National Educational Technology Solutions LLC

K-25 Oral History Interview

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Interviewee: James Hackworth

Interviewer: Bart Callan

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[1:01:09]

Callan, B.: We'll start out with the hard question. Let's go ahead and state your name and spell your name out so that we have that on tape.

Hackworth, J.: My name is James Hackworth. H-A-C-K-W-O-R-T-H.

Callan, B.: How old are you?

Hackworth, J.: 73.

Callan, B.: Tell me where you were born and expand upon your --

Hackworth, J.: I was born about ten miles from here, near Clinton, Tennessee. Lived there a very short period of time. My parents moved to another location that within Anderson County, which is just the present county Oak Ridge is in.

Callan, B.: So you were living in Anderson County prior to coming to work at K-25?

Hackworth, J.: Actually, I was living in Detroit and came here from Detroit. I was here visiting some relatives and heard about some job openings. Came down and applied, and 30 days later I had a Q clearance and was going to work.

Callan, B.: What kind of work did you do prior to working a K-25?

Hackworth, J.: I was working at an automobile factory, an assembly at Dodge main plant in Hamtramck Michigan.

[1:02:22]

Callan, B.: Where did you attend high school and when did you graduate?

Hackworth, J.: I graduated in 1949, Clinton High School, Clinton, Tennessee.

Callan, B.: Did you attend a college or university? And if so, what degrees did you obtain?

Hackworth, J.: I attended the University of Tennessee; did not get a degree. I also attended some other schools, universities here and there. Undergraduate work and then some graduate courses as well, but have enough time for a degree but never did receive a degree.

Callan, B.: Why did you come to work here? You just sort of told me why you came to work here. What attracted you to come?

Hackworth, J.: Well, I had, as a child growing up nearby Oak Ridge, that during the early stage of the Manhattan Project, I could, living eight miles away. I could see the lights and hear the machinery running in the night and around the clock. My dad worked here on the -- he was early as far as in the military and then later, he worked on the Oak Ridge Police Department. But occasionally I had a visit as youngster to come in Oak Ridge in late '43/'44. In later years, it was quite interesting. Came back here, I was in high school playing football and basketball, played against the Oak Ridge High teams as well. So I had a little bit of feel of what it looked like in the very early days. The muddy streets, the wooden sidewalks, the housing going up almost overnight. It was an amazing place to be and to see in the progress.

[1:04:29]

So that's -- that kind of whetted my appetite. Really what's going on at Oak Ridge, what is there, so when I had the opportunity to come back, I came back to Oak Ridge.

Callan, B.: I'm going to go a little bit off my outline here, kind of based upon what you're saying. Did you know what this community was like prior to --

Hackworth, J.: Yes.

Callan, B.: You did?

Hackworth, J.: Yes.

Callan, B.: Tell me a little bit about that, the original residents that were and how they were displaced and what this place was like before --

[1:04:57]

Hackworth, J.: Okay. Prior to the beginning of Oak Ridge and the three plants in Oak Ridge, the Oak Ridge area itself was pretty much -- it was a rural area, kind of like a local general store, gas station, very little as far as businesses was in Oak Ridge, it was primarily a farming type community.

Some of the folks that lived in this area worked at various places. There was various knitting mills and this sort of thing. But it was

a very quiet rural neighborhood. What is today is the Oak Ridge Turnpike was Highway 61 at that time. Most of the other roads that led off of that were gravel roads, like leading toward Oliver Springs or some other areas, going toward Solway, toward Knoxville, to at the time, some of those roads were gravel.

So it was a farming area primarily. So, it was quite a variety of hay cattle, that sort of thing of what was raised. I've been told it might have been occasionally moonshine or two. Raise a little bit of what was called white lightening. So there was a little bit of that going on maybe.

[1:06:18]

Callan, B.: Did you know any of the people that lived here that got displaced when the --

Hackworth, J.: I did. I knew several of the folks. One of the persons that has a museum close by, a few miles from here; it's called Appalachian Museum, Museum of Appalachia. And John Rice Irwin was a fellow there, and he was raised in this area, what today is kind of the Scarborough neighborhood, where his family lived. I knew a -- some folks at -- actually owned the local general store. I knew the younger kids -- some of those. Yeah, and I had an uncle that actually owned some of the land where the golf course is at today, Centennial Golf Course is. I was somewhat familiar with it prior to Oak Ridge.

Callan, B.: At the time that all of a sudden this transition occurred and, you know, the land had to be bought up, do you recall what their thoughts and feelings were at the time that happened?

Hackworth, J.: Well, I think you would easily find some folks that was pretty well upset about it; given two weeks notice to move out. There was a lot of folks that weren't satisfied with being displaced, as well as the way it was handled as far as their property and their personal property and crops they had in the field and this sort of thing.

So there was some people pretty upset about the way it was -- the prices offered and the time frame that they were -- that they had to move out. Some were forced to move. Some were actually loaded up by U.S. Marshalls and otherwise and escorted away, including their cattle, their hogs, and the whole bit. Some of them were sat in the rain. So, you can see where there might be a little bit of ill feeling about that.

[1:08:13]

Callan, B.: Another thing I want to ask you. I've heard some urban legends or myths about some people that made it into the community that actually benefited from K-25 coming in. One that I heard, and we don't know whether it is valid or not, is the cowlings that are on top of K-25, the vents, were actually inspired, I guess, somebody was coming up here wondering how they were going to put this building together and they saw these steel chicken coops that were being built out here. And the guy actually got a contract. He was just some farmer that made chicken coops, and he actually got a contract to make these things. And that's what the design inspiration was behind the hood cowlings on the --

[1:09:06]

Hackworth, J.: I think you're probably referring to the ventilation ducts?

Callan, B.: Yes.

Hackworth, J.: For the exhaust fans and this sort of thing?

Callan, B.: Yes.

Hackworth, J.: I've heard that story, but I've never -- I can't verify that. I've heard a story that that was a fact. I will say this in reference to that; many of the old chicken coops that I remember as a kid was made from wood, and they weren't made precisely in the direction of -- or the shape or the contour of those. I can verify that because I've worked on a lot of the equipment within those particular ventilation ducts and this sort of thing. So, very familiar with those.

Callan, B.: When you first arrived or first saw K-25, what were you first recollections?

Hackworth, J.: Well, I guess – to describe it in one word would be awesome. Even today, folks that were involved with it for many years are still impressed not only the size and the shape of the building, but actually the contents within the building.

[1:10:23]

The timeframe -- the short period of time it took to construct, from the ground breaking to completion, you know, working around the

clock. Every abled body individual that wanted to work, had a job if they wanted it.

And it's kind of interesting; in those days they still had water boys. And some of those water boys were making 50 cents an hour, which they thought was fantastic. But it took a variety of skills of individuals, the craft people, the engineers, you know. It's really I think a good example of what can be done if everybody works as a team effort.

When you think about the construction of K-25 and what's within, and I've spent several years within the building working as maintenance mechanic, working as a supervisor, front line supervisor, general supervisor, and a manager of various duties within that building, and I'm extremely families with it. I don't think there's a square inch in that building that I haven't been. And that's -- wears out a lot of shoes to do that.

Of course, you understand there was bicycles available? If you were lucky, you got a bicycle to ride. I was actually under -- probably a lot of folks may have already stated this, but the distance of the length of the building around the exterior of it was more than one mile in a U-shape building. It was quite an engineering feat. It really was a -- quite a compliment and I would say extremely difficult for people to understand today how people did some of that work in those days and have the quality and outstanding workmanship there is and is still there today to be seen, with nearly -- not nearly equipment you've got today to perform that work with.

[1:12:28]

So, it was -- even though, you know, I spent many, many years in this building, I'm -- I've still got to say that it was an outstanding effort, outstanding craftsman, and outstanding engineering folks to pull this all together in 18 months or less an go on operation from the time of ground breaking. It's absolutely -- it's almost unbelievable it could be done.

