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K-25 Oral History Interview

Date: 5/20/05

Interviewee: Wayne Henderson

Interviewer: Bart Callan

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[1:01:03]

Henderson, W.: -- along with the Bran Flakes and such.

Callan, B.: And some coffee, huh? I was never a big coffee drinker. I could never get a taste for that.

Henderson, W.: Well, it's a hot drink and that helps sometimes.

[crew talk]

Callan, B.: We'll start out with the hard-hitting question and that's just go ahead and state your name for me and spell your name out so that we have it preserved on tape.

Henderson, W.: Wayne K. Henderson. W-A-Y-N-E K. H-E-N-D-E-R-S-O-N.

Callan, B.: And talk to me. You don't want to talk directly to the camera.

Henderson, W.: Okay.

Callan, B.: Go ahead and tell me where you were born at and expand upon that if you want.

[1:01:44]

Henderson, W.: I was born in Lewis County, Missouri, which is a little county, a little town not far from the Mississippi River. And date, well, that would be back many years ago.

Callan, B.: Where were you living prior to coming to work at K-25 and Oak Ridge?

Henderson, W.: I was raised mostly in Montana and went back from there to work along about early '40s. I heard sort of a ruckus going on and they wanted a lot of people working in explosives. And I went back to work with Atlas Powder Company and ended up in a TNT plant in western Kentucky.

Callan, B.: So you were working in Kentucky? Where did you attend high school and what year did you graduate?

Henderson, W.: In high school? It was Livedo, Montana (phonetic sp.), which was 1937.

Callan, B.: Did you attend a college or a university?

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Henderson, W.: I went to what was -- is now Montana State University, Montana State College at the time, and had a degree in Chemistry. Majors in Chemistry and Biology.

[1:03:12]

Callan, B.: What prompted you to go to work from the explosives plant to K-25?

Henderson, W.: Well, Japanese war ended in early August. They shut the plant down in the next day or two. The next month, they were cleaning up -- washing out and cleaning up the lines and I came down -- some of the friends I knew had come down to work at Y-12 at the Manhattan Project at that time. Names change over the years and we came down, my wife and I came down to sort of see what was going on here as a recreation trip. Turned out to be a rather long recreation.

Callan, B.: What were your first recollections when you came out here and saw K-25?

Henderson, W.: Well, we came into the Manhattan Project and at that time, you had rec halls, recreation halls and they had told us when we came in here that there was no liquor to be had and you were not to bring it into the plant, into the area.

[1:04:43]

So two of us, we were just fairly newly married. We decided to go to this rec hall. They had little tables about like card tables, usually 4 people at a table and by each table leg, there was a bottle of something or other. I'm not right guaranteeing what it was, but it didn't look like a Pepsi Cola.

Callan, B.: What years did you work at the K-25 site? And then did you transfer to another laboratory?

Henderson, W.: I started work at K-25 in late -- 'bout the 10th of October, 1945 and worked there until '51 and went to the startup at the Paducah plant in '51.

Callan, B.: While you were working out here at the facility, did you meet any famous people or notable scientists?

Henderson, W.: Well, most of those had pretty well gone from here at that time. They were here during the -- mainly during the initial work of the

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plant. By the end of late '45, most of those had already gone, I think. I didn't meet any. You're talking about Bohr or this sort of people and they were not here at that time. As far as I know, no. If they had been here, they would not have been advertised anyway, so you could meet somebody and not know who they were, what they were.

[1:06:31]

Callan, B.:

So did you end up moving to Oak Ridge itself?

Henderson, W.:

Yes, we moved and at that time, we lived up on 415 Delaware, which is a one of the cement -- cemestos houses on the big curve on Delaware Street as you go on up to, like, Oak Ridge.

Callan, B.:

If people were to ask you what work was done here, how would you describe it?

Henderson, W.:

At that time, they were still building the upper sections of K-25 and people did not talk much about the different jobs. I knew some of the people that worked in different plants from people that had worked with me in other places and had come down here earlier. And I knew that they were working with uranium. I didn't know it was the process, but I knew that was going on. And many people knew even less than that about it at the time. In fact, one of the friends I knew said she knew what they were doing at K-25 'cause they were making vacuum cleaners. She heard a lot about vacuums, so she knew they were making vacuum cleaners.

[1:08:21]

Callan, B.:

What are some of your most vivid recollections of the time that you spent at K-25?

Henderson, W.:

If you're real careful, you don't have anything that you have to remember. The only times you have stuff to remember is if you get careless and get in trouble.

Callan, B.:

What did you like most about working at K-25?

Henderson, W.:

Well, it was an interesting time and I had some jobs that were -- any job you do routinely becomes uninteresting -- but I had some jobs that I enjoyed.

Callan, B.:

Can you give me an example of one?

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Henderson, W.: Oh, sometimes you'd better forget.

[1:09:30]

Callan, B.: Was there anything that you disliked about working at K-25?

Henderson, W.: Traffic going to work. [laughing] It was always a pain. It is today, it was then; I think it will be tomorrow.

Callan, B.: Yeah, the traffic's pretty intense in Oak Ridge.

Henderson, W.: At that time, I think they had something like 85,000 people in Oak Ridge. It was -- many of it were -- many of it, especially construction people were housed in trailers and temporary housing and dormitories and such of that sort. And we had a lot of people and many of them, of course, were young, essentially single and early married people. It was a time for young people, anyway, at that time. So it -- it was an interesting place to be.

Callan, B.: Let's talk a little bit about the work environment at K-25 and tell me, what was communication like with your fellow co-workers in the secret facility?

[1:10:49]

Henderson, W.: Rather limited. You worked in one