Harold Cofer and the COLEX process, part 6 – Some amazing innovations

As we wrap up the maintenance support for the Alloy Development Process known as the COLEX (Column Exchange) process and installed in Buildings 9201-4 and 9201-5, one of the most interesting aspects of this whole operation was the electrical requirements for all those huge pumps. Harold Cofer tells of a time when a decision was made to increase the direct current power capabilities by adding four more generators.

This addition would require the installation of two 7,000 horsepower alternating current motors. There had to be an aluminum buss bar installed by the construction contractor. The arrangement would cause a relocation of the electrical power feed for two of the 7,000 horsepower motors. This job seemed to call for an extended electrical power outage which operations desired to avoid.

The electrical drawings were reviewed by the management of the Electrical Department that was located in Building 9737 and provided support for all the Y-12 Plant. The result of this review was to declare the job would require a one-half day electrical power outage for one-half of the building.

Because of the pressure to continue operations, the local maintenance group, headed by Harold, was asked to review what had been recommended by the central electrical group. This put Harold in a very bad spot, as he was actually working in the same organization as those who had made the recommendation. However, Harold was also a loyal supporter of the operations group he supported. So he agreed to look over the situation.

After studying the electrical power system drawings, Harold determined there was a way to do the job safely without a total electrical power outage for any part of the building. The building electrical system had cross tie breakers that could be utilized to switch electrical power sources in a manner where no electrical power would actually be turned off to the equipment.

One problem this buss split created for the local maintenance group was putting the generators back on line after any shutdown. Previous to the split, all the motor and generator controls for a given process system, known as a “cascade” were located in the same room. After the split, four of the generators controls were on the other side of the 13.8KV electrical switchgear control room.

The way the equipment was started back up after any shut down was to put the Auto-Manual control switch on Manual. Then close each generator electrical breaker control switch and go to the main control panel and raise all the generators up to the operating power level.

When full power was reached the Magnetic Amplifier control was adjusted to match the electrical power level and then the Auto-Manual control switch was turned to Auto. This operation was a very touchy one and required excellent understanding of the electrical power system. If for any reason the generator settings were out of balance, you might trip all generators off and have to start over again.

Harold said, “As you can imagine, after the buss split was installed, this meant that you would have to close eight generator electrical control switches in one room, the race across to the other control room to close the other four.” Not something the electricians enjoyed doing, but something that they understood was necessary.

There was another variable with which the electricians had to content and that was what Harold called a “direct current battery action” caused by the solution in the absorber trays. It seems that after the electrical power had been on for some time to the trays, this battery action was known to exist.

Harold said, “If you were balancing electrical power, attempting to put a generator on the line, the battery action would be present and if you didn’t close the switch very soon, the voltage would drift down causing the reverse current device to trip the generator breaker. This was very frustrating.”

His approach to this problem was to close the eight switches in one room, bring electrical power up to a reasonable level, then go to the other room and manually balance the electrical power on the four remaining generators and finally to close the breakers and bring the entire group up to full power. As you can see, it was something of an art to balance the electrical power to all these pumps and associated equipment.

Harold said that there were times when things were not nearly so hectic and to pass the idle time a favorite trick that some engaged in was tying a rubber glove on the instrument calibration panel in the maintenance shop and barely opening the air valve feeding air into the glove. They would then just casually walk out of the shop.

He pointed out that everyone in the building was very concerned about hydrogen gas explosions, having been briefed many times on the hazard. Well, after a few minutes the rubber glove would fill with air, expand until it reached its limit and explode with a loud bang! Harold said that loud explosion would "scare the dickens out of everyone in the vicinity."

Maintenance support in the operating areas was important to Y-12 then and it is equally important to operations today. The "Can Do" attitude spoken of in recent articles extends to the teamwork between operations and maintenance personnel in all areas of Y-12 as it does in other interactions among organizations. That is one of the secrets of Y-12's success over the years.