Control System Upgrade

Location
Prince George, British Columbia

Customer
Canadian Forest Products Limited, Prince George and Intercon Pulp and Paper Mills

Background

Canadian Forest Products Limited (CANFOR) owns and operates two pulp and paper mills in Prince George, British Columbia. The two mills are next to each other, and currently under one management. Prince George Pulp and Paper mill was built around 1964 and produces 500 tons of bleached kraft pulp per day and 295 tons of brown sac kraft paper per day. Intercon pulp mill was built in 1965 and now produces about 685 tons of bleach kraft pulp per day.

Prior to the control systems upgrade, the instrument and control systems were mainly 1960's vintage, using pneumatic field sensors connected to pneumatic PID controllers mounted in control panels in the control room. Interlocking logic was done through relay systems, pushbuttons and pilot lights on the control panel and in the field.

Certain parts of the Prince George Pulp and Paper mill have already been upgraded to a distributed control system and programmable control systems. This is pushed by the necessity to upgrade productivity to compete with other more modern mills that are using the new control systems.

At the same time, field instruments in process areas such as the bleach plant has suffered considerable corrosion from operating in a sometimes corrosive environment and decisions have to be made whether these field sensors should be replaced or changed over to electronic systems to work with electronic or distributed control systems.

Spare parts for the pneumatic instruments and sensors were becoming very difficult to obtain and their performance on repeatability was substantially lower than that of electronic sensors or transducers.

Reason for the project

The project was launched to take advantage of the substantial spending that will have to be made to replace 25-year old instruments and controls, and at the same time, bring the mill to modern day practices to be competitive in the market.

Mill management is also increasingly convinced that advanced process strategies such as optimization and statistical controls need to be implemented. A distributed control system and programmable logic controls are the first step in moving towards advanced controls.

Other considerations are changes in operating manpower requirements, better start-ups using the new system and better maintenance and troubleshooting.

Project Scope

The scope of the project covered the upgrade of all the areas of the two pulp mills for about 2,600 instrument control loops and 6,000 discrete input/outputs for logic control. The plan was to start from the most important part of the mills, the fibre line, then proceed to the utilities, and then to the machine room. Initial budget figures for the complete upgrade of the two mills is about Can$100 million.

The fibre lines for both mills include the wood chip receiving, handling, and sorting, the Kamyr continuous digester, the brown stock washing and screening, the bleach plant and chemical preparation areas. Recausticizing and the lime kiln areas were also done as part of the fibre line.

The utilities include the power and recovery boilers, as well as other support processes such as water treatment, effluent treatment and other services that are essential to mill operation.

The machine room will include the pulp dryers and the paper machine.

Universal Dynamics was retained from the beginning of the project to assist Canfor personnel with preparing budgets for the master plan, preparing a reasonable schedule for the project to work around the minimal system down times available for system changeovers, and to map out a strategy on the details of the changeover without affecting the mills' normal production.

We also assisted them in selecting the supplier for the distributed control system and the programmable control system.

We assisted them in setting up standards for motor control and operator interface displays, which are then used throughout the project.

We assisted them with designs of the new control rooms (a total of seven planned).

Universal Dynamics engineers and technologists performed field checks to verify existing wiring and tubing conditions and formalized the desired mode of operation for each control loop and discrete logic point. We then prepared the drawings and scope of work description to describe the work required. Where the work is to be done by outside installation contractors, we assisted Canfor in tendering the package, supervised the work and commissioned the system during the brief planned outages in the system.

We programmed the programmable logic system, designed the system configuration for the project and implemented temporary operator interfaces for motor control to smooth out the system changeover.

We also assisted with normal construction assistance such as tracking materials, project progress, budget control and contractor performance. When each area is completed, we provided as-built drawings of the installation.

Benefits of Project

To date, the fibre lines of both mills are complete and operational, The distributed control system provided the operators with much more process information than what was available to them before.

Typical comment from the process engineers is that they are no longer preoccupied with making the process work but are now spending a lot more time implementing advanced strategies and trying to make the mill work better. This is evident by the various advanced strategies they have implemented or that are under consideration. The time it takes to bring the plant back up after a shutdown is also much reduced.

Statistics maintained for the Intercon mill, which is the first to upgrade, indicate that the percentage of time that the mill is producing “on-grade” pulp has improved by 5% for the first two years after upgrade as compared to previous statistics. Given the economic value of the production for the mill, this type of improvement is impressive and more than justifies the cost of the project.