

Project Title Feasibility Study and Technical Specifications for SCADA/EMS Upgrade and Backup Control Center (*Renovación Tecnológica del Actual Centro de Control de Energía y Desarrollo del Nuevo Centro de Control de Energía*) at ICE, Costa Rica

Contracting Agency Instituto Costarricense de Electricidad (ICE). Project execution and supervision under the responsibility of the Centro Nacional de Control de Energía (CENCE) with funding from the Inter-American Development Bank (IADB)

Project Organization Prime Contractor: Fichtner GmbH & Co. KG (Fichtner), Sarweystrasse 3, 70191 Stuttgart, Germany

Savu C. Savulescu from Energy Consulting International, Inc. was subcontracted by Fichtner as an Independent Consultant, with responsibility for *providing the full scope of technical services* except for project management, which was the only activity performed by Fichtner

Summary This project aimed at conducting a feasibility study, developing technical and procurement specifications, performing cost-benefit analysis and proposing a migration strategy as part of a major IADB funded undertaking that will eventually lead to the complete replacement of the existing SCADA/EMS facilities and the implementation of a primary-backup mirrored two-control center architecture. The entire range of technical consulting work was performed by Savu C. Savulescu (SCS) in capacity of sub-contractor to Fichtner and encompassed the: diagnostic of the current situation; analysis of computer architectures and operating systems; conceptual design and analysis of SCADA/EMS, power plant interfaces and RTU and Substation Automation System requirements; cost-benefit analysis; recommendations for the migration strategy; and the preparation of the bidding documents

Background The supervision and control facilities currently used at CENCE have been originally installed by Bailey Network Management (today known as ABB) in mid 1997. The system performed satisfactorily, was maintained on a continuous basis, and underwent several rounds of upgrades and improvements. However, the technological obsolescence caused by the discontinuation of Compaq's Alpha platform and Tru64 Unix operating system became unavoidable and determined CENCE to move forward and replace the existing system with a modern SCADA/EMS solution.

A further motivation in this process stems from the need to implement an emergency backup control center which, together with the main system, would make it possible to operate, control and supervise the power system of Costa Rica without interruption and regardless of circumstances, including the worst case scenarios.

The project aimed at developing the Feasibility Study and Technical Specifications for SCADA/EMS Upgrade and Backup Control Center (*Renovación Tecnológica del Actual Centro de Control de Energía y Desarrollo del Nuevo Centro de Control de Energía*) which described in this

data sheet represented the first phase in this long-term process, has been concluded in January 2009, and is currently being continued in a follow-up project¹.

Objectives

- Perform a diagnostic of the current situation for the purpose of: determining whether the performance and functionality of the existing SCADA/EMS facilities are sufficient to cope with the future; evaluating the impact of the technological obsolescence of Compaq Alpha and Tru64; assessing the interoperability attributes of the communications protocols currently deployed at CENCE; and evaluating the ability of the existing facilities to exchange data with the Regional Operator in central America (EOR)
- Conduct an analysis of contemporary computer architectures and operating systems and come up with an educated guess regarding the future developments in the IT industry
- Develop the conceptual design of an integrated main-backup mirrored architecture that would incorporate the new Control Center and would accommodate the existing SCADA/EMS facilities as well, including: system architecture; functional requirements; personnel and training requirements; and cyber security requirements
- Perform a cost-benefit analysis and identify the most beneficial strategy to reach CENCE's stated goals

Scope of Work

- Task 1: Diagnostic of the Current Situation, which also included a mini-workshop, conducted in San Jose in conjunction with the kick-off meeting, about computer architectures and current trends in the IT industry as well as their impact on SCADA/EMS solutions, and the preparation of a detailed Diagnostic Report
- Task 2: Conceptual Design and Analysis of Requirements, which also encompassed the preparation of a detailed report
- Task 3: Cost-Benefit Analysis, which was conducted by using the SCS-proprietary methodology developed, and used, by SCS in conjunction with his earlier SCADA/EMS projects in Central America, Bosnia and Herzegovina, and Vietnam; the cost evaluation and projection spreadsheets were attached to the Task 3 Report
- Task 4: Preparation of Technical Specifications, which will form the basis for the project described in reference¹

Period of Performance

June 2008 – January 2009

¹ The subsequent phase of this major effort is documented in the project data sheet *Assistance with the Design, Commissioning and Installation of the Primary-Backup SCADA/EMS Solution (Servicios para la Asesoría Proceso de Contratación de Diseño y Equipamiento SCADA/EMS) at ICE, Costa Rica*