Chapter 2.2
End-User System Development:
Lessons from a Case Study of IT Usage in an Engineering Organization

Murray E. Jennex
San Diego State University, USA

EXECUTIVE SUMMARY

How much end-user computing is too much? Should end users develop systems? This case looks at a study of end user computing within the engineering organizations of an electric utility undergoing deregulation. The case was initiated when management perceived that too much engineering time was spent doing IS functions. The case found that there was significant effort being expended on system development, support, and ad hoc use. Reviews of a few key systems illustrate quality problems found with the end-user developed systems. Several issues were identified affecting system development including use of programming standards, documentation, infrastructure integration, and system support. Additionally, the issues of obsolescence, security, and procurement are discussed.

ORGANIZATIONAL BACKGROUND

This case looks at end user computing (EUC) in an engineering organization. End users are non-IS professionals who use computers and EUC are those computer activities end users perform (Edberg & Bowman, 1996). Alavi and Weiss (1986) describe EUC as a rapidly growing and irreversible trend. But how much EUC should organizations allow, what kinds of activities should end users do, and how should organizations manage EUC?

The subject engineering organization is part of a large, United States based, investor owned utility. The utility is over 100 years old, has a service area of over 50,000 square miles, provides electricity to over 11 million people via 4.3 million residential and business accounts, and had operating revenues of approximately $8.7 billion in 2002. Utility net revenue has fluctuated wildly the last few years with a $2.1 billion loss in 2000, $2.4 billion in earnings in 2001 (primarily due to one-time benefits from restructuring and other

initiatives), and decreasing to $1.2 billion in earnings in 2002. To service its customers, the utility operates a transmission and distribution system and several large electrical generation plants and is organized into three main line divisions: Transmission and Distribution; Power Generation; and Customer Service. Divisions such as Human Resources, Security, and Information Technology (IT) support the line divisions. The utility has approximately 12,500 employees.

The power generation division is organized into operating units dedicated to supporting specific power generation sites. Each operating unit has line organizations such as Operations, Maintenance, Engineering, and Chemistry/Health Physics. Power generation operating units are supported by dedicated units from the corporate support divisions (security, human resources, IT). The engineering organization used for this case study is part of the nuclear operating unit of the power generation division and is located at the largest electrical generation site operated by the utility. IT support is provided to this operating unit by Nuclear Information Systems (NIS) which administratively is part of the corporate IT division and which operationally reports to both corporate IT and the nuclear unit of the power generation division. NIS supported engineering through its Engineering Support Systems group. This group consisted of a supervisor, two project manager/analysts, and two developers. This group was tasked with the maintenance of the 11 systems under NIS control. New systems or enhancements to existing systems were done at the instigation of engineering. Engineering through a charge-back process paid costs associated with these projects and developers were hired as needed to support the work.

At the time of the study the engineering organization consisted of approximately 460 engineers disbursed among several different engineering groups reporting to the Station Technical, Nuclear Design Organization, Nuclear Oversight, and Procurement management structures. Industry restructuring was causing large drops in revenues that was driving the nuclear unit to reorganize engineering into a single organization consisting of 330 engineers under the management of the Nuclear Design Organization.

SETTING THE STAGE

Between May 2000 and June 2001, the cost of unregulated wholesale power rose above revenues collected via rates that were frozen in 1998, and the utility was not allowed by the regulators to pass these excess costs through to its customers. As a result, the utility incurred $4.7 billion (pre-tax) in write-offs related to under-collected costs and generation-related regulatory assets through August 31, 2001. The net impact of these under-collected costs was a net loss of $2.1 billion by the utility in 2000. This put the utility into a crisis situation with the result that all divisions were asked to freeze hiring and restructure to reduce costs.

The power generation division had its groups assess their work to determine what had to be done and what could be dropped or deferred. The nuclear division decided the existing engineering organizations were inefficient and could be consolidated under one management structure. This review determined that staffing should be lowered by approximately 25%. An engineering change management team was formed for identifying where and how work effort could be reduced. During this process, it was noticed that the engineering organizations were spending significant amounts of time and effort on information technology (IT) related tasks. Computer use in all groups/sub-groups included use of the site work process systems and the basic software such as e-mail, WordPerfect, and QuatroPro (all considered standard end user computing per Benjamin (1982)); plus, whatever other software/hardware was deemed necessary to accomplish their mission. This other software