AEDIS IN POWER UTILITIES AND PLANT MANAGEMENT
TOKYO ELECTRIC POWER COMPANY (TEPCO)

Designing, operating, and constructing nineteen nuclear power stations and other water and thermal electric generation facilities are monstrous tasks. Add to that the increasing user demands for 120% more energy over the next 10 years and you have the need for an extremely robust, flexible and reliable information management solution. Toden Software Inc. (TSI) spent two years searching for to find a system powerful enough to support its information management needs. It was searching for an enterprise-wide solution that would provide immediate and future support. AEDIS was chosen as technology for the core infrastructure of the information management solution TSI is the information management division of Tokyo Electric Power Company, Inc. (TEPCO), one of nine Japanese electric utilities founded on May 1, 1951 and the world's largest privately operated electric power company. TEPCO supplies nearly one-third of Japan's total electricity requirements. Currently, the company is supplying about 250 Billion KWh of electric energy annually to more than 24 million customers in its 39,000 sq. km service area. This includes Tokyo, Japan's capital and political, economic and cultural center. The company's mission is to furnish these customers with a stable and economical supply of clean, electric energy well into the 21st century. More power plants must be built as well as expansion of existing power transmission and distribution facilities.

Through supporting the design, construction and operation of TEPCO's power plants and facilities, AEDIS contributes in preserving basic resources, efficiently and effectively managing information and protecting the environment. This helps in maintaining steady supplies of energy at reasonable cost to customers.

TSI has implemented AEDIS technology in a number of subsidiaries of TEPCO - Nuclear Construction Department, Telecommunications Company, Hydro Electric Power Station Construction Department and others (Figure 6 and 7).

TEPCO/TSI are also used AEDIS in connection with the Japanese Ministry of Trade and Industry (MITI) as part of the pilot project for Nippon Computer Aided Logistics Support (CALS).

Problem Scenario

The Japanese nuclear power utilities had large conglomerates of diverse and widespread departments all needing to communicate and exchange information. The utilities had information that had duplicate copies of information, data that was out of date and that existed in multiple, widely separated locations. Their existing Information sources were largely paper-based with massive paper storage areas and very slow retrieval times. Further, electronic information sources were from different vendors and were in a variety of formats. For example, a user requiring a view of a particular object had to go to the retrieval source center and submit a request for the necessary documents. The "librarian" would then submit the request to the appropriate department or access point for physical retrieval. The department personnel would then access the electronic or hardcopy themselves, make a copy and send it back to the retrieval source center. This process was unreliable, time-consuming and tedious (Figure 3.).

Enterprise Integration

ILT's Agile Electronic Distributed Information Solution (AEDIS) was used to create the first ISO standard modularized electronic document imaging system for the Tokyo Electric Power Company (TEPCO). TEPCO now uses an extensive and complex enterprise-wide AEDIS system. In particular, three levels of core AEDIS modules were deployed: a first level at a single computing headquarters, a second level at 17 branch offices and a third level at 50 local offices. The AEDIS solution alleviated TEPCO's potentially crippling logistics problems by reconfiguring its data. This reconfiguration occurred when the files, regardless of their format, were imported into the AEDIS system (Figure 4 and 5.).

TEPCO's construction department built a hydroelectric plant that uses a dam for generating electricity (Figure 6). The design department uses AutoCAD to generate the drawings (Figure 1). They are plotted and converted to raster images then stored and revised using the AEDIS system. This provides common access on all computer platforms. Secure access is given to engineers and managers of other departments for remote view and markup. The system operates over a Wide Area Network (WAN) and supports users on the Internet World Wide Web through an AEDIS browser interface. Color pictures are inputted from digital cameras to a Macintosh computer. They are then indexed and imported into AEDIS. These are historical data on how the construction is progressing. Workflow for drawing creation and review happens before any data is recorded in the AEDIS archival system.

A set of AEDIS servers manages each utility site and the AEDIS user interface or desktop has inter-site access through a Wide Area Network (WAN). Policies were set up for security purposes by user, group, application, object, or task and are provided from within the Docudex server. The critical problem resolution capabilities are found in the AEDIS DOCUDEX™ (DX™) module, which is the distributed database information manager. It is the "Intelligent Hub" of the system.