Callan, B.: I agree. When I see this and I hear about the amount of effort that it took to put that thing together and just to think about all the independent contractors and the people that were out there to put that thing together in a year. And then for it to be functional is just something that just kind of blows my mind.

I've got another interesting story that I don't know if you know anything about it or not. But do you know anything about the -- I guess the three foot jog in the slab on the east wing of the building?

[1:13:30]

Hackworth, J.: On the level differential?

Callan, B.: Yes. I don't know -- I heard that it had to do with, I guess, like transposing a number. I guess two separate contractors were pouring slabs in separate --

Hackworth, J.: You got to realize that they were pouring concrete around the clock. They did have their own batch planter, own quarry, own batch plant and right close by. It's off of Blair Road area, which was within a quarter of a mile or less of the K-25 site. So it was a short distance as far as turnaround, but you gotta keep in mind the volume and the amount of concrete used within that building, it was unprecedented.

So I have heard the story. I've also experienced some of the time -- some of the projects over the years as to where some of the piping had the same problem, same difficulty. And I'm sure that the other folks have told you the number of miles of piping that's in this building. But it is totally amazing, and not only the various sizes but the types of material of piping itself, what is required to be used with the process. And it was a totally amazing.

Yes, I've heard those stories. It's -- there's a lot of those stories go with the construction of it. You know, everything from a bulldozer quitting on them and a little problem with it and they just happen to have a hole handy. They pushed that bulldozer in the hole with another and covered up and kept going and built right over. Supposedly that bulldozer is still there today. I've actually talked with folks that saw that happen. So, I don't doubt it happened.

[1:15:31]

Callan, B.: What about the Dentments in Happy Valley. Do you know anything about that? I guess when the construction was going on, what was that like?

Hackworth, J.: Well, that's another amazing situation. You can think about -- I'm going to estimate at one time it was probably as high as 13,000

people lived in Happy Valley, the dormitories, the trailers, the whole bit. It was like a little city -- theater, bowling ally. The contractors themselves, there was even a draft board at that location. You know, a lot of these people were subject to draft during the war still or some had been in and some were 4F and this sort of thing.

But there was a draft board there. There was a post office there. You know, there was everything from A to Z. It was like a little city. And it was scattered out up and down the -- if you were approaching K-25 from the east, on the left side. And it basically -- some of the sports facilities and whole bit – from about where Blair Road is at today on down to -- not all the way to the old power house building but in that direction.

[1:16:51]

Callan, B.: And that was just there just during construction right? So maybe a year or less and it just kind of disappeared.

Hackworth, J.: It was a very short period of time. Then some of the old flooters, footings, and this sort of thing, and supports for the buildings, they were on there later years, but they were eventually cleared out of the way.

Now, some of the fire hydrants, the fire lines and this sort of stuff are still in place today. It, of course, had its own septic system and the whole bit. And that was quite an interesting thing, the way that was operating. But --

Callan, B.: Tell me about it.

Hackworth, J.: Well, you know, things -- there wasn't as many requirements in those days as we have today. And you think about a sudden influx of initially maybe 5,000 people, a couple of thousand more, eventually maybe another 6,000 or so, and you can imagine the demands on small system. So there was some problems with it. Plugging problems, use of volume of it, and took some -- occasionally they would have to have some honey wagons to haul some away. And this sort of thing.

[1:18:06]

But after they got some of the K-25 building built and some of that tied in with a new system and that relieved that quite a bit.

So, it was like a little city, you know. It was like a -- somewhere between 13,000 and 15,000 little city today. You can imagine what it is but it occurred overnight, kind of like popping up like mushrooms, very quickly.

Callan, B.: Was it close enough to the construction site that most people just walked to work?

Hackworth, J.: You could. They could, yes.

Callan, B.: Did they have like busses or cattle cars?

Hackworth, J.: Well, okay, that's -- one of the means of getting folks back and forth -- keep in mind now that it was during war time. A lot of the younger folks had been drafted, up to 45 years basically. And the shortage of man power was tremendous. This was overcome by kind of breaking the ice initially. A lot of the women were employed in a lot of different ways, as they were in ship yards and otherwise.

[1:19:18]

But there was -- a company started, and it was called Fox Bus Line. Some of those folks are in business today, in the automobile business and otherwise. One of the gentlemen went on to have a very successful house building business. But they would -- the government supplied the busses. They operated the bus lines, furnished the drivers, supplied drivers, this sort of thing. Government furnished the fuels and so forth because they were rationed, you know. Oil and gas and tires were rationed. And they would go as far as Chattanooga. They would go as far west from here at Crossville, which is about an hour drive west of Oak Ridge. They would drive up the -- up near the Tennessee / Kentucky border to a place called Jelico. It's right on the border, a little town up there. They ran busses in all directions, north, east, west, and south. And up as far as Sevierville today, that's where -- Dollywood is up that way today, if you ever heard of Dollywood.

But I'll tell you they actually hauled people on these things now. Some are like regular school busses and some are what's called cattle cars.

[1:20:36]

A cattle cars is a tractor, as in tractor trailer. They had some of these wooden plywood housing built as a trailer on the beds. And

they had stows in those things that either would burn coal or wood, primarily coal. And this was -- you know, you'd sit 50 people in this thing and you traveled back and forth.

Now that was the most uncomfortable way to go and the school bus and otherwise, but some of those folks' roads were, you know, two hours or more each way, back and forth to work. So they had some long days. The fortunate ones were the ones that lived right here close by in Happy Valley because they could walk across the road.

One of the unusual things about this to me in the construction of it was the fact that you could ride you private vehicle right up to the building and that was -- could be a little risky, I guess, particularly if they were painting and the wind blowing your direction, but on the other hand, you know, some of the folks from distances would ride it.

They also had busses that ran around the clock between here and Oak Ridge. They were 15 minutes, I believe is correct, as I recall, between -- actually between K-25, Y-12, and X-10 sites.

[1:22:55]

And there was a lot of dormitories built in Oak Ridge. There was a lot of what was called temporary housing at that time, and you had everything from a one-bedroom flat top, two bedroom flat tops, three bedrooms. You go to -- what kind of amazed me in later years if you go to Richland Washington or go to Los Alamos and some other locations, and you would see the same type housing as you did as the early housing in Oak Ridge. You look like you're in the same city. So they were built by a lot of the same companies.

Aladdin Industries is the one that is credited with building the first modular and they were shipped in by truck and rail car and they were assembled -- a crew could assemble one of those in just a few hours and move onto the next one. That's what, it's amazing how quickly the town went up.

Callan, B.: They could be assembled in a few hours. Was that usually the flat tops or --

Hackworth, J.: Uh-huh (affirmative), flat tops. Yeah. See, they came in sections, like modular thing today -- house today. And one day, they would go through and grade a roadway for the street or circle. You

know, they had lots of -- The Corps of Engineers laid the city out, and the streets are marked by avenues and streets and circles and places and all this sort of thing.

[1:23:41]

So your main ones was A through whatever, you know, starting with Alabama on the east went of Oak Ridge and heading west. And it came -- the early Oak Ridge was as far as Louisiana Avenue. So those run north / south. And your other streets -- the turnpike around east / west. And then each of those avenues then you had your other streets running north of those.

So they would go in and grade the roadways. Today there would be people right behind them digging the ditches to put in the sewer and the water lines, right behind them would be the people digging the hole to put up the electrical power poles for electricity and telephones. And they a crew come up at the same time be coming through and they would be digging for the footers, setting the posts at these flat tops the interior would sit on or some of the other housing, just dependent on what type.

