

ITT FEC NEWS

Published by the Public Relations Department of:
FEDERAL ELECTRIC CORPORATION
A UNIT OF ITT
TELECOMMUNICATIONS CORPORATION

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Paramus, NJ 07652

Saudi LORAN Program Enters O&M Phase

In Saudi Arabia, the Long Range Hyperbolic Radio Navigation System (Loran C) has achieved yet another milestone, marking the completion of the design, construction and installation portion of the contract. Project Director E.J."BOOTS" Rainwater has been given the go ahead by the customer, the Saudi Ports Authority (SPA), to begin the two year operation and maintenance phase.

The initial Loran contract was signed with the SPA in 1981 for \$95 million. Since that time, expansion of the area of coverage, relocation of the master control station, and other modifications have increased the contract value to \$137 million the largest turnkey effort to date in FEC's history. The Saudi Arabian Loran C system is the largest single such network in the world. It employs the most advanced state of the art equipment and covers all of the Arabian Gulf, the Straits of Hormuz, the upper Arabian Sea, the Gulf of Aden, the Red Sea and the Gulf of Aquaba, an area equivalent to the entire United States west of the Mississippi River. The system enables Loran C receiver equipped vessels to continuously fix their positions within an accuracy of 200 meters.

Station Facilities

The network is comprised of ten stations, seven transmitter sites and three monitor sites. Six of the transmitter sites provide living accommodations for personnel, as well as operations buildings, a prime electrical generating plant and support facilities. The seventh transmitting site serves as a master control station and includes a separate building for systems maintenance, a transmitter building, miscellaneous support facilities and expanding living quarters. All transmitting sites are completely self supporting and are topped by a 720 foot antenna which radiates from 200,000 to 1.4 million watts of power. The three unmanned monitor stations are also equipped with prime electric power generating plants.

FEC's contract included the engineering, furnishing and installation of separate communication systems to connect each of the ten sites to the Saudi Arabian PTT Communication System. The voice and data network for the control of the Loran C system is comprised of these ten systems, plus the Ptt nationwide system.

Another first for FEC was the decision to perform civil works totally "in house" rather than by subcontractors.

This single manager concept provided superior flexibility and cost control during the construction and implement stages.

Construction and Installation

The Loran C turnkey effort was carried out by an international workforce representing the nations of Bangladesh, Egypt, Ethiopia, Germany, India, Pakistan, the Philippines, Somali Republic, the United States, the United Kingdom, Yeman Arab Republic and Sudan. Maximum use of the local Saudi Arabian technicians was made at all times.

Construction and installation were conducted under some of the most challenging environmental conditions found anywhere in the world. Sandstorms rivaling blizzard white out conditions were a daily occurrence in some areas, as were temperatures exceeding 120degF. Total life support systems, including food and drinking water, had to trucked hundreds of miles to remote locations. Temporary living quarters and support facilities had to be built before site construction could begin.

The site are located in a triangle of 2,000 kilometers (1,200 miles) on each side. One of the transmitter stations was situated in the geographic center of the triangle.

In Jeddah, John Bryson's Logistics Department, supervised by Mike Urias in the office and Lonnie Mobley in the warehouse, dispatched more than 1,200 truck loads to the sites during the construction phase.

Additionally, approximately 1.5 million miles were logged over the new road system, much of which is still under development. Mobley was responsible for over 3,000 separate line items which were constantly flowing through the warehouse.

Hank Del Bianco managed the Construction Department, a workforce of some 150 craftsmen, supervisors and engineers, who operated simultaneously on as many as five sites in differernt phases of construction, moving into areas as their particular skills were called for.

Site Managers Bob Hunter and Ed Thaller organized the specialty crews to assure compliance to design specifications developed by the Paramus Engineering Department and also handled the day to day life support problems. Construction Superintendent Ed Beard provided interface between field operations and the Jeddah project office to accelerate and maintain the schedule for timely completion.

Equipment and Materials

The enormity of the project is reflected in a brief glimpse at some of the staggering statistics: Over 150 tons of steel reinforcing bar for foundation work; 8,000 cubic meters of poured concrete; 60,000 bags of cement and 245 kilometers (147 miles) of radial wire.

Materials in large quantity that would meet specifications kept Joe Dibrell's Purchasing and Contracts Department scouring all three of the main Saudi market centers of Jeddah, Riyadh, and Damman, where most of he purchasing was done. The task was complicated by occasionally having to substitute, mix and match products manufactured in the United States, Europe, The Middle East and Far East. Considerable support was also provided by the Paramus Purchasing Department.

Implementation Manage Paul Herrmann and Installation Manager Moe Alleman shared responsibility for meeting beneficial occupancy dates. Under their direction, the (installation) construction crews installed 146 tons of Transmitter and Monitor equipment which formed the "heart" of the system. Additionally, they terminated an estimated 17 miles of control and signal cabling and logged more than 125,000 miles of travel in the process. The quality of the

construction effort was proven in the few problems encountered during the final system testing.

Herrmann's department, with supervisors such as John Allen and Larry Oliszewski, performed one of the most outstanding checkout and certification job's in FEC's history. "This quality and production oriented group had virtually no rework" commented Mr. Rainwater, " and it all met the specs the first time!"

The successful completion of the turnkey program effort is attributable to the entire in country team.....

The Next Step

The two year operation and maintenance phase will continue to be a challenge for the estimated 90 plus site and support personnel scheduled to remain in Saudi Arabia. To meet the overall operations standards, all transmitters must maintain a 99.8% reliability rate, which translates into only about eight minutes of "down time" per transmitter, per month.

Retired Coast Guard Commander William Jones is the mainspring of the technical operation of the system.

Later in the program, site personnel will conduct an operation and maintenance training program for Saudi Arabian personnel. The contract, under FEC Vice President John Bruno, currently extends through July of 1986.