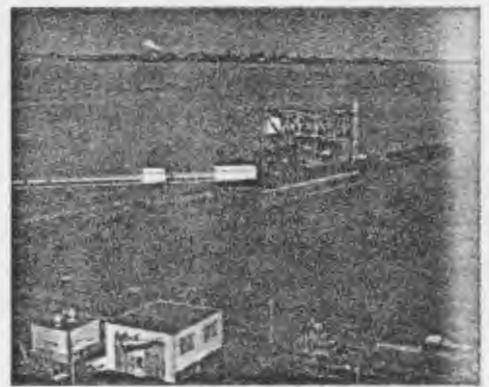
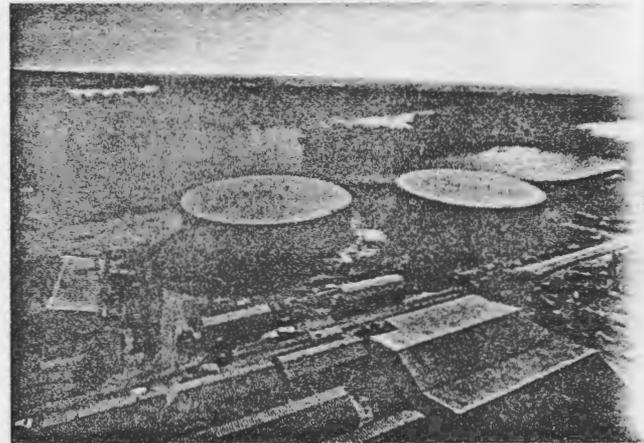
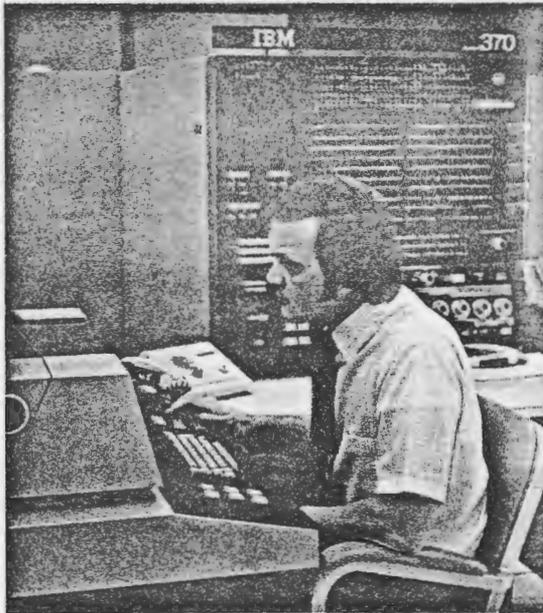


# SUPPORT SERVICES



## Startup & Testing

test program development  
test procedure preparation  
operating procedure preparation  
field startup and testing services  
operations consulting services



**Manufacturer Print Control**

**Vendor Drawing Control**

centralized receiving, recording, distribution  
computerized expediting

**Management and Operations Consulting**

depreciation/valuation  
operations research  
rate/regulatory  
corporate financial modeling  
cost and load analysis  
personnel training  
continuing technical services  
accounting and administrative systems

**Laboratory**

boiler water analysis  
cooling water analysis  
fuel analysis  
ash analysis  
wastewater analysis  
stack sample analysis  
insulating oil analysis  
lubricating oil analysis  
scale analysis

**Reprographics**

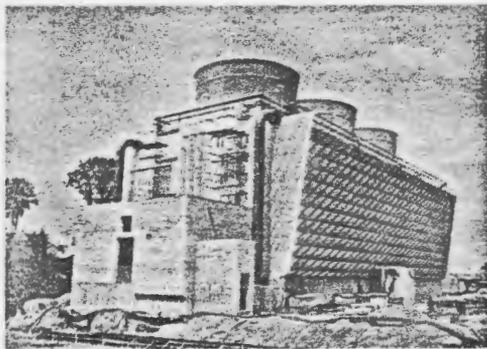
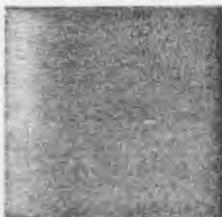
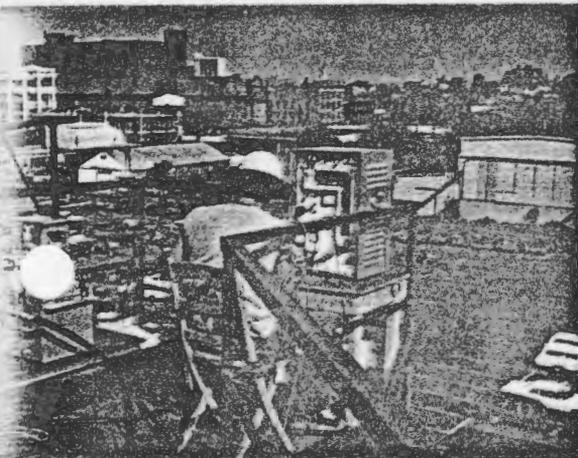
offset  
dialo  
xerox  
microfilm  
camera  
contact