But flat tops are the ones that went up fast. You know, it would be like grading the road on Monday. Friday there would be people moving in on that street. The one unique thing about this was that -- as well, each -- a lot of the houses initially had a little coal box that the contractor would come by and fill the coal box. And you had coal stoves in a lot of these houses. Some of them you had fireplaces, you know, the early ones, A, B, C, D type. They had fireplaces so that was a little better.

[1:25:17]

But you just kind of call it primitive living but as I recall the flat tops rented from like 16 dollars a month. They furnished the coal. They furnished the water and you paid your electricity. And then the other housing was kind of equal of that, A, B, C, Ds. The Es and Fs and then the houses in Woodland, the cemestos and all this sort of thing. All of this was operated by contractors. So, that was quite a situation until the city was sold in 1959, as I recall.

Callan, B.: What about --

Hackworth, J.: Can we go once more on the housing?

Callan, B.: Sure.

Hackworth, J.: Because I got something that's going to tie right into that.

Callan, B.: Sure.

[1:26:14]

Hackworth, J.: Okay. What -- there was -- you could imagine the impact of 75,000 people coming in, workers, plus they estimated probably another 75 as far as dependents. So 150,000 people moving in within a short period of time. You think about the lack of housing, lack of restaurants, you know, just a lack of everything. It was kind of -- to me, it was a little bit amazing that people would be willing to live in some of the places that they did. Actually, some old shop areas and even a chicken house had been cleaned out. And they would -- people actually move into these things to have a place to live. It was just totally amazing.

But at the same time, the school systems were impacted. You know, you would go to school today and there might be two or three new kids. Tomorrow there might a dozen more new ones at the same place. So, you can imagine immediately the problem areas that school systems ran into.

So that was quite an impact, you know, on the area. And there's just -- you think about those days you didn't have motels like today, you didn't have the amount of hotels. So it was quite a problem for folks to find a place to live.

Callan, B.: And let's go ahead and switch tapes real quick and then we'll go along to the next set of questions here.

[End of Tape 1, Begin Tape 2]

[2:00:13]

Hackworth, J.: I asked to be moved or transferred to another location to learn more about building or process because it's a fascinating world, let me tell you.

Callan, B.: The more you can understand the big picture --

Hackworth, J.: It was one of a kind, you know, until Portsmouth and Paducah were built in later years. It was still -- they considered to this to be the mother ship, so to speak.

Callan, B.: If people were to inquire what sort of work was done, how would you describe it?

Hackworth, J.: I think to be fair and give everybody the due credit as to what really occurred, the type of work that occurred required engineering. It took a tremendous amount of the maintenance, as well as technical support. The -- it was a production type of facility for U^{235} and the process in order to get there was pretty much complicated, a long, drawn-out process. It wasn't the type of procedures that you would -- items going in one door and come out the other the next day. It was an ongoing press, 24 hours a day, 7 days a week. And it was a tremendously challenging process and procedures that were required to be used.

[2:01:45]

Callan, B.: I don't think I asked this, but what years did you work at the K-25 site and what other sites did you work at?

Hackworth, J.: I worked at the -- K-25 site started at December 11, 1951, and I was laid off 19 -- June 21, 1961 and I worked construction overseas for four years and I came back to the X-10 plant here in Oak Ridge, and I worked over there about 7½ years. I was going to be laid off there, so I went back to K-25; opportunity there. And I completed my employment and a career there at K-25 for total of 40 years company service in the Oak Ridge area.

Callan, B.: And during that time, the whole time that you worked at K-25, what did you like most about working there?

Hackworth, J.: Well, the opportunity to learn not only about the process but at the same time staying on top of the new technical issues that were arising. As I mentioned a bit earlier, K-25 is a pretty complicated location and some of the processes and areas that you worked in you had to stay on top of new techniques, new innovations -- new technology. It almost went from a solid state like to electronics and then from that, that made things much easier to follow, what I'm saying, as far as the process. But at the same time you have the opportunity to learn a new technology.

[2:03:39]

So there's opportunities throughout the whole site, not just in K-25 building itself, but the support buildings for K-25, one of those being the barrier plant. I spent quite a bit of time at the old K-25 power house, at the air plant, the sewage plant, the steam plant,

you know, decon facility, so I had some opportunities to work eventually during my career at every building at the K-25 site.

Callan, B.: How did workers communicate to each other? What was communication like inside a secret facility? Tell me a little bit about the security there.

Hackworth, J.: Okay. As with any type of security and the clearance level that you had would determine the level that you had access to, and you had to communicate in regard to that as to knowing what the person you were communicating with whether it be through drawings or conversations or in meetings. You didn't do this over the telephone, of course, to discuss security issues of that type.

So in the early stages you might get part of a blueprint, and you would fabricate that part. Someone else would get another part and that would be fabricated. Eventually, somewhere along the line, the whole thing came together. But the same people assembled together would not have been the folks that did the initial fabrication on those individual parts. That way, you maintained a level of security and usually by the time it got to the final stage, those persons probably would have at least some idea of what it might be gonna do but not fully. So they would always be, of course, Q cleared and that sort of thing.

[2:05:43]

Callan, B.: Okay.

Hackworth, J.: But yeah, the other type of communications that was unique was in the buildings, what they call a PAX telephone, that's P-A-X and that was a three digit type system within the building itself or later years tied in with other buildings. You could call a certain location by knowing the numbers or the central control room.

The central control room is the hub of the activity as to where your monitoring equipment was, as far as observing and how the equipment was running and pressures, temperatures, and this sort of thing. So that was the central location. That was the hub of all activities.

[2:06:23]

So you operated around the clock, you had people that were called plant shift superintendents, and they were in charge of that particular shift. I was, of course, in later years, I was one of those

so I started out a very entry level job and was able to get up to that level. I appreciated that opportunity but I think one of the things that helped me get there was the fact of knowing the process, knowing the areas, and knowing the buildings, and better yet, knowing the people.

So that was -- communication wasn't really a problem. It might appear to be from the outside, or you know, people wonder, but I feel it was handled very well.

So you had, of course, safes to lock up your security items, whether it be documents or prints or whatever. And if you owned that safe, you were responsible for that safe. You answered questions if there should be an infraction. So that's pretty -- I was very much aware that those need to be secured.

Callan, B.: What were the physical working conditions like at the facility?

Hackworth, J.: The physical conditions were tough. When I say tough, I mean hard, I mean hot, very hot, very noisy, very strenuous from the maintenance standpoint. Operations was as well but it wasn't as physically demanding on labor.

[2:08:03]

It wasn't unusual to go into the K-25 building, when everything was fully operational and, if you know what is inside of a cell, buildings are broken down into cells. And each cell had so many pieces of equipment, compressor, motor driving -- no compressor, I'm sorry. Centrifugal pump in K-25's motor driving that, you had a converter and you had a compressor control valve. That basically was what -- plus other internal ingredients I can't describe as part of the process. I guess best describedas a filtering process.

And, of course, when you force anything through piping you're going to generate heat. And your pumps were pushing continuously through miles and miles of piping. Each stage had a pump and motor and doing the same thing. So each cell had so many stages. Each building had so many cells. You add it all, 120, together, you can see where you would have miles and miles of piping, tubing, all your access openings to go into, but it was very hot.

It wasn't unusual to go in one of these buildings and work ten minutes on some of these jobs and the water would be running out

of your shoes; you would sweat that much. You would be soaking wet, you know; water running out of your shoes, very, very hot, very noisy, very physically demanding.

[2:09:45]

Callan, B.: Okay.

Hackworth, J.: I might add to that, that you didn't see too many overweight people working in those areas because you sweated. [laughs] You sweated it out. You stayed in great shape, really. So there was some positives to all the sweating and exertion.

Callan, B.: Were there safety rules that were important to following in working the facility?

