

SAU
338.4762131
09538
AL-BAW

البوار
مهندسون



al-Batwardy
consulting engineers



Review 1982



BRINGING power to the kingdom...

17 APR 1989

CENTRE FOR ARAB GULF STUDIES

UNIVERSITY OF EXETER

It is with deep respect and great satisfaction that my colleagues and I record the rapid development of Al-Bawardy Consulting Engineers from its formation a few years ago.

I am grateful to my former colleagues in the Saudi Arabian Government for my most useful experience in the generation and distribution of electrical energy, in both operation and in development planning.

From this background it is our aim to contribute, to the best of our abilities, to the development of the Saudi Power and Water Industries.

Working in collaboration with consultants of international repute, we have been able to adopt the most modern technology, and are grooming a number of talented Saudi engineers to be future partners in our company.

May I finally thank you for the confidence shown in me and my colleagues and reassure you of our continuous efforts to meet your future expectations.

Mohamed Al-Bawardy Chairman



New Riyadh head office complex of Al-Bawardy Consulting Engineers



When I examine the professional approach by Mohamed Al-Bawardy and the rapid progress of Al-Bawardy Consulting Engineers, I am pleased to serve as a personal advisor to him without compensation.

I have been involved in the international energy and management fields for more than forty years, and always I have sought to develop highly qualified organizations and people to serve the needs of others.

As an engineer myself I seek to recognize the merits of

organizations engaged in professional consulting engineering such as the Al-Bawardy group. Step by step they attain success and take a rightful place in the progress of mankind.

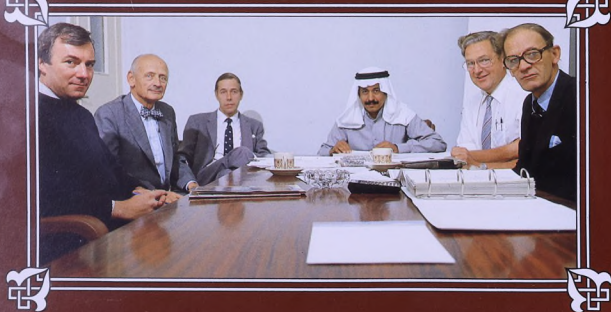
Mohamed Al-Bawardy has principles of excellence in his work, and thus he and his associates in the years ahead in the international field will merit recognition and success.

I am happy to provide this testimonial to Mohamed Al-Bawardy because of my long friendship with him.



Walker Lee Ciser
Detroit, December 1981

Roger Barkis
Ed. Benabib, Vice President (Project)
Dr. W. Samadhi, Executive Vice President
Mohamed Al-Bawardy, Chairman
Lara Chewahed, Generation Expert
Liamant Elgh, Transmission Expert



organisation
chart

computer aided Design

Al-Bawardy Consulting Engineers were asked to organize the power supply for a sparsely built-up area of about 100,000 square kilometres in Saudi Arabia.

At the start of the project the major problem was the non-existence of cartographic material together with a very tight time schedule.

However, by using a CAD-system (Computer-Aided Design) the project was approached and completed as follows:

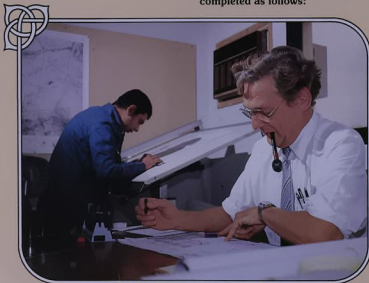
- Satellite pictures covering the area involved were interpreted into the CAD-system, and existing roads and buildings were digitised.

- The various satellite pictures were brought together into one continuous map via identifiable points in the overlapping areas.

- The density of population was established by field check. Then by using existing information stored in the computer, all building areas were calculated and the population laid down.

- Various alternative routes for the main transmission system (132-33-13.8 kV) were outlined on the screen of the CAD-system.

- The final proposal was then drawn by the computerised drawing machine at various scales showing more, or less detail.



