Deliberate and Emergent Changes on a Way Toward Electronic Document Management

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A unit of Fortum Service Ltd. operates and maintains the Rauhalahti power plant in Central Finland. In 1996-97, the unit launched a project pursuing coordinated organization-wide electronic document management (EDM). The case follows deliberate and emergent changes related to document management in the organization since the initiation of the project until February 2000. New information technologies were adopted, and responsibilities for continuous improvement of EDM were assigned. The continuous improvement was implemented as an extension of the ISO 9002 quality system earlier adopted for process improvement. The case shows that a shift from the paper-based era towards organization-wide EDM is a comprehensive change both affecting and affected by several components in the organization. EDM development in the organization was part of organization recursive dynamics where the quality system supported both planning for deliberate changes and reacting to emergent changes.

BACKGROUND

The Rauhalahti power plant in Jyväskylä, Central Finland, is the chief supplier of district heat (140 MW, 1996) for an area of some 80 000 people. This middle-sized, peat-, wood-, and coal-fired plant also produces steam (65 MW, 1996) for local paper industry and electricity (87 MW, 1996) for the grid. The plant started energy production in 1985. A unit of Fortum Service Ltd. (IVO Generation Services Ltd. until 1998) operates and maintains the plant with c. 80 employees. The unit, our target organization, also remotely operates and maintains several small-scale power and heating plants in the area. In total, the unit looks after 755 MW power generating capacity (Virkkunen, 2000). Local energy

suppliers and other industrial companies own the capacity of Rauhalahti and the other plants operated by the target unit.

A middle-sized power plant is an immense and complex construction that includes several interrelated technological components, for instance, varying mechanical machinery, physical and chemical processes, automation, and electrical systems. The routine operations of the Rauhalahti plant (as well as the small-scale plants in the area) can be remotely controlled from one control room where tens of monitors show the status of numerous automated processes: for receiving fuel, changing it into energy, supplying heated water and steam to regional pipe systems and electricity to the grid, etc. The routine maintenance processes, rare (but still possible) technical breakdowns, and yearly revisions of the equipment, however, require working also in several stations physically located around the plant(s) in separate buildings and floors. In addition to the technical operation and maintenance processes, several administrative and managerial activities are naturally needed in running the plant.

A great amount and different kinds of documents play a crucial role in the technical and administrative processes of the target organization, as in contemporary organizations in general. Since the plant started 1985, numerous advances in information technology (IT) related to documents and document management have occurred, as well as changes in the business environment and organization structures of our target organization. Hence the case represents an interesting opportunity for investigating the shift from the paper-based era towards organization-wide electronic document management (EDM) from several viewpoints.

For this case description, we collected data from multiple sources between January 1996 and February 2000:

- two researchers' participant observation for five months between January and May 1996 in a development project, which was launched as the first step towards coordinated improvement of EDM,
- documented material describing the target organization and its document management (e.g. Aro, 1993; Repo, 1996; Rauhalahti 1,2, & 3),
- several discussions and 19 structured interviews (aiming at a requirements definition for an EDM system) during the development project with the employees representing different work roles in the organization, and
- two follow-up interviews with the representatives of management, document management, and IT development in June 1997 and February 2000.

SETTING THE STAGE

Document Management in the Organization

At the turn of the 1990s, document management had not been generally identified as carrying great importance in the organization. Documents were archived in paper and other non-digital forms, although a great number of them already was produced by computerized office applications. A separate IT intermediary was responsible for acquiring and updating IT applications according to occasional needs of the employees. No coordinated cooperation existed between document management and the management of IT applications. The attitude towards document management among the personnel, including the management, was described as follows (translated from Finnish by the authors, like the subsequent quotations):

"As long as our plant is running and producing energy everything else [e.g.,