Hackworth, J.: There were rules. There were safety rules, and they were important. Unfortunately, there probably weren't as many safety rules as there should have been, which, you know, we live and learn over a period of time. Probably there could have been some of the folks that avoided some of the things contracted later on as to working in the process. By that, I mean, asbestosis and some of the other lung-related items, chronic breathing disease, toxins, and this sort of thing.

It wasn't adequate, but it was -- for the time frame, it probably was adequate. But the foresight of saying there is going to be harm down the way, that wasn't seen, I don't think.

[2:11:03]

Callan, B.: What about health facilities? I guess there were adequate health facilities available?

Hackworth, J.: Yes. There was a -- at one time, out in the areas, there was little dispensaries within the building itself. Also, there were canteens, what's called canteens. I'm not sure you want to discuss that.

Callan, B.: Those were cafeterias, right?

Hackworth, J.: Well, no, you couldn't call it a full-fledged cafeteria. Those were called canteens. Now, it was like -- kind of like a short-order type thing. They were opened around the clock for years within the K-25 site. Interesting enough whether or not you -- today is something that wouldn't be permitted -- but the cooking was within 50 feet or less of where you might have an open system.

So, you know, in today's world totally un-permissible. You wouldn't be in there at all. You were supplied some safety equipment within the process buildings, hard toe shoes, coveralls, and this sort of thing, hard hats, in later years earplugs, and that sort of thing. But the respiratory pretty much was lacking over the years. There was some there but it wasn't adequate to take care of it.

[2:12:32]

Callan, B.: Over the years, were people given regular physicals? Was there regular health monitoring that occurred?

Hackworth, J.: Pretty much on the early basis on the physical. There was times in between that you were working in the area and you did periodic urinalysis and it might show up there that you would need to be removed from the area for a period of time. But -- and you also had film badges you wore in later years. They were improved.

But around the clock, there was a – at the main dispensary, there was a nurse there around the clock, on each shift. So there was some coverage. If you had anything major, you would come to Oak Ridge emergency room.

Callan, B.: The next topic I have is questions specific to the Manhattan Project. Did you want to go over that or would you like to jump ahead to the Cold War era.

Hackworth, J.: Well, we can cover some of that if you like because I was -- I was involved with an awful lot of people that was involved in that. I can kind of get to feel your questions and then we'll go from there.

[2:13:47]

Callan, B.: Okay. Did you have -- you weren't specifically here, but did people have an idea of what they were doing here prior to the bomb, prior to August 6, 1945?

Hackworth, J.: Very few people had an idea what was occurring prior to the, you know, the bomb test. I would venture to say there's probably not three dozen people, really, knew that it was about -- because again you're doing some of the work in fragmented sections, whether it be drawings, loop or in type. The routine maintenance type thing as far as seal changes and otherwise, those were considered routine items but played a significant part.

Callan, B.: What was your reaction on August 6, 1945 to that news and what were your thoughts on the role of the K-25 facility?

Hackworth, J.: My reaction was, "Well, golly, it's right here under a doorstep almost," and they played a vital part. I think one of the areas that my dad was working here at the time and I had two brothers that was in the service at that time; so one actually was leaving France heading for an invasion of Japan; so we were very glad to hear the tour was over -- or soon to be over.

[2:15:25]

Callan, B.: Where were you at on August 6, 1945?

Hackworth, J.: I was at my parents' home, near Clinton.

Callan, B.: What was the overall atmosphere like --

Hackworth, J.: Oh, it was celebration. You know, the telephones ringing and this sort of stuff. Of course, matter of fact, I still have a newspaper, the local newspaper with considerable detail about it. But yeah, I very, very distinctly remember it was days of celebration for sure. And somewhat in awe, there was a point of really you still didn't have a good understanding how this works. You know how did you create a bomb and you know what part of it or was it all made at K-25 or Y-12 or wherever. You know, there were still a lot of questions to be answered.

Callan, B.: How do you think that history will view the Manhattan Project and its outcome?

Hackworth, J.: My personal opinion is that the Manhattan Project will be viewed as one of the top five projects of all time, not only from an engineering aspect of it, but the fact that the timeframe it was built within, what it did, the impact it had on the world, at the time what it has today, and what it will have eternally on the world. It's almost awesome to try to think about have it really just the tip of the iceberg on what you really can do with this.

[2:16:55]

So it's -- our scientists have a whole lot yet to proclaim that can be done with this, but on the other hand, it was absolutely an awesome engineering feat and I don't know if it will ever be topped.

Callan, B.: I can't agree with you more in terms of the significance. Just out of curiosity, what do you see as some of the otter top projects of all time that you can compare it to --

Hackworth, J.: I think the --

Callan, B.: the pyramids?

Hackworth, J.: Well yeah, actually the pyramids were great you know. I think one of the more recent things I won't say compares with but comes close is the dam that's presently being built in China. That is an awesome project in itself.

Callan, B.: I'm sorry. What's that again?

Hackworth, J.: A dam that's being built in China, and it's going to be a tremendous boost for hydro power for China. It has taken several years to build and it makes the TVA dams look like, you know, play things compared to that.

[2:18:08]

The Aswan Dam in Egypt was another major project. The space program itself, you know. I think the space program rates very, very high, but I still consider the Manhattan Project to be above that. It's very, very close to being number one in my book.

Callan, B.: You wouldn't have a space program if not for the Manhattan Project.

Hackworth, J.: That's right.

Callan, B.: The Manhattan Project ended technically in 1945, I guess, K-25 went into the expansion period or the expansion program. Are you familiar with that and can you explain that? When did that begin?

Hackworth, J.: After World War II ended then there was a large lay-off at K-25. Of course, they didn't need the construction workers. This period went on for a period of time and then in 1949 there was another lay-off, some additional folks. And then in 1951, they began to hire some more people to come in because a lot of this equipment had been running for many years. It was just worn out, bearings, and, you know, this sort of thing.

[2:19:29]

So from the maintenance aspect, as well as operational end, there were a considerable number of folks that went in about that period of time. The expansion program within K-25 itself now, I'm going to turn that as being upgrades. I'm going to talk about the upgrades. Some of this, you were always looking -- well, we'll back up.

K-27 was built as some additional back up and some additional volume of capabilities after K-25 was completed. But it was also -- it actually produced more materials than K-25, the K-27 building. So that came along, of course, following K-25, and it was operational on through, I guess, 1961 or so. K-25 building itself you operated your impeller sizes, you did some changes within your system as far as your converters, and you increased your pressure somewhat, and you did some things that you would get additional product. But as far as expansion program, what I would term as an expansion program was later on in years when K-25, K-31, and K-33 were built. Now that was K-29 coming on and built in '49, finished up about '49 or early '50, I guess, put into play. And K-31 was built following that. Again, the demand for more material, and then the K-33 building was built; started in about '52 and was completed in 1954. The K-33 building, of course, by far outstripped production capabilities of all the others put together.

[2:21:39]

Callan, B.: What was that?

Hackworth, J.: I'm sorry.

Callan, B.: What was that?

Hackworth, J.: The K-33 building. It was roughly a 1,500 yard square building, two stories. The lower level was your operational end, control room, and so forth. And a lot of your airflow, your intake fans, and this sort of thing for cooling purposes. And then the second level is where you had all your converters, compressors, and motors driving those. And that's where you had a much, much larger piece of equipment.

Pretty much K-29, in the explanation, that -- you went from an axial flow type pump to an axial flow compressor -- centrifugal flow type pump to an axial flow compressor, which increased your volume and capabilities tremendously. But as the demand went along and, you know, got into the Cold War situation and it kept the expansion over the years. So finally K-33 was built and

eventually Portsmouth, Ohio and Paducah, Kentucky Gas and Fusion plants were built there. That was in '51, '52. Then from there on up.

[2:22:58]

So it continued to expand on the demand and desire for increased volume and product.