Computer in operation

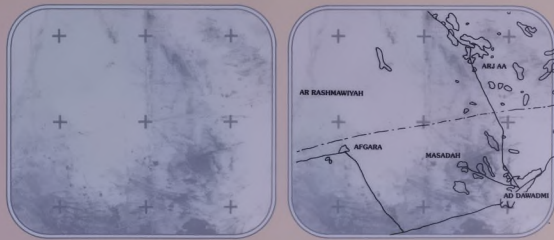
More and more details can be fed into the computer to build up a more exact model of the proposed construction.

Using the CAD-system reduces construction time, makes alternative layouts a matter of course and keeps all kinds of basic information together and available to all parties working on the project.

Computer-aided design is not merely a draughtsman's tool to speed up the production of drawings, but can be used to give a more complete picture of the

construction by taking account of investments and maintenance costs of alternative materials. This means that product and mass specifications are automatically available when needed, as are budgets for costs and maintenance.

The CAD-system is an invaluable asset for the project managers, enabling quick decisions to be made. It is however, a complex technique and the operators are professionally skilled technicians with personal experience in designing.



A satellite picture showing part of a survey area in Saudi Arabia.

From the satellite picture, information about roads, buildings and power distribution, etc. is interpreted into the CAD-system.



The computer calculates the density of population, related by the density of overprinting.

Alternative routes for the power distribution can be shown on the computer screen.

computer aided Design

Al-Bawardi Consulting Engineers were asked to organize the power supply for a sparsely built-up area of about 100,000 square kilometres in Saudi Arabia.

At the start of the project the major problem was the non-existence of cartographic material together with a very tight time schedule.

However, by using a CAD-system (Computer-Aided Design) the project was approached and completed as follows:

- Satellite pictures covering the area involved were interpreted into the CAD-system, and existing roads and buildings were digitised.

- The various satellite pictures were brought together into one continuous map via identifiable points in the overlapping areas.

- The density of population was established by field check. Then by using existing information stored in the computer, all building areas were calculated and the population laid down.

- Various alternative routes for the main transmission system (132-33-13.8 kV) were outlined on the screen of the CAD-system.

- The final proposal was then drawn by the computerised drawing machine at various scales showing more, or less detail.

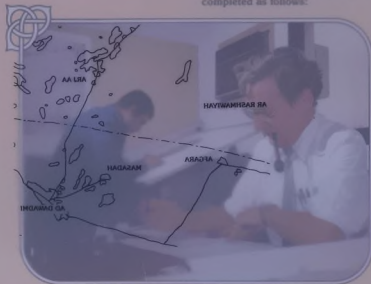
More and more details can be fed into the computer to build up a more exact model of the proposed construction.

Using the CAD-system reduces construction time, makes alternative layouts a matter of course and keeps all kinds of basic information together and available to all parties working on the project.

Computer-aided design is not merely a draughtsman's tool to speed up the production of drawings, but can be used to give a more complete picture of the

construction by taking account of investments and maintenance costs of alternative materials. This means that product and mass specifications are automatically available when needed, as are budgets for costs and maintenance.

The CAD-system is an invaluable asset for the project managers, enabling quick decisions to be made. It is however, a complex technique and the operators are professionally skilled technicians with personal experience in designing.



Computer in operation



A satellite picture showing part of a survey area in Saudi Arabia.



From the satellite picture, information about roads, buildings and power distribution, etc. is interpreted into the CAD-system.



The computer calculates the density of population, related by the density of overprinting.



Alternative routes for the power distribution can be shown on the computer screen.