The DOCUDEX module of the AEDIS system is a database gateway for other AEDIS modules and can regulate relationships within a tree of databases and archives located on a variety of workstations, mainframes and other hardware. It works in tandem with the DOCUDEX user interface manager (DXIM™) and other AEDIS modules to provide a wide variety of data and work flow management schemes. The Computer Center has a DOCUDEX module, and also manages the central AEDIS Archive File Server™ and AEDIS Cache Management Server™. It supports AEDIS clients and allows special access from subcontractor clients who are authorized to perform search operations and, if necessary, work flow.

The Branch Offices have DOCUDEX modules and manage the Branch Archive File Server and Branch Cache Manager. It also supports local clients. The Local Offices must search at the Branch DOCUDEX and retrieve data to be deposited locally. When a local office performs a search at the Branch DOCUDEX, it checks there to determine where the search query should be fulfilled. Then, from a table that maps the index to a target, the DOCUDEX search can be directed to another Branch Office Host or to the Computer Center if needed. The search is performed at the targeted host, and the result is returned to the user. In this way a single DOCUDEX unifies the data via a wide area interconnection that is completely transparent to the user.

This application of AEDIS shows the practical capabilities of the system to support information within a corporate Intranet. In addition remote client services are provided through the AEDIS Webserver™ module that allows Netscape, Mosaic and other browsers a secure access.

Figure 1.

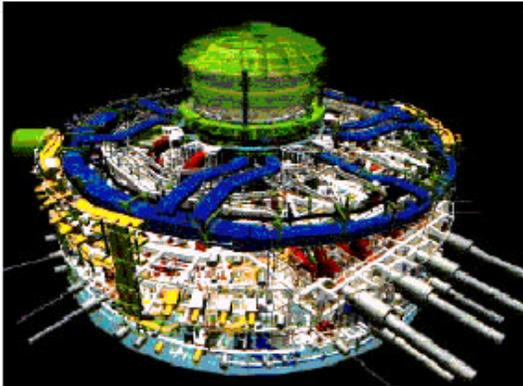Toshiba's 3D Computer Aided Design (CAD) models.

Figure 2.

TEPCO's Kashiwazaki-Kariwa Nuclear Power Station under Construction.
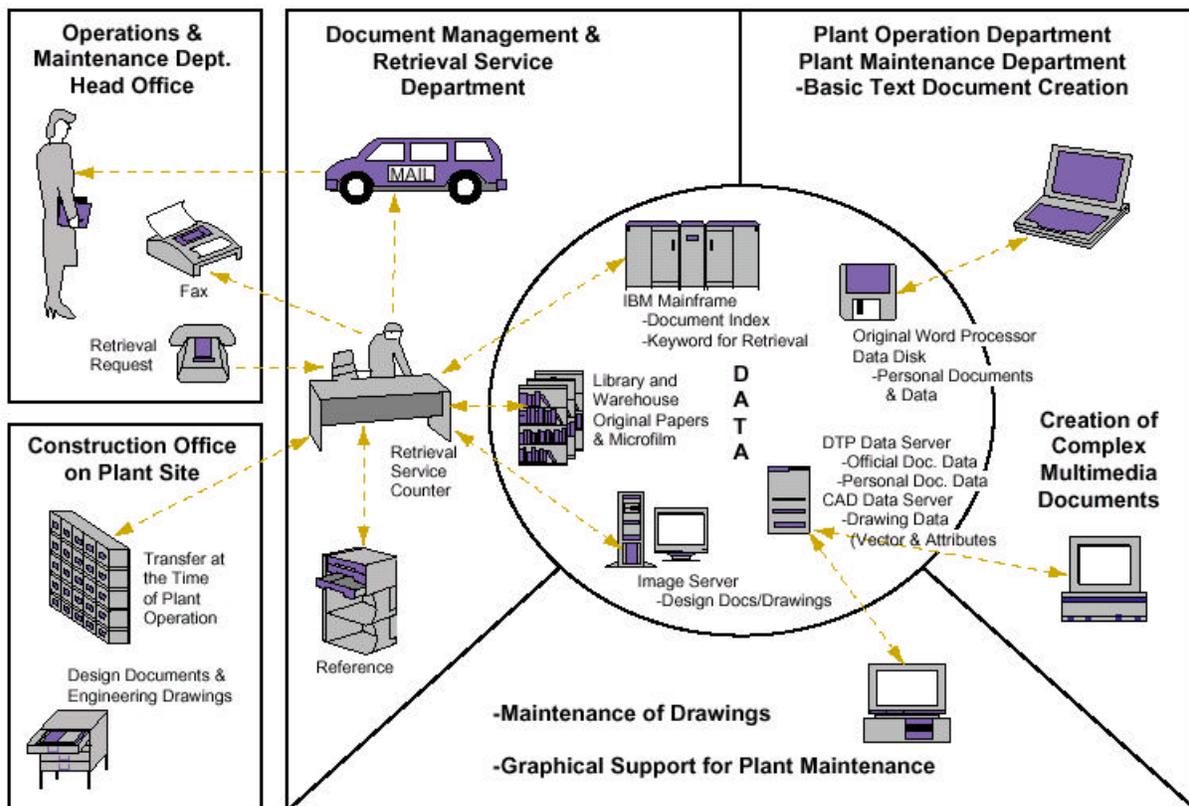