Callan, B.: What was the mission of the K-25 and support facilities during the Cold War era? Why the production? Why the expansion?

Hackworth, J.: Well, if you gather the information and look at it and say, okay, there was two processes, or actually three, going at -- competing at the same time. K-25, as far as gas diffusion, Y-12, you know, they were looking at a different process and there was a second process at K-25. It was known -- oh my God. I'll have to think about that a minute. It was in the power house area. And it was a different process and different method.

Callan, B.: Thermal, wasn't it?

Hackworth, J.: Pardon.

Callan, B.: It was a thermal process that didn't --

Hackworth, J.: Thermal diffusion, yes. Yes. That's what -- thermal diffusion was at the K-25 area but it's the K-25 power house area specifically.

[2:24:14]

I remember buildings being there. I've talked to a lot of people that were there. They had an engineering battalion moved in and supported that facility as far as the technical aspect in engineering. Many of those were students just graduating from some of the top universities. But they had many, many problems with it -- leaks, lots of leaks. They had material airborne, which is a matter of record, and that wasn't what they were seeking. They were having problems with appropriate welds and maintaining their steam pressures and materials.

So that was a third process that General Groves decided, you know, are we going to get there with K-25 or Y-12? If not, we're going to start a third process, and proved successful. They actually -- they came up with some material. Had they had

probably better material and better welders at that time, they probably would have done very much more so.

But some of that processes were used in later years.

Callan, B.: So what you're saying, and I haven't heard or not why they scrapped the whole thermal process thing. So it sounds like you're saying that they actually were able to make materials and it was --

Hackworth, J.: Yes.

[2:25:30]

Callan, B.: -- a working process --

Hackworth, J.: Yes.

Callan, B.: -- just I guess it wasn't -- what's the word I'm looking for?

Hackworth, J.: The level of success wasn't met is what they -- the expectations were from General Groves. That was another amazing success. That building was built and in operation within 69 days, which is totally amazing, totally amazing is how they did that.

Callan, B.: And was that being built at the same time as K-25 or --

Hackworth, J.: Yes. Yes. It was in the same timeframe. See, there was problem with the barrier being successful as anticipated. And General Groves got to fretting about and worrying about whether or not we were going to get there because he really had a lot pending on these three sites to get enough material for -- at least to make an attempt at testing a bomb. But Y-12 had some difficulties, magnetic process there they had; electromagnetic process, Y-12, and the gaseous effusion, and thermal fusion. Those were the three here in Oak Ridge.

In talking and read a lot of literature some of these gentleman had that were here actually involved with that, they were successful but they just did not have the materials and so forth they needed to make it even more successful.

Callan, B.: Let me have him change tapes. How are you doing? Are you okay?

Hackworth, J.: I'm okay.

[End of Tape 2, Begin Tape 3]

[3:00:11]

Callan, B.: I'd like to get that on camera. [laughs]

Hackworth, J.: Absolutely. You sure did. And you know, that's another issue; as far as all this material coming in. You think about it. They built rail spurs into each of these sites, but when you think about it, they had all these sidetracks. And I talked to an old trainman one time, and he said, "We got trains backed up and sidetracked and waiting to get into Oak Ridge from here to Cincinnati.

Callan, B.: Let's talk a little bit about that. Let's talk about Groves and the things you were just commenting on.

Hackworth, J.: Okay, one of the things that as an addition support for K-25 and Y-12 as far as pursuing getting enough product for a bomb, was called an S-50 project. This project was located at the K-25 power house area and General Groves decided that he needed to go through a third prospect and this is when he determined that I want this building built within 90 days and in operation.

[3:01:15]

Well, actually it was built and within operation in 69 days, which again was amazing, even for that time frame. But they did have a considerable number of leaks with this particular project. Some of those were material problems of getting the right materials, but incidentally General Groves had the authority to determine where particular materials were on trains, maybe sent out from various plants or sites. And he had the authority to have that sent to Oak Ridge.

So you can imagine some other folks on the other end expecting to receive some of this material and particular the war time that they were having some problem with that, no doubt, as far as manufacturing processes.

But it turned out that the S-50 site wasn't as successful as they had hoped, but on the other hand, it was a proven method and there was some of that method and production was used along with K-25 and Y-12 as far as incorporating into the bomb.

[3:02:30]

Callan, B.: Moving right along. We were talking about the Cold War and everything. Basically it was in 1964 when the facility was put on standby. What did you do when the facility was put on standby?

Hackworth, J.: I left K-25 in 1951, but a good part of K-25, part of it was already shut down then, at that time. Some of the K-27 was shut down at that time as well. So those are two buildings that even though K-27 was after 1945. It was just almost immediately after. But they were shut down, and it was kind of a heartbreaker to a lot of folks. You know, it meant livelihood. You was gonna be laid off, and you can understand that and this sort of thing. A lot of folks were uprooted and moved to other areas. Some went, you know, to Paducah, Portsmouth, sites later on, but it was kinda like a lot of people were scattered throughout -- back throughout the U.S. in various locations, aerospace and otherwise.

Callan, B.: Let's talk about some job specific questions about what you did during your time there. What kind of jobs did you have associated with K-25? Give your job titles and approximate years that you worked those jobs.

Hackworth, J.: I started out as an entry level job. It was a maintenance mechanic trainee, advanced from that. I served four years apprenticeship with that. That's basically at K-25. What you did was mechanical work, rigging work, pipefitting, you do copper tubing type work, silver soldering, as well as running copper tubing, operating equipment, overhead cranes, forklifts, portable cranes, pretty much what might be along the equipment line. But it was actually pretty much based in the -- maintain -- either maintaining or removal and insulation of the axial flow compressors or converters or the motors; maybe the motors changed. We did a lot of these as far as uprating or upgrading, changing motors, changing impellers, some of the converters, compressors. Those were upgraded and for additional production.

[3:05:12]

From there -- I was laid off in 1951, but when I came back -- well, I went to -- I worked overseas four years in construction and then I came back to X-10 over there and worked there as a millwright, which is mechanical type work again for seven and a half years. I was going to be laid off there and was transferred back to K-25. I worked there for a few months as a maintenance mechanic. I was promoted to front line supervisor. Within a year or so, I was promoted to general supervisor. And then from there, I was promoted to maintenance coordinator to a general foreman. And

in later years, I was promoted to plant shift superintendent. And then the last three or four years I was there, I headed up an engineering group, field engineering.

[3:06:09]

So that pretty much is kind of a nutshell on the 40 years.

Callan, B.: You had an impressive career. Sounds like you really worked your way up through the ranks, I guess you could say.

Hackworth, J.: Well, I had opportunities and I had a lot of folks that gave me some opportunities, but I was very interested in learning all the processes, learning the buildings; had the opportunity to work in every building out there. So, that put me in a position of having the edge of some other folks of knowing the buildings, knowing the people, knowing the processes. So that helped.

Callan, B.: What would you say was your most challenging or one of your most challenging assignments as either an individual or a group while you worked at K-25?

[3:06:53]

Hackworth, J.: Probably one of the most challenging would have been when we had a complete cell change. That would mean removal of the motors, compressors, converters, pulling out the control valves, everything out of inside the cell. You put them back in. You fed them up. You line up your motors, along with the other equipment. And you do that within eight hours. That was very challenging. We were able to do that in the early days and later years it took three days to do it.

So I'll leave it at that.

Callan, B.: What would you say was your most significant accomplishment over your career at K-25?

Hackworth, J.: My -- I guess I've got two that run pretty parallel. One was being a shift superintendent. Shift superintendent, you're over the whole sites of nights and weekends. So as the times, you might have 900 employees under you. So that was pretty significant.