**Modifications**

stack emission controls  
backfitting cooling systems  
fuel conversions  
waste treatment and disposal  
coal gasification

**Computer Applications**

direct digital plant control  
data logging  
SCADA systems  
environmental monitoring  
dispatch and control software



Alabama Power Company  
American Electric Power  
Service Corporation  
Arkansas Power & Light Company  
Atlantic City Electric Company  
Baltimore Gas and Electric Company  
Braintree Electric Light Company  
Burlington Electric Light Company  
Cambridge Electric Light Company  
CFE Mexico  
The Cleveland Electric  
Illuminating Company  
Columbus and Southern  
Ohio Electric Company  
Comision Federal de Electricidad  
—Mexico  
Concord Electric Company  
Conemaugh Owners Group  
The Connecticut Light  
and Power Company  
Consolidated Edison Company  
of New York, Inc.  
Construccion de Centrales  
Electricas de Pereira  
The Dayton Power and Light Company  
Delmarva Power and Light Company  
Duquesne Light Company  
Edison Electric Institute  
Electric Council of England  
Electricite de France  
Electricity Corporation of Libya  
Empresa de Energia Electrica  
Empresa Nacional Calvo Sotelo—Spain  
Empresas de Municipales de Cali  
Empresas Unidas de Energia  
Electricas de Bogota  
Ente Nazionale per l'Energia  
Elettrica—Italy  
Exeter and Hampton Electric  
Federal Power Commission  
Florida Power Corporation  
Florida Power and Light Company  
General Public Utilities Corporation  
Georgia Power Company  
Gulf Power Company  
The Hartford Electric Light Company  
Holyoke Water Power Company  
Homer City Owners Group  
Iberduero, S.A.  
International Atomic Energy Agency  
International General Electric Company  
Iran—Ministry of Water and Power  
Iran Electric Authority  
Jacksonville Electric Authority  
Jamaica Public Service Company  
Jersey Central Power & Light Company  
The Kansai Electric Power Co., Inc.  
Kansai Electric Supply Corp., Ltd.  
Kentucky Utilities Company  
Keystone Owners Group  
Korea Electric Company  
Kyushu Electric Power Company, Inc.

Lake Superior District Power Corp.  
Manila Electric Company  
Metropolitan Edison Company  
Mississippi Power Company  
Missouri Public Service Company  
National Electricity Board  
National Power Corporation  
—The Philippines  
NEGEA Service Corporation  
New Bedford Gas and  
Edison Light Company  
New Jersey Power & Light Company  
New York State Electric  
& Gas Corporation  
Northeast Utilities Service Company  
Northern States Power  
Ohio Edison Company  
Pacific Power & Light  
Pennsylvania Electric Company  
Pennsylvania Power Company  
Pennsylvania Power & Light Company  
Philadelphia Electric Company  
Portland General Electric Company  
The Potomac Edison Company  
Potomac Electric Power Company  
Public Service Company of Colorado  
Public Service Electric and Gas Company  
Public Service of New Hampshire  
PJM Interconnection  
Rochester Gas and Electric Corporation  
Ryuku Electric Power Corporation  
—Okinawa  
Salt River Project—Agricultural  
Improvement and Power District  
Saxton Nuclear Experimental Corporation  
South Carolina Electric & Gas Company  
Southern California Edison Company  
Southern Company, The  
Southern Electric Generating Company  
Taiwan Power Company  
Terminor, S.A.—Spain  
Tokyo Electric Power Company, Inc.  
Toledo Edison  
United Gas Improvement Company  
—Luzerne Electric Division  
United Nations International  
Atomic Energy Agency  
United States Government  
USAID—Iran Electric Company  
USAID—Lagos, Nigeria  
USAID—Government of Western Nigeria  
Army, Department of The  
Marine Corps  
Navy, Department of The  
Corps of Engineers  
Utilities Development Finance  
Corporation  
Wellsboro Electric Company  
Western Massachusetts Electric  
Company  
Westinghouse Electric  
International Company

PARTIAL LIST OF CLIENTS

NOW AND IN THE FUTURE

## ...serving the electric utility industry

Historically, man's quest has required increasing amounts of energy to explore the unknown and bring his dreams to fruition. The task faced by utilities is enormous: to generate and deliver sufficient electricity to meet ever increasing demands without endangering our environment. The responsibility is awesome. Having grown with the electric utility industry, Gilbert recognizes and assumes a similar responsibility. We are actively engaged in the assessment and development of new efficient methods to generate electricity—coal gasification, MHD, advanced cycles, and others. And we are constantly investigating means and techniques to improve environmental systems. Clearly, our role is to help utilities meet the challenges of today and the future by providing professional services of the highest quality wherever and whenever they may be needed.

