

Working at the K-25 Gaseous Diffusion Plant part 1

(As published in The Oak Ridger's Historically Speaking column during the week of July 17, 2023)

Clyde Kelly worked for me at the Y-12 National Security Complex for several years. He was a dedicated individual who could be counted on to perform his job to the best of his ability and was well liked by all who worked with him or for him. He recently contacted me asking to contribute to the history of the Oak Ridge Gaseous Diffusion Plant (K-25) which is where he worked before coming to Y-12 and working for me. I agreed as I knew he would share insights that had not been well documented.

Enjoy Clyde's perspective on his time working at the Oak Ridge Gaseous Diffusion Plant (K-25).

I have goggled to the end of the earth on what craft workers did at the K-25 plant and the dangers they faced every day with almost no success. I would like the American public to know about these jobs, how smart the people were, how important they were and the many dangers they went through prior to about 1992.

I was an Instrument mechanic and it intertwined with the Welders and Outside Machinist. Just the skill and efforts of these crafts could fill volumes of books. The K-25 plant stopped the diffusion process about 1985. Most of us that worked at it and really understand what happened are now in our 70's and leaving here fast.

Most people know about nuclear weapons and nuclear power plants, but very few people know what conditions workers during the Cold War faced. This will hopefully show the effort many men and women faced working to keep the K-25 plant operating. (As many of you know, the K-25 Building at the K-25 Gaseous Diffusion Plant was the source of most all the highly enriched uranium enriched during the Cold War. It was shut down in 1964, but the remaining four gaseous diffusion buildings, K-27, K-29, K-31, and K-33 operated until 1985. – Ray)

I was an Instrument Mechanic and was expected to help keep this equipment running in these conditions. Now let me explain a little about being an Instrument Mechanic. I walked into K-25 in 1976 as a brand-new Instrument Mechanic. I really had no idea at all what an Instrument Mechanic was. It was an entirely new term to me. I was an electronics guy with a BS degree from Tennessee Tech and I was following in my family footsteps to work at K-25 close to home.

I grew up farming so I knew hard work and tough working conditions, but this would be an altogether different world. When I interviewed for the job about the only questions I remember were. "Could I solder and did working in nasty confined spaces bother me?" Well, when you want a good job at home the only answer was, "Yep, I can solder and, nope, them working conditions were fine." I imagined like a house attic, but boy, was I so wrong!

I was paired with some super good and smart mechanics at the K-131 maintenance shop. No real training and no real safety information, except I was given a half-face respirator and was told to put it on if I see smoke. Well, that did not take long K-131 was a production building where UF₆ cylinders were heated up from a solid to a gas and put in the system to be enriched.

Well, low and behold not long after being in the plant we were doing a routine maintenance job in K-1131 and the feed pigtail or pipe blew off the feed cylinder and did we have plenty of smoke. I quickly put on that half-face respirator and went outside. The operators soon got it all back under control and everything was back to normal operations.

By now my contaminated respirator just went back on my work belt for next time. I had my first safety lesson. Also, while we were at K-131 doing maintenance on a Hydrogen Fluoride (HF) facility and all I knew was do not get this stuff on you because it just burns down into the skin unless you get paraffin under the HF in the skin. Well low and behold, my partner pulled a line loose, and I noticed a little spark smoldering on my coverall sleeve.

Working at the K-25 Gaseous Diffusion Plant part 1

(As published in The Oak Ridger's Historically Speaking column during the week of July 17, 2023)

On instinct, I pulled my sleeve up and scraped the skin with my pocketknife. It appeared to work as no skin was burned. So, I do not know if the paraffin cure was true or not. My education continued until it was shift-assignment time and being the new guy, off to K-31 and K-33 I went for round-the-clock upgrade work on the cells in those two huge buildings.

My next job was a five-day rotating shift in K-31 and K-33 which were production buildings built after World War II. Each building had two floors. The first floor held all the control panels and electric switchgear to operate the production equipment located on the second floor. The second floor contained groups of individual cells in what was called cell housings. K-31 contained 383,000 square feet on each of the two levels. K-33 had 1,400,000 square feet on each of two levels. This means those two combined buildings contained 41.3 acres of space on each of two floors.

It is necessary to understand one simple cell system before any of the hazards that were faced by these workers can be fully appreciated. These cells consisted of large compressors run by electric motors as big as a small car.

These compressors pushed UF₆ through large converters (A steel housing holding many barriers pipes made of a type of nickel). It took eight compressor and converter units to make up a cell. This one cell was about the size of a 2,000 square foot house. It was contained with heavy insulated metal panels. This was necessary to keep this process piping at about 140 degrees Fahrenheit to keep the UF₆ in a gaseous state.

Now we have a 2,000 square enclosure that is about 140 degrees hot and a decibel level of well over 140 from the motors and compressors. This sets the stage for the working conditions the maintenance workers faced. Today I look back and wonder how we worked in this environment.

This was the biggest investment in the history of nuclear power. At this time the USA was heading down a road of energy independence and upgrading these two massive buildings was critical for this nuclear power. This work meant all the cells I described earlier had to be completely tore out new barrier rods installed, and all the associated equipment upgraded.

This equipment had been running enriched uranium through the stages for at least 20 years. My job as an Instrument Mechanic was to strip out all the old copper control tubing. All the controls for these massive cells were controlled by a series of pneumatic control transmitters, pneumatic controllers and pneumatic control valves and miles and miles of quarter inch copper tubing.

My job quite simply was to cut out all this old tubing and equipment and install new in its place. The cell housing had the top removed and we went to work. The bigger piping and equipment were all cut out and removed by Outside Machinist and Welders. This was accomplished by the Welders torch-cutting through inches of very contaminated metal.

They did wear a full-face respirator but when they started to cut this material it looked like the fourth of July with fire and sparks going everywhere. Looking back these Welders where the most exposed of the crafts.

Now back to my job. All these control instruments and all those miles of copper tubing had also been exposed to 20 plus years of contamination. Best I remember we did not have to wear respirators since we were pulling the equipment out without torching it, even though the Welders were torching the big stuff right beside us. For about six months I tore out old and installed new working in areas that had been contaminated over the previous 20 years.

Working at the K-25 Gaseous Diffusion Plant part 1

(As published in The Oak Ridger's Historically Speaking column during the week of July 17, 2023)

Thanks Clyde, for sharing your early experience with us. I am sure many who worked at K-25 during that time can identify with your story. Others who may never have experienced work such as that will be amazed at what you were doing and how well it was done despite the difficult conditions. Next, Clyde will tell us in more detail about some of the jobs he did at K-25.



Clyde Kelly



Two of the buildings where Clyde worked, K-31 and K-33