Figure 3. TEPCO Data Management Issues

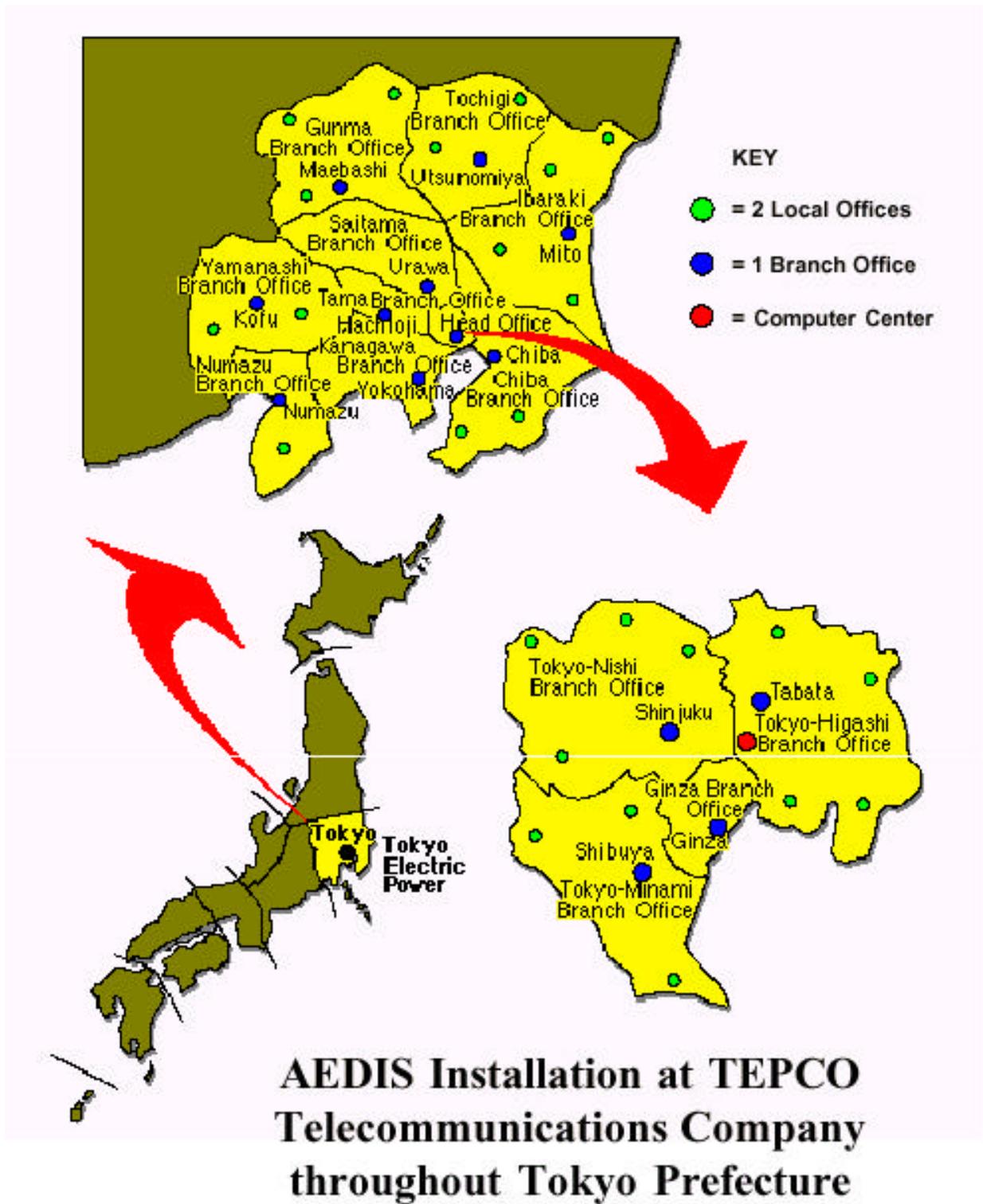Figure 4. TEPCO Branch and Office Locations