Professional Services

Project Management

- establish objectives
- establish environmental requirements
- establish magnitude of capital investment
- establish financial feasibility
- investigate local resources
- investigate availability of materials
- investigate transportation
- investigate labor and services
- investigate taxes and laws
- investigate insurance
- propose plans and methods
- train Saudi employees in all facets of project
- propose equipment and material
- propose schedules

Construction Management

- interpret scope of project
- interpret compliance with regulations
- interpret site investigations
- define site plan and highlights
- define major equipment
- define structures
- establish timing
- establish manpower
- establish operating conditions
- establish profit and investment
- establish cash flow
- develop final documents for tender

professional services

conceptual planning:

- establish objectives
- establish environmental requirements
- establish magnitude of capital investment
- establish financial feasibility
- investigate sites
- investigate local resources
- investigate availability of materials
- investigate transportation
- investigate labour and services
- investigate taxes and laws
- investigate insurance
- propose plans and methods
- propose basis of design
- propose equipment and material
- propose schedules

project planning:

- interpret scope of project
- interpret compliance with instructions
- interpret site investigations
- define site plan
- define major equipment
- define structures
- establish timing
- establish manpower
- establish operating costs
- establish profit and investment
- establish cash flow
- develop final key documents for tender

project management:

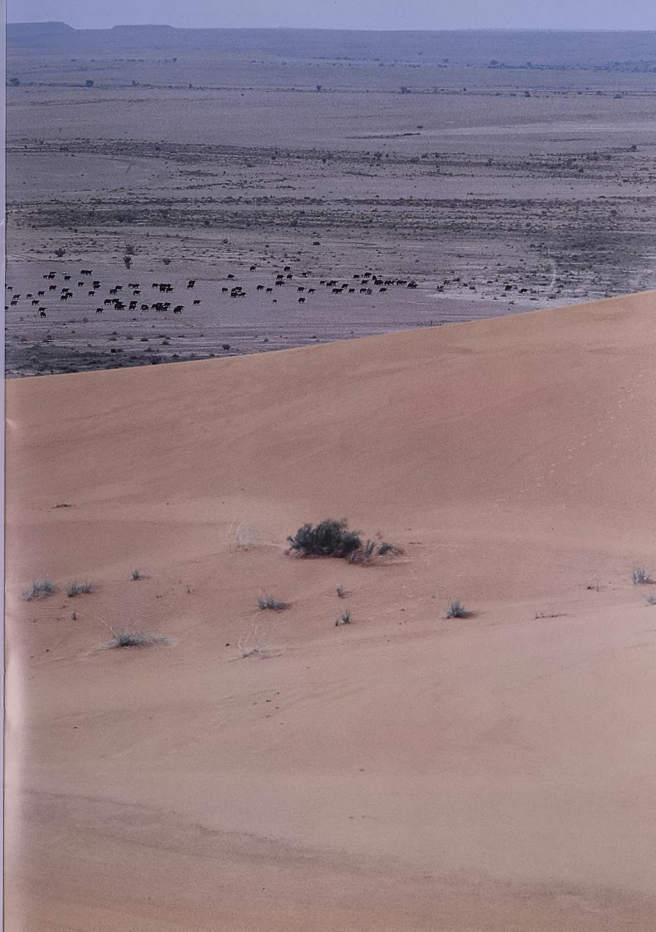
- establish administrative procedures
- establish responsibilities
- establish organisation
- establish lines of communications between client/engineer/suppliers/field forces
- develop estimates
- develop budget
- develop control system
- schedule engineering
- schedule procurement
- schedule construction

construction management:

- plan job site services
- interpret drawings and specifications
- report field activities to client
- co ordinate engineering field forces
- co ordinate subcontracts
- co ordinate receipt of furnished materials and equipment
- monitor progress
- monitor performance
- monitor quality
- monitor costs
- schedule operations
- train Saudi engineers in all facets of construction management

professional services

- project management**
- establish administrative procedures
 - establish responsibility
 - establish organization
 - establish lines of authority and communications between client, engineer, supplier/forces
 - develop estimates
 - develop budget
 - develop control system
 - schedule engineering activities
 - schedule procurement
 - schedule construction
- contract administration**
- plan job site activities
 - establish drawings and specifications
 - report field activities to client
 - coordinate engineering field forces
 - coordinate subcontractors
 - coordinate receipt of materials and equipment
 - monitor progress
 - monitor performance
 - monitor quality
 - monitor cost
 - schedule operations
 - train 2nd engineers in all facets of construction management



