selected solution is now under implementation.

D) Anunet and DAEGrid Setup:

DAEGrid network was secured from external networks by the commissioning of a firewall based on unified threat management product from Fortinet Inc.. This implementation has allowed us to build customised firewall for using various applications with varied security requirements on the DAEGrid setup, thus enhancing the security of the setup on the whole.

E) Inter DAE Video Conferencing setup:

Promotion interviews were successfully conducted for the first time ever in RRCAT, using the video conferencing facilities, commissioned at RRCAT and BARC. The process involved setting up a video conference between BARC and RRCAT with an interview committee attending the video conference at BARC and the candidate and his DR attending the video conference at RRCAT. In all, 14 candidates were successfully interviewed.

F) Expansion of the telecommunication network:

Telecommunication facilities were extended to the new Laser R&D block H and Alignment Lab buildings. Mobile access facilities were enabled on 20 extensions and 80 new telephone connections were installed inside RRCAT campus. To take care of near future requirements, two number of 400 pair cables were terminated at laboratory area exchange. Revamping of 40 number of TDPs was carried out to strengthen the telephone cabling network in our campus, thus increasing the uptime of the telephone network.

G) Workshop on Unix operating system:

Unix is a preferred operating system in any R&D organization. Two weeks workshop on Unix was organized by Computer Centre during 9-20 July 2007 at User Hall. workshop was aimed at providing basic understanding of the Unix operating system and user level commands, useful to perform day to day operations on the Unix systems. workshop was attended by 24 candidates nominated from various Divisions/ Sections in RRCAT.

H) ANSYS training programme:

The resources in User Hall were utilized by engineers of our centre to conduct ANSYS training programme to get updated about the latest features available in this software package. About 30 participants from various Divisions/ Sections of RRCAT benefited from this training.

Contributed by:
S. S. Tomar (tomar@cat.ernet.in) and A. Rawat

I.3 Development of vacuum brazing furnace

Fig.I.3.1: Photograph of the vacuum brazing furnace.

In joining of components, where welding process is not possible, brazing processes are employed. Value added components, high quality RF systems, UHV components of high energy accelerators, carbide tools etc. are produced using different types of brazing methods. Furnace brazing under vacuum atmosphere is the most popular and well accepted method for production of the above mentioned components and systems. For carrying out vacuum brazing successfully it is essential to have a vacuum brazing furnace with latest features of modern vacuum brazing technology.

A vacuum brazing furnace has been developed and installed at Accelerator Components Engineering & Fabrication Division, RRCAT, for carrying out brazing of components of copper, stainless steel and components made of dissimilar metals/materials. The above furnace has been designed to accommodate jobs of 700 mm diameter x 2000 mm long sizes with job weight of 500 kgs up to a maximum temperature of 1250°C at a vacuum of $5x10^{-5}$ Torr. Oil diffusion pumping system with a combination of rotary and mechanical booster pump have been employed for obtaining vacuum. However, this pumping system will be replaced with a dry vacuum pumping system in the near future for

better and clean brazed components. Molybdenum heating elements, radiation shield of molybdenum and stainless steel - 304 have been used. The above furnace is computer controlled with manual over ride facility. PLC and Pentium PC are integrated together to maneuver steps of operation and safety interlocks of the system. Close loop water supply provides cooling to the system.

Many components have been vacuum brazed successfully including vacuum brazing joints of copper to copper and stainless steel to copper components. Main components vacuum brazed include : safety shutter, fixed mask, collimator etc. These are components of the front end of beam line. Test cup assembly of LINAC with six joints of copper to copper is also vacuum brazed. Vacuum brazing of Ceramic-to-metal is under progress. After vacuum brazing, these components are leak tested up to 5×10^{-10} mbar L/s. The above facility has further augmented the development and manufacturing capability of RR CAT.

Contributed by:
R.V. Singh (rvsingh@cat.ernet.in),
K. Yedle, and A. K. Jain

I.4 Automization of management of receipt and distribution of water using SCADA in RRCAT

RRCAT receives water from two water sources viz Narmada authority and some tube wells located in and around colony area. The water from these sources is collected into under ground water sumps located in colony area and another set of sumps near guard house. This stored water is then pumped to 15 m high overhead tanks located in the colony area as well as in the laboratory area. There are two pumping stations : one in the colony area and other near the Guard House. Overhead tanks are at three locations : 1) near Indus building, 2) opposite Community Centre and 3) one at the new efficiency apartment complex. The water collected in overhead tanks is distributed to the users in colony and laboratory areas by gravity flow. The distribution to each segment is carried out by operating number of distribution valves installed at various locations in the premises. In order to efficiently carry out management of receipt and distribution of water, number of operators are required to work round the clock in the shifts and physically move to all locations wherever valves, pumps etc exist at discrete locations.

In view of non availability of requisite staff; engineers from Construction and Services Division and Laser Electronics Support Section of RRCAT have successfully commissioned a water automation system by which entire operations related to management of receipt and distribution of water are now performed from main control room located in colony pump house area. At this control room, a Supervisory Control And Data Acquisition (SCADA) system has been installed using PLCs to automate the entire operation. Now any pump or valve located in the laboratory area or in colony area can be operated by click of a mouse. Water level in the sumps as well as overhead tank is constantly monitored and updated on PC panel. To make it convenient for operator, the control system has a graphic user interface and a Hindi panel. Apart from this, water which is received from the Narmada Authority is now metered using an electronic flow meter and data is logged on daily basis. The system has manual, semi automatic and fully automatic modes so that one can select a mode depending on the situational demand. This system is operational since November 2007 and operators have been trained. A layout of the automated water distribution system in the colony area is shown in Fig.I.4.1. Presently new colony area comprising of new efficiency apartment complex is not covered under automation.

Computer Centre, RRCAT has provided required telephone connections and allowed the use of existing telephone cables in the above set-up.

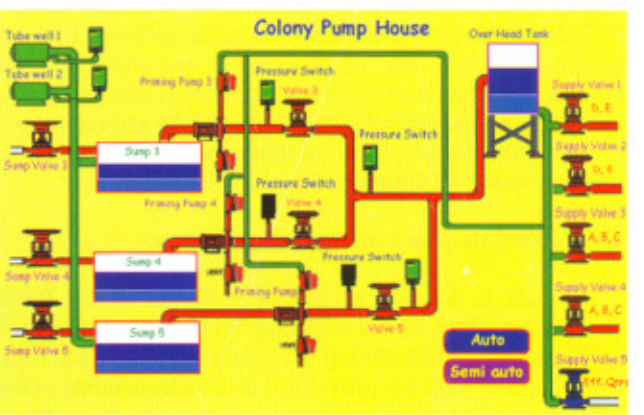

Fig.I.4.1: A layout of the automated water distribution system in the colony area.

Contributed by:
L. Jain and S. Farkya (sunilfarkya@cat.ernet.in)