AEDIS Installation at TEPCO
Telecommunications Company
throughout Tokyo Prefecture
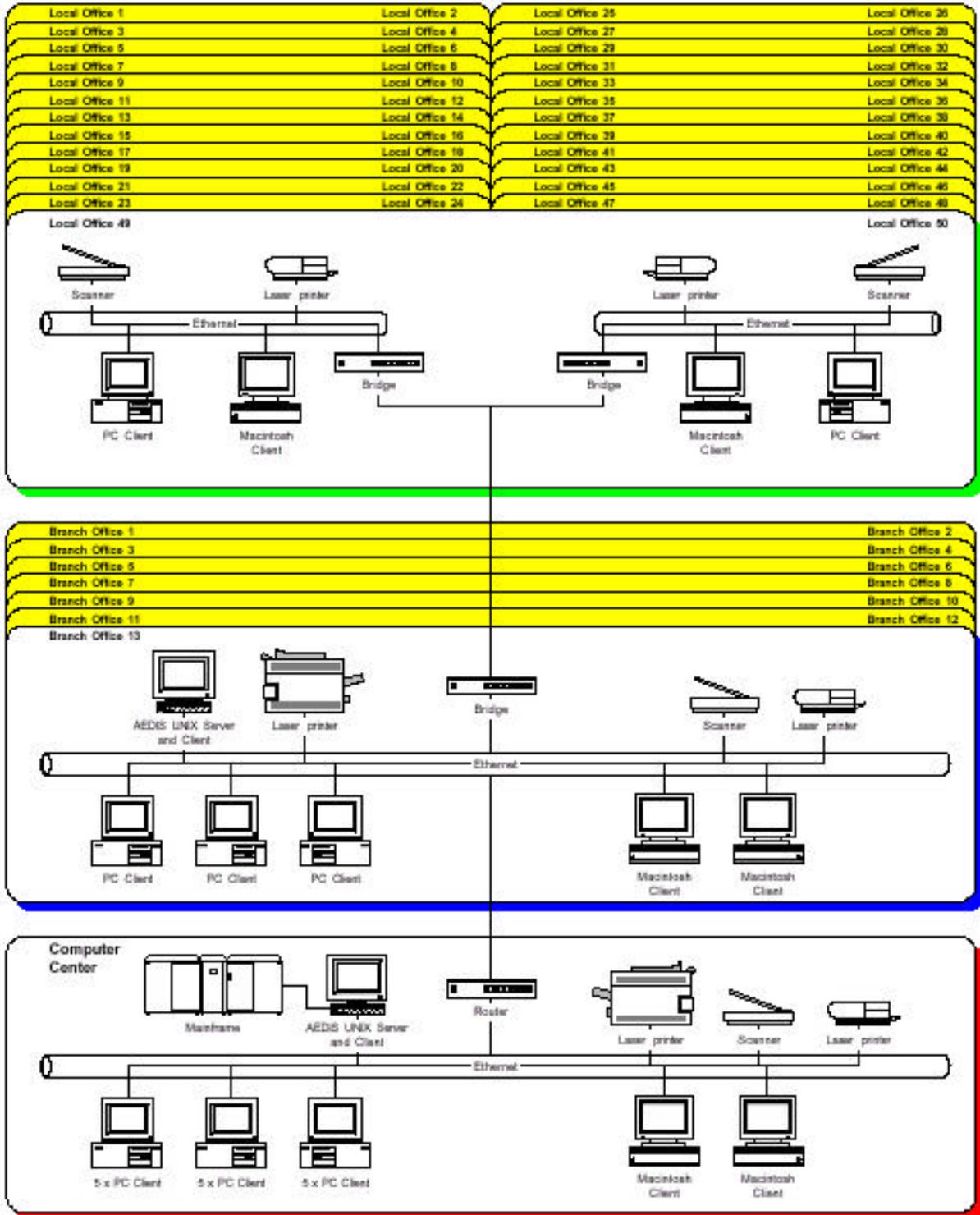
Figure 5. AEDIS Installation at TEPCO