project list

PROJECT NAME	CLIENT	PROJECT CHARACTERISTICS
Samtah Electrification Project	GEC	Complete development of a rural electrification project for the Samtah and Al-Tawal Emirates for 30 villages.
Wadi Al-Dawaseer Central Electrification Project	SCECO (C)	Complete development of a rural electrification project, including bringing a partly-developed power station back onto the planned schedule.
Assir Power Station and Desalination Plant, Phase 1 & 2	SWCC	Design and construction management for one 25 MGD desalination and Power Plant in association with Electrowatt Engineering Services Ltd. The load demand and water demand studies as well as 40% of construction management.
Al-Jubail Desalination Plant, Phase 2	SWCC	Sponsorship of the design, project management and construction of one 175 MGD desalination and 1150 MW Power Plant for Catalytic, USA
Master Electrification Plan for the Sudair, Al Washim and Ad Dawadmi Areas	SCECO (C)	Complete development of a rural electrification project with plans for interconnection to the National EHV Grid System.
Project Maps Development	SCECO (C)	Development of accurate maps for an initial area of 50,000 sq. km. to the scale of 1:125,000 and 1:50,000 by a fully computerised CAD-system based on satellite photographs.
Tihama Central Electrification Project	SCECO (S)	Evaluation of construction tenders part redesign and complete project construction management on a rural electrification project on the coastal plains of Tihama. The project comprises 132-33-13.8 kV OHL and GT generation facilities in excess of 300 MW.
Tarabah Electrification Project	EWR	Complete development of a rural electrification project and construction management.
Al Wejdh Electrification Project	EWR	Feasibility study, load forecast frequency conversion and cost estimates.
Al Kharj Load and System Survey	SCECO (C)	Computer-aided load development study based on micro area load forecast for Al Kharj city, and extensive survey of the farms and villages in an area of 36,800 sq. km.
Bahrain MSF Desalination Project	SWCC	Development of the basic design criteria, detailed design and tender documentation for the construction and establishment of a 10 MGD desalination plant based on the multistage evaporation principle. This includes precontract engineering activities such as tender evaluation and award of contract.



project list

PROJECT NAME	CLIENT	PROJECT CHARACTERISTICS
Samtah Electrification Project	GEC	Complete development of the Samtah area for the Samtah and Al-Hudaybiyah projects, including design, construction, testing and commissioning of the power station and the distribution network.
Wadi Al-Dawaseer Central Electrification Project	SCECO (C)	Complete development of the Wadi Al-Dawaseer area, including design, construction, testing and commissioning of the power station and the distribution network.
Assir Power Station and Desalination Plant, Phase 1 & 2	SWCC	Design and construction management for the 100 MW Assir power station and the 100 MGD desalination plant. Phase 1 includes the power station, desalination plant, and associated infrastructure. Phase 2 includes the power station, desalination plant, and associated infrastructure.
Al-Jubail Desalination Plant, Phase 2	SWCC	Design and construction management for the 100 MGD Al-Jubail desalination plant. Phase 2 includes the power station, desalination plant, and associated infrastructure.
Master Electrification Plan for the Sudair, Al Washim and Ad Dawadmi Areas	SCECO (C)	Design and construction management for the master electrification plan for the Sudair, Al Washim and Ad Dawadmi areas, including design, construction, testing and commissioning of the power station and the distribution network.
Project Maps Development	SCECO (C)	Development of project maps for the Wadi Al-Dawaseer area, including design, construction, testing and commissioning of the power station and the distribution network.
Tihama Central Electrification Project	SCECO (S)	Evaluation of existing and proposed electrification projects in the Tihama area, including design, construction, testing and commissioning of the power station and the distribution network.
Tarabah Electrification Project	EWR	Complete development of the Tarabah area, including design, construction, testing and commissioning of the power station and the distribution network.
Al Wejdh Electrification Project	EWR	Complete development of the Al Wejdh area, including design, construction, testing and commissioning of the power station and the distribution network.
Al Kharj Load and System Survey	SCECO (C)	Complete load and system survey of the Al Kharj area, including design, construction, testing and commissioning of the power station and the distribution network.
Bahrain MSF Desalination Project	SWCC	Development of the base design, construction design and tender documentation for the Bahrain MSF desalination plant, including design, construction, testing and commissioning of the power station and the distribution network.



ad dawadmi, sudair & al washim area electrification project

The Saudi Consolidated Electric Company for the Central Region, as part of their ambitious programme of total electrification, asked *Al-Bawardi Consulting Engineers* to develop a 10 year master plan for the Ad Dawadmi, Sudair and Al Washim areas.