On the other hand, I had the opportunity to get involved in what was called the preliminary work for a Tiger Team review. Tiger Team being DOE -- had a team of somewhere between 60 and 75 people -- and they would come in and look at the disciplines of work, engineering, look at today's world as far as RCRA, CERCLA, you know, all the environmental rules and look at OSHA and this sort of thing.

[3:08:32]

I was able to lead a team, and again going back -- part of that knowing the plant, knowing the equipment, and knowing what was there. So I was able to lead a team of folks that I got to select who they would be. And we worked for about almost a year, full time, on that and were able to go out and get involved and determine what the environmental problems were, what the OSHA type problems were, looking at the conduct of operations, conduct of maintenance, and those type things. And what really was the good part about it is not just being involved with it, but it's a, you know, being able to select the folks that would help me with this and some other people that worked with -- jointly with me.

But from the viewpoint, when it was all over with, and they completed their audit of us, we came out -- K-25 was the top site of 33 sites in DOE, the best score. So that was a lot of satisfaction, a lot of tremendous amount of hard work. But it was very satisfying to see the end result. So that was -- to me, that was a major issue. That was -- it was a real challenge but I enjoyed every minute of it.

[3:10:00]

Callan, B.: Good answer. You did a lot of supervisory work and management work. How many people did you typically oversee?

Hackworth, J.: Initially, as a front line supervisor, approximately 20. And as I was promoted on into additional responsibility, probably somewhere in the neighborhood of 450, 450 on average, prior to going into shift superintendent's job.

Callan, B.: What sort of management difficulties did you encounter?

Hackworth, J.: Well, some of the things you'd encounter would be lack of materials, you know might not arrive in time, by and large, I had great cooperation of the craft people and the other supervisors, the other managers, worked very well together on that. But what you

did you identified your problems and you overcame -- find ways to overcome those problems and not let that hold up your project. Sometimes it wasn't easy but you found ways to do it, and I'm saying in a safe manner. I'm very happy to say with all the years in the craft and otherwise, and over a period of time hundreds of people involved, I guess, maybe in the thousands, I never did get anybody seriously hurt, that worked under my management. So I'm very proud of that as well. That is very hard to do.

[3:11:37]

Callan, B.: Especially over a career that spans the length as your does. That's very impressive!

Hackworth, J.: And you're dealing with a lot of high temperatures. You know, I'm talking about burn possibilities. A lot of the type welding we did, scarfing and burning, this sort of thing. And I'm very proud of the fact that no one got seriously hurt.

Callan, B.: Were there any conflicts that ever occurred between management, workers, and the unions?

Hackworth, J.: Oh, you know, you're going to have some misunderstandings. Again, one of the things that helped me was the fact that I had worked as a craftsman and I understood what the union rules were and I knew what the job assignments should be in regard to who does what type work. And yes, there would be occasionally grievances and this sort of thing. That's what -- the good part about it was that I was able to sit down and discuss the issues and work out without the majority of them going on to a higher level of grievance. I only ever recall one case that went to the arbitrator. And that was over a dismissal, unfortunately, that a gentleman was sleeping. He was a security inspector and had a gun and he was sleeping. So that was a dismissal for cause and that's the only case we had to go to arbitrator. The rest was able to settle in some manner prior to going to that.

[3:13:09]

So it takes a lot of give and take, you know. You've gotta be willing to listen. You've gotta willing to negotiate, and you've gotta understand where the other people, what you're saying, and where they're coming from. Then you work toward resolving the issues. And that's, I'm happy to say, had good results.

[crew talk]

Callan, B.: Let's talk about women at the facility. What sort of roles did women working at K-25 have?

Hackworth, J.: Well, you know, there were days, I'd have to say, that probably wouldn't have successful if women hadn't been there as far as time frame and completion of the Manhattan Project. You know, they did some tremendous amount of work. And in later years, it came -- in later years, they had opportunity to come in and work in various jobs. And I felt it went well. You know, there are women that ended up in the craft positions that wound up in operations that wound up in every job out there; I guess, eventually.

[3:14:20]

And those were qualified -- the majority of them did a great job. And they are to be commended.

Callan, B.: Initially, was there like a certain job role or something that women fell into?

Hackworth, J.: Well, initially, you know, I guess the old school of thought was, you know, clerical and this sort of thing and that's it. But then they began to bring people in, in the stores -- the department -- stores being materials, locations, and the operations, and eventually into the maintenance end. We had -- I'm happy to say we had some very good electricians, lady electricians, maintenance mechanics, welders, you know. They did well. So, I was very proud of those folks. They worked hard. Many, many felt like they had to prove themselves. I never considered it that. I said, "If you're qualified for this job, that's what counts."

But they did well and I'm very happy to say that I'm very proud of those ladies.

Callan, B.: What about African-Americans and minorities? What sort of job roles did they serve at the plant? How were they treated?

[3:15:35]

Hackworth, J.: Well, I'm darn not happy about having to say this, but initially, the role that African-American men and women -- women were in the janitorial, and men as well. But the only African-American men that were in positions when I was there was either in roads and grounds, which is similar to a labor job. Some maybe like air tool, semi-skilled and otherwise, and build up some experience over the

years or had it when they came; cement finishers and this sort of thing. They weren't given the opportunity to get into craft jobs or into operations or other jobs.

Now that's all changed. You know? I left in 1961. Those were the conditions. I came back to K-25 in later years, and that had changed due to civil rights and otherwise. But you know, my personal thought is it was long overdue on change, should have been much, much earlier. But bottom line is that by and large most of those folks, you know, they did just as well as anyone else. They went through the training programs; you know just the same as anyone else. You either did or didn't. You know, you had certain requirements to meet as far as blueprint reading or this sort of thing with crafts. But some very good craft people turned out, both male and female African-Americans.

[3:17:12]

I'm happy to say they were able to go ahead and bid into other jobs. I was personally able to – some qualified folks, to promote those myself and was very glad to do so.

Callan, B.: Good. Were you married at the time you were working at K-25?

Hackworth, J.: Yes.

Callan, B.: What was life like for your spouse and children?

Hackworth, J.: Well, I think maybe I'll expand a little bit on shift work, if you haven't heard about shift work.

Callan, B.: I haven't.

Hackworth, J.: Okay. The majority of the time, particularly if you were hourly folks, as I was when I first went in, you would be assigned a shift because of a lack of seniority. So, this was a three-shift, seven-day rotation. And it's not easy, particularly with a growing family with small kids. Some folks just cannot tolerate it. We actually had some people quit because they couldn't handle it. They couldn't sleep, you know, when they should be sleeping.

[3:18:20]

But it's kind of a situation that you get on a rotating shift, you know all the people, kind of turns out like a family. In those days you had recreation committees and one for each shift. And you

had several hundred people involved in it, softball, bowling, you know, bingo, whatever. And it was kind of tough on your families, growing up especially because there was events you would miss if you were working evenings or otherwise, your kids involved. You had to try to compensate on that with your time off and get in the quality time you could. So, that was tough on, you know, growing young families.

But it worked well. Still, you know, in the '50s you had your canteens in the K-25 and K-27. And again, you had a canteen in a running process building, which, you know, would never happen in today's world. There's some of the difference.

But it was interesting. I personally liked shift. I'm a night owl and I like the 12-day shift, and most of us hated it. You know, just, oh my. But anyway, it was some -- you got to learn to make the best of what you got. You know, you heard the old saying, if you got lemons, you make lemonade. Well, if you got shift, you got shift, and you make the best of it. And quite frankly, I enjoyed it; a lot of people don't.

[3:20:04]

But in more recent times, they've gone to a four-shift, 12-hour work day, which is much, much better.

[End of Tape 3, Begin Tape 4]

Hackworth, J.: -- that same way in K-29, 31 -- K-29 didn't have housing. They were out in the open. They didn't have housing on them, but 31, 33 did and 25 and 27.