Figure 6. AEDIS Document Management System at a TEPCO Construction Department (Hydro-Electric Power Station)
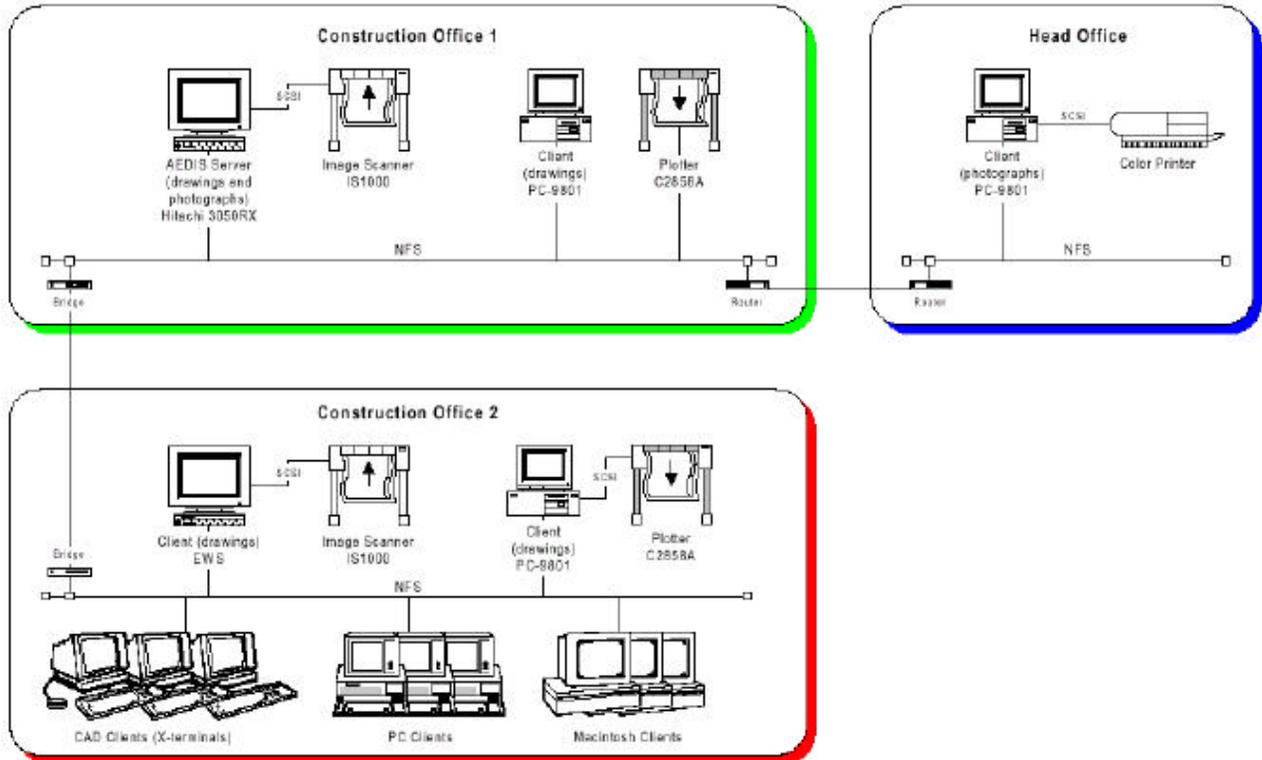
Figure 7. Document Management System at a TEPCO Nuclear Construction Department