

Quality at Y-12

Or: Quality an important part of business (title as it appeared in *The Oak Ridger*)

Ken Bernander is one of my most ardent readers of Y-12 history. He helps me watch for mistakes and lets me know when I overlook important details. However, Ken always has more interesting history for me to include.

Such was the case when he called last and we talked about Roy Williams. Ken was the person who provided the data reports that Roy used to monitor "transaction clockings." This was the data that showed the number of hours being worked on a given task and using that level of detail Roy could see right down to the working floor.

However, remember this was early in the age of such data gathering. A funny story Ken told on Roy was that Roy was counting the number of clockings and found one where a worker had clocked the same job 17 times. He asked Ken about that and Ken pointed out to him that the person was just trying to get a completed clocking. The system was failing to accept the worker's input and the 17 clockings were just persistence on the part of the worker.

Ken used this and other incidents where the communications lines were faulty because of the type of communication lines being used to push for fiber optics. He succeeded and Y-12 was among the first if not the first place to take full advantage of fiber optics for production data collection. That was just one of many ways in which Y-12 led in innovative data capture and analysis.

While we were talking about this fiber optics story, Ken noted that we needed to tell the history of Quality at Y-12. I readily agreed and asked him who he recommended that would know that story. We discussed several people, one of whom was Bud Leete, Y-12 Statistician. I contacted Bud and he agreed to help document the history of Quality at Y-12.

We will begin Bud's history in this column and will continue it in future installments until we have the full history documented. My sincere appreciation goes to Ken Bernander and Bud Leete for this documentation, without such knowledgeable people making sure these important elements of Y-12's history are captured, the essence of that great heritage might well not be available for future generations.

Bud has prepared the following:

HISTORY OF QUALITY AND THE QUALITY ORGANIZATION AT Y-12

The Early Days

Quality has always been an important part of doing business at Y-12. In August 1962 the Quality Control Department was formed with Ken Bernander as its leader. In those days, departments were large organizations, much the size of divisions today. The Quality Control Department had Statistical Services, Material Accountability, Quality Liaison, Data Processing, and the Gage Laboratory.

Some have suggested that the department was formed in part to cope with problems that continually arose from the on-site Atomic Energy Commission (AEC) inspection program, where component parts were routinely re-inspected by AEC personnel. As you might imagine, questions frequently arose about how closely measurements should agree and what to do when the disagreement seemed large.

Quality Liaison is the organization compiling and auditing the quality records, making sure the paperwork confirmed that items were manufactured with the appropriate procedures to the appropriate requirements. They served as the liaison group with both the customer and with the on-site regulating groups with regard to the quality methods and records.

The Gage Laboratory had the responsibility of maintaining the integrity of the certification equipment, making sure the inspection gages were properly calibrated and providing schedules for periodic recall for testing.

Quality Control methods were very prevalent in industry in those days, and it was a natural step to incorporate those practices into Y-12 manufacturing. To assist in producing the weapons components, teams were formed consisting of a mechanical engineer from the machining area, a mechanical engineer from the inspection area, and a statistician.

These teams, called Process Quality Control (PQC) Teams, were set up in 1966. Their job was to improve quality by analyzing inspection and testing results, studying process variables, and finding ways to reduce variability in the items produced.

In these days, Y-12 had seven production machining areas, three assembly areas, two plating areas, along with other areas for casting, arc melting, rolling, forming, and can fabrication. Each area had an assigned PQC team.

Early Initiatives

In 1967 Ken Bernander was assigned to take over the Product Certification Department, becoming responsible for all the dimensional inspection, nondestructive testing and laboratory analytical operations at Y-12. Work was on the rise with multiple new weapon programs coming on line. Bernander realized how expensive it was to perform 100% inspection on all the components, and he was instrumental in convincing the Design Laboratories to approve the use of statistical sampling plans for certification.

The program was based on the data compiled by the statisticians on PQC teams, and sampling saved millions of dollars by requiring only limited inspections on components having a near-perfect track record. Sampling saved money because it avoided costs of purchasing more inspection equipment and people to handle the workload. It also allowed more time for the inspection of problem parts and reduced part handling and worker fatigue.

Processes for bringing new production programs were formalized through operating and manufacturing procedures. Evaluations, called "prove-ins" were conducted where prototype items were made and inspected multiple times so that both manufacturing and inspection variability could be assessed before actual production began.

Next we will look at Quality management.