Callan, B.: I get different recollections of working conditions. Here again, you're one that talks about that it was kind of hot and uncomfortable. A lot of people say, you know, the working conditions were great in there, but I think a lot of the people I'm speaking to probably didn't spend a lot of time on the cell floor, I guess.

Hackworth, J.: I would guarantee they didn't. You probably been talking to some engineers or otherwise that never had any need to be there. And unfortunately, they don't really know some of these things I'm telling you.

Callan, B.: Tell me again about cell housings and about the temperatures inside these things.

[4:01:06]

Hackworth, J.: Okay. In the K-25 building each cell you have a housing around it. And within that housing, you have the converters and part of your Allis Chalmers, which is a centrifugal type pump. You also have a control valve and a lot of piping and tubing and so forth. Now, you gotta. The friction of running the -- pumping this gas through the system creates a lot of heat. And in turn, you have a lot of heat inside all of the cell housing.

So, it approaches within inside the cell housing near 200 degrees ambient. There was occasion that you might go in there and do some quick check or whatever. But I don't know of anybody that was able to stay in there more than one minute; most of the time it was 30 seconds or less. And you would come out and you absolutely be red as a beet. So it had to be necessary to go, you know, almost like an emergency. Earlier years, it wasn't considered to be that much of an emergency. Later years, yes, it's, you know, you may have a problem with heat with somebody standing there at all or being in there.

So the difference in the cell housing was all metal, welded up by oxyacetylene on the K-25 housing and K-27. It had a steel floor inside on top of the concrete. And when they got through welding those up and prior to putting equipment in, they actually pressure tested those. When I was working overseas later and I rented a guy in Cuba, and he actually asked me what was going on in Oak Ridge, and I welded up all of that sheet metal in what they called cells. And he said what was that. So I was able to give him an explanation in what it was. This is several years, you know, after it was built.

[4:03:03]

So it's very hot inside of a cell. Inside of the whole entire cell, the building housing, it's also very hot. You did have some supply fans in there, but it would get -- it wasn't unusual to be 115 or 120 is about what it stayed. So it was very hot in there. So if you went in there and stayed a few minutes, you was fully wet with perspiration.

Callan, B.: If people worked full shifts.

Hackworth, J.: I worked eight hours in those and turned around and worked eight hours more overtime. And at that length of time you're just totally exhausted.

Callan, B.: And the purpose of cell housing is again, that was sort of like, I guess, like a safety measure to prevent overflow if there was an issue?

Hackworth, J.: The cell housing itself was initially because they weren't sure of the whole process. This was theoretically. Is this going to work, yes. Well, they did this in case there was leaks, it would be contained and not get out into the atmosphere, you know, within the rest of the building or out, you know, to the public beyond K-25. So that was the purpose of that.

[4:04:17]

So it was a good engineering thought because you really didn't know what was going to happen.

Callan, B.: Okay, and you said K-33 didn't have cell housing.

Hackworth, J.: K-29 did not have a cell housing; it just opened. You could see the piping and the compressors and everything. You know, it was viewable and you just went ahead and worked on those pieces of equipment the same you would the other.

Callan, B.: Was the temperature at K-29 hotter overall than K-25?

Hackworth, J.: Some areas of K-29 in the summertime, I've known it to be 130 and that's pretty extreme working conditions.

Callan, B.: Was that probably because they didn't -- not having housings probably have something to do with it?

Hackworth, J.: That's part of it. That's part of it. And some of the work that you did, and I'll refer this to K-25, you had a vault area and you had also what they call a (indiscernible) area. The vault area would be the lower side from the outside of K-25. And within that area you had some different type of equipment. You had some supply fans. You had some after cooler type heat exchangers, not -- heat exchangers, and a lot of the equipment in those areas. And then on the opposite side where you would come inside of the U -- when I sad inside, inside the U type, the type of U being the U, that level was higher than the exterior and you would come right in, drive in

to the cell floor. Your operating floor in K-25 and K-27 was on the top floor of the building.

And in between those two floors you had what's called a pipe gallery. That was almost an area like we joked about. You really needed some people about 4 feet, 6, because you couldn't stand up straight. You did a lot of work under there; extremely hot; you'd do the welding, you'd do the cutting with air kind of tools. You'd create a lot of smoke and this sort of thing. And it had rock wool as an insulation and anytime you'd walk over that, it would just kind of boil up and, you know. The time of day, whether you're working at night, you'd just be red as a beet and like you want to scratch all over.

[4:06:46]

That was pretty extreme working conditions.

Callan, B.: Let me ask you this, and these are just questions coming out of my head now because I'm seeing, you know, a lot of things that you can offer a unique point of view on because you have a lot of hands-on experience with the plant itself.

How often was there down time in this plant? I've heard that once they got up and running, you know, it was almost impossible to shut it down, and there weren't really any downtime issues. How often did compressors have to be replaced? I heard that like when you start up the fans, you could --

Hackworth, J.: Deblade.

Callan, B.: Yeah, they deblade. Tell me about some of those types of issues and how often they occurred.

Hackworth, J.: In the K-25, you had centrifugal type pumps, impellers in other words. Those didn't deblade. Generally, if you pull one of those, it was as far as being maybe deposits on it, it might be out of balance, a little -- or you might be pulling it to put in a new type or an improved type impeller on it.

[4:08:05]

You generally -- there was a bolt circle on those that was pretty difficult to get to, very tight, and you would really raise a lot of sweat getting those things out. But there was a kind of unique thing about those. They had little grooves cut in them and then

you had an aluminum gasket about 36" in diameter in one and probably about 34. And you had to roll those in and the best thing we could find to roll them in was cutting a broom handle off, make a little notch in the end and roll that around and that would press those gaskets in and stay. Otherwise, you just couldn't get them to stay. So that was kind of a unique thing.

As far as pulling converters that was in the K-25, it depended on which one was leaking. If you had to pull one that was in the back side, away from the door opening, you had a door that would swing open. You had a very unique thing.

A truck that had a bed on it that you could rotate the bed and you had an air operated wench on this, cable type wench. And you would run in; you had some eyes there; you'd hook two. You'd pull -- let's see. You might have to pull two out of the way to get to the leaker. So you had to go in there and cut a few welds out and then take these things out. And you'd set those aside. You had them cover up the ends. You get the leaker out. You put your -- that one back in, you weld those up, and then you put your others back in.

[4:09:37]

There was no overhead cranes in K-25. So it made it a lot more difficult that it did in 29, K-29 and K-31, 33. That was much more difficult, getting those things in and out. But you didn't have that much problem.

Now, the other building is where you had some deblade problems. K-29, which is axial flow type compressor. Best described axial flow would be as if it was a – you know what a steam turbine looks like? And you have a rotor and a stator. Very much looked the same way. But these create a lot more possibilities and a lot more production in what you would get from a smaller K-25 AC pumps.

Callan, B.: I've heard this, that the fan blades in K-29 were so heavy that you'd get a little sag on the axle it was sitting on, so half the time you didn't even know if they were going to work when you started them up because they might deblade right when you start them up because of the weight of the blade.

[4:10:48]

Hackworth, J.: Well. Okay. What you might have -- the situation on those, and that potential, again a buildup on one, they were very finely tuned, very much as far as balanced and this sort of thing. But it would be like any item, whether it be a steam turbine, or whether it would be one of these, if you got something that's on the shaft, even though it might be several inches thick shaft, if it don't rotate over a period of time, it might sag a little on you. So you don't never want that to happen, but should it happen, and not necessarily because of that but some other reason, one deblades, you had what you called an Easter egg hunt.

Now that was an adventure, believe me. That was an adventure. What you had, you would go in and cut some holes large enough in the side of your piping for a person to get in. And you would don a fresh air mask. And the fresh air mask in those days -- I need to describe this old fresh air mask.

