

**SEPAC PRODUCTS  
LINE**

1.- *Local Monitoring Systems*

2.- *Supervisory Control and  
Data Acquisition Systems  
(SCADA's)*

3.- *Integral Systems for  
Substation Automation*

4.- *Integral Systems for  
Power Plant Automation*

5.- *Protection, Control  
And Metering Panels*

6.- *Excitation Systems for  
Synchronous Machines*

7.- *Operation / Engineering  
Consoles*

8.- *Rectifiers*

**SUBSTATION AUTOMATION SYSTEMS****SIMPAC T****SICLE PROJECT OVERVIEW  
Local Station Integrated Control System****Brief History**

In 1998, the Mexican Government issued a privatization initiative that will affect the Electrical Company of the country, CFE ( Comisión Federal de Electricidad ). This process will take several years and the politics around it have started some degree of protests. However it will happen over the next years. The first steps towards the privatization are already beginning on the Generation sector. Some opportunities for private investments are expected to be published soon.

CFE is currently on an ongoing effort to improve their operations as preparation for the coming changes. Based on these facts, CFE has been issuing new specifications for control systems in the three major sectors ( Generation, Transmission and Distribution ).

The SICLE specification is for Transmission Substations ranging from 220 to 400 kV. It is similar to a previous specification issued by the Distribution sector for their integrated control system. The SICLE specification is more demanding.

CFE published in 1998 an international call for bids on the SICLE specification. In its first stage it comprises 120 Transmission Substations, pertaining to the Transmission network of the country. It is important to mention that this stage covers the 3 most important cities in Mexico, which are Mexico City, Guadalajara and Monterrey. It also stretches out to the Yucatan Peninsula and other important cities. The second stage will take place in the near future and comprises substations that are currently under construction and future new substations.

SEPAC was proud to accept 66 out of the 120 substation systems, a solid 55 % of the project. Our competitors were awarded the rest in different percentages. Two American companies and a Spanish competitor got the rest of the project.

This has been the biggest single project ever done by CFE in Substation Automation. It was also the first time that the Factory Acceptance Tests were performed exhaustively involving the officers of Protection, Control, SCADA, Operations and Maintenance of the end-user areas within CFE.

**Development**

SEPAC had to submit a prototype model for testing and approval before the actual granting of the project. A system was constructed with all its parts and functions and delivered to laboratories of CFE for extensive physical and functional testing. After this step was taken, the first systems were built.

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The substations comprised in the project already had control and protection systems. The SICLE is replacing the legacy control RTUs and other components of the system. This means that protection and metering devices were already in place.

SEPAC personalized each system to the specific environment of the substation that it corresponded to. CFE provided information of each substation, including what relays were in place, what metering devices, how they wanted their alarms to display. etc.

Factory Acceptance Tests took a total of 160 days in 1999. It was the most extensive testing activity for SEPAC ever. The first systems took 6 weeks to test, and as we progressed, we were able to test 5 systems per week, by the end of the project. CFE personnel were actively involved during the tests, making sure that their equipment would perform 100 %.

### Current Status

By the end of 1999, SEPAC had delivered all 66 systems after FATs. By December 2000, 18 systems had been successfully commissioned by SEPAC and are currently in commercial operation; 18 more are operating in sub-master mode, soon to begin commercial operation as well. Actions are being developed by the users to commission the remaining systems within the next 3 months. SEPAC has given 2 training courses and will be conducting 2 more to fulfill its contractual responsibilities.

With the SEPAC participation in equipment commissioning and training of user engineers, CFE is now able to fully understand and comprehend the total operation of the equipment as well as acquire a high degree of expertise in the selected area of state-of-the-art technology.

The project has exceeded CFE's expectations, its software applications developed for engineering analysis and information management have proven superior functionality. The specific software for monitoring primary equipment and information exploitation from IEDs, comprises the advantages of the SEPAC system. Real time information presented in a friendly format allows users to plan and program operation and maintenance activities.

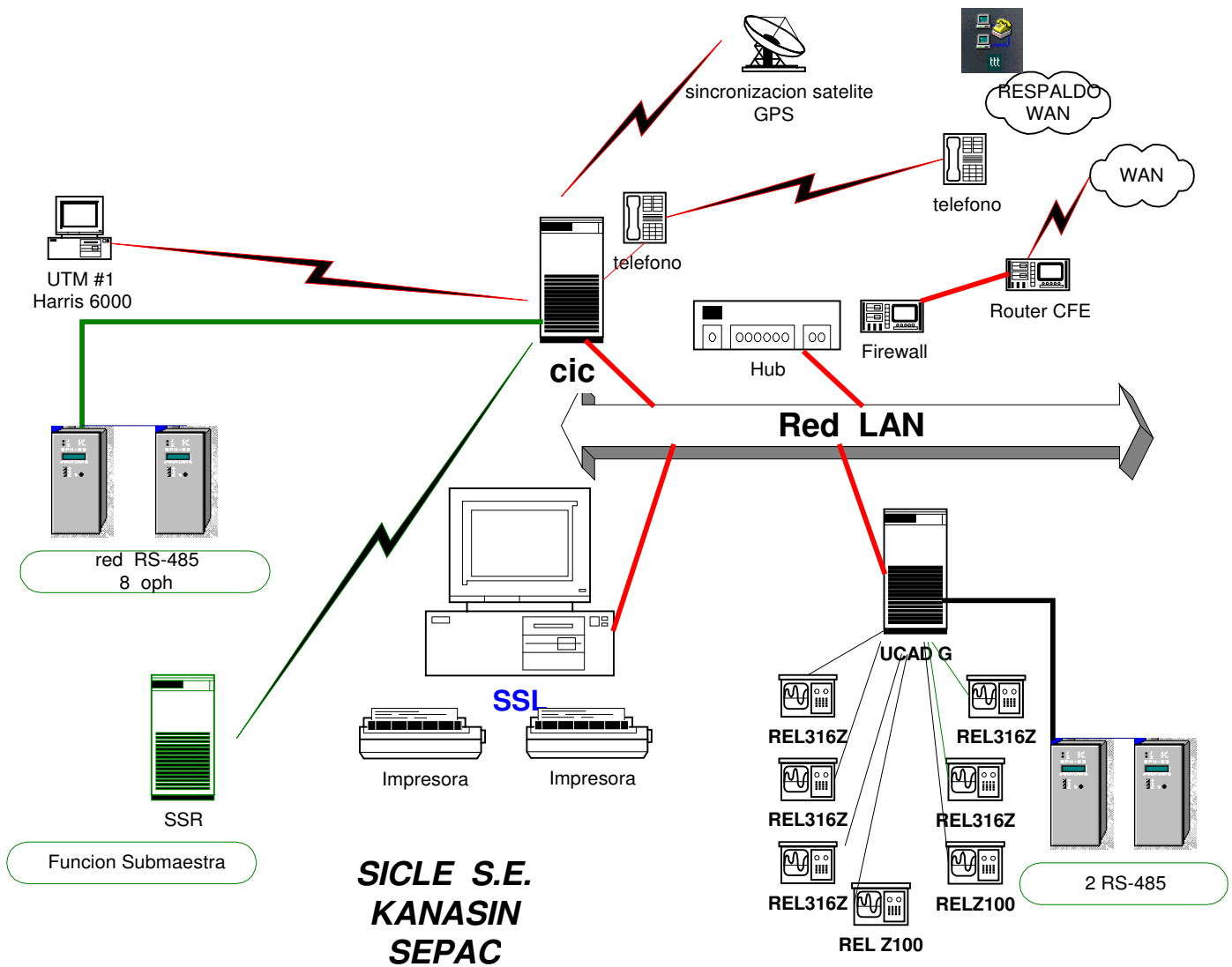
With the information provided by these systems, the user can focus, locally or through WAN, on operation efficiency, energy balance, predictive & preventive maintenance for breakers and transformers, engineering analysis, fault analysis, historic trends, etc., thus controlling and saving operation costs.

Because of all these advantages, CFE is considering further investment on a second stage of the project, complementing existing substations and automating new ones.

Diagrams of two of the working systems are attached.

December 2000

# Kanasin Substation



# Tepic II Substation