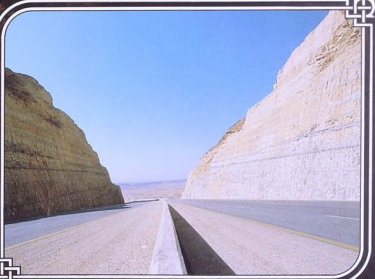
The contract applies to an area of over 50,000 sq. km, containing 375 villages and a present-day population of around 335,000.

The work involves an extensive survey of the region, detailed design of the system, preparation of tender documentation and tender evaluation.

The detailed designs already made and the tender documents prepared envisage in the first phase 463 km of 132 kV lines, 8 substations 132/33 kV, 1900 km of 33 kV subtransmission and distribution lines and 39 substations 33/13.8 kV. Generation installations, each of 100 MW capacity, will be constructed at Ad Dawadmi and Shaqra

An interconnected system is planned linking Ad Dawadmi, Shaqra and Al-Qoseim to ensure a secure power supply in case of faults at any power station or transmission line, and to assure total system economy.

Another important consideration built into the design, is the proposed interconnection with the extra high voltage (EHV) system planned to be introduced into the region by 1986. Following this the local generating capacity, apart from being utilised for peak power generation and for standby purposes, would also serve towards system stability.



tihama electrification project

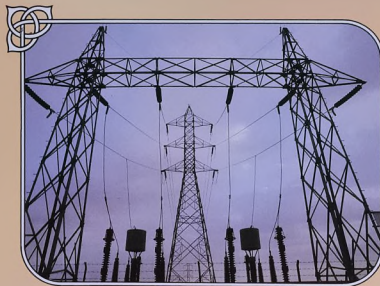
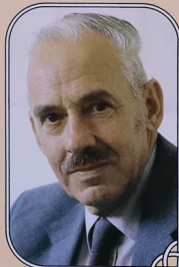
For the Saudi Consolidated Electric Company (SCECO) for the Southern Region, *Al-Bawardy Consulting Engineers* are currently executing the pre-contract engineering consultancy and construction management contract for the Tihama Electrification Project.

This mammoth SR4 billion project consists of a 250 MW power station at Qunfudah, 800 km of 132 kV single circuit transmission lines, 13 substations of 132/33 kV, 800 km of 33 kV distribution lines, 2000 distribution transformers ranging from 40 kVA to 500 kVA and 200,000 consumer service connections. The electrification programme covers a 30,000 square kilometre area of Tihama and will serve a population of around 350,000.

Al-Bawardy's consultancy work includes pre-contract services, tender evaluation, negotiation and construction supervision and management.

The SR 32 million contract awarded to *Al-Bawardy Consulting Engineers* is already under way, with a large team of international experts centred at our regional office at Abha.

The work involves a complex amount of scheduling, planning, supervision and quality control of the work of a number of internationally-renowned contractors, towards the successful completion of the project in 42 months.



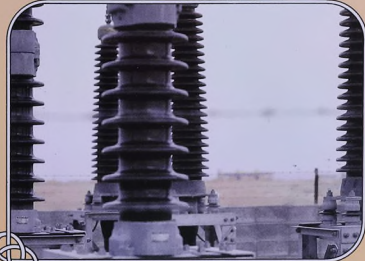
▲
132 kV substation

▶ Project site

◀ Project office

▶ Joe Ekbery, Abha project manager

132 kV substation switchgear





Al-Bawardy Consulting Engineers
Riyadh · P.O. Box 8080 · Kingdom of Saudi Arabia
Licence 240 · Tel. 4782355 · Telex 200448 BWARDY SJ