What it was was basically a kind of a canvas type hood that would go over your head a little bit and kind of viewing thing. It looked more like a visor type thing you might use as grinding materials, you know, that sort of thing. And then, of course, you would be decked out in coveralls and put on a couple of pair and wear the booties and all this sort of stuff.

[4:12:17]

Then if you got chosen to go in there and you crawled through this pipe and you began to pick up pieces here and there, the deblades the blades themselves or the pieces, and then you had to back out. Well, in the old days, we had a wooden crank -- it was a wooden box with a little squirrel cage type on it, and you hand cranked this thing and you forced the air through the hose and into this person inside. That's what you had. Now it's changed tremendously. In today's world, you wouldn't be permitted to even go in there, you know. But I guess one of the things that always amazed me, there was nobody there from health physics to check you when you came out. You know, I've asked the question why.

Callan, B.: Why was that?

Hackworth, J.: Not available. So, anyway --

Callan, B.: How often did this sort of thing happen?

Hackworth, J.: This could happen, oh, a couple of times a month. These are K-29, K-31, and K-33. I've done it several times. I was a little bit

slimmer then than now. But I can say I didn't enjoy any of them because you might have to go 40 or 50 feet up that piece of pipe.

[4:13:41]

Callan, B.: I've never heard of Easter egg hunts. This is really --

Hackworth, J.: Easter egg hunt is what it was called.

Callan, B.: [laughs] What was the other question I was going to ask you. It just completely slipped my mind. You kind of blew my mind with Easter egg hunt.

Hackworth, J.: That was the term.

Callan, B.: [laughs] If you were writing a story about Oak Ridge and K-25, what topics would you cover?

Hackworth, J.: That is a very good question. It really needs to be incorporated into one, the city being built at the same time. It's hard to omit Y-12 and X-10 at the same time because they were being built. The size of what was occurring, you know, in today's world it's still awesome. It's almost unbelievable how fast and how it occurred. I'd really have to think about that question a while because there's so much that would need to be incorporated in it.

Callan, B.: Okay. That's fine because --

Hackworth, J.: I would have to say it would require volumes for it to be done appropriately.

Callan, B.: Okay. I want to back up because I remember the question I was going to ask you. One of my previous interviews talked about power outages. Do you have any recollections of power outages that occurred?

[4:15:27]

Hackworth, J.: Oh yes. I've been involved in some of them. A -- one power outage specifically -- it went back to a problem that TVA had. They had a failure. Maybe just take this a little further. If I remember correctly, at one time there was five different sources of power coming into K-25. And that was in order to ensure being able to maintain a constant power supply. Now you paid a premium for this, you know, in your power bill monthly, yearly, quarterly, whatever to TVA you did have to pay a premium for

this, and it was considerably higher than what it would have been just a commercial rate.

But power outages created a whole lot of problems, potential problems. The secret to power outages was getting back on as quickly as possible, that being hopefully within an hour or less. The longest I recall was probably about 4½ hours that I was involved with. And that was a TVA failure.

What it did, some of their equipment failed and that in turn come back and kicked us out in our switchyard at K-33. I think you're probably aware the amount of power that was used here in Oak Ridge. It was a tremendous amount.

[4:16:54]

It actually was a steam plant built in Kingston to accommodate it, Bull Run steam plant built, and I actually have -- one line was tied in with Muscle Shoals in Alabama. So it was pretty extensive, the grid, the way it was tied in. But it was trying to prevent a failure.

Now there was not a lot of those, but the main thing you tried to do is get it going back as quickly as possible and make sure that you had enough folks to ensure that you had your oil flows and this sort of thing to your motor bearings and your compressors and this sort of thing. So you generally have to borrow people on the other areas of the plant to come and help do that.

Incidentally I had one of those one time, and I got some folks to come over from the barrier plant and they brought several over. It came up time to get everything back on order. I had one guy missing, so we got to looking for him and finally found him. He was up on the cell floor wandering around. He said, "I can't find my way out of here." Well you think about the first time you'd ever been in the building, I can understand it. It's just awesome. You know you can put 17 football fields in one building. That's pretty big.

[4:18:10]

But to answer your question in regard to how would you do it, how would you write, what you do about it? It just -- it would be several volumes and really to do it justice, you'd have to break it down into timeframes, really. K-33 was different from K-25 or K-27, of course. But it's -- the demands were different. The cascade system, once you got running, it would pretty well run itself, you

know, after you got everything, you know, the bugs out, and you got your deblades over with, if you had any. And you know, but the good part about it was you could shut down individual cells, valve them out, and bypass around. So they came about in later years and much better in the newer buildings.

Callan, B.: Did I ask you to describe what future generations should remember about K-25?

Hackworth, J.: You did.

Callan, B.: That's really all the questions I have. Is there anything else you want to discuss or expand upon before we wrap up the interview?

Hackworth, J.: Well, I would just say that I feel to DOE and the other folks that's appropriate and a good thing to do to record and get some of the information for future generations. It's something that will never be experienced again. You know, eventually, in a very short time, the Kentucky gaseous diffusion plant will be shut down. The one at Portsmouth is pretty much down already.

[4:19:53]

And you know, one day, if people drive by and all they see is a -- some green grass growing and a ~~scary~~ security fence up, they might say, "What's this all about?" I really feel like there should be Roosevelt's cell or something there other than just a little monument saying this is what happened. I think the federal government needs find the money to fund that and have that for future generations, plus it would be a tremendous, I think, tourist attraction in years to come.

Callan, B.: I think it was definitely a worthwhile tourist attraction. I think a lot of people don't have an appreciation for the significance of the Manhattan Project and what went on here, and I certainly didn't before I started on this project, doing something with -- what is a gaseous diffusion plant and who really cares. But as I've gotten into this project, really, it's just a phenomenal thing.

Hackworth, J.: Absolutely.

[4:20:52]

Callan, B.: It's mind boggling.

Hackworth, J.: This is not to do with K-25, but I had an opportunity to work at Richland -- Washington at the Hanford site, since I've retired, and also been at -- I've at the Savannah River site, Aiken, and, of course, I've been to Portsmouth and Paducah over the years when Lockheed and Carbide was here. But I've got to say there was a lot of things -- good things happen at the other sites, but they still don't really compare with the total picture of what happened at K-25. I've been to Los Alamos. You know, I've seen what's there. So I've been fortunate in a lot of ways, you know, to see a lot of the other sites, but people -- the bottom line is people is what makes things happen. People made K-25, Y-12, X-10, all these sites throughout DOE. But without the people, cooperation, teamwork, the effort it just don't happen. So it's obvious it works. I think it's a shining example of some of the folks, whether it be business school or otherwise, here's a great example of what occurred.

Callan, B.: I absolutely agree. I can't agree with you more. It's just such a different site, not a different site, but I guess a different piece of a story that really has never been told to me before. You hear about the Manhattan Project, you know, you hear about the multiple scientists and, you know, the research done at Los Alamos, and you know, the tests -- at least from my region, I think it's that all over. You hear about Los Alamos. You hear about White Sands. But you don't hear about really what the biggest, I guess, coordination of human effort that occurred for the Manhattan Project and that was this right here. And a good idea is one part of it, but you know, the actual production is a completely different part. You don't hear that story. I have now. [laughs]

Hackworth, J.: I'm sure you considered what General Groves had. You know, here we are building three sites in Oak Ridge, building the city, building the city at Hanford, building a site there, and eventually coming on at Savannah River and Los Alamos, all at the same time. Think about what that man had. You talk about some responsibilities. He's a good delegator.

Callan, B.: Yeah, he had project management expertise that we all could only wish to have.

Hackworth, J.: Absolutely. Absolutely.

Callan, B.: Well that's all the questions I have. Was there anything else you want to --

Hackworth, J.: Nothing I have to add.

Callan, B.: Okay.

[End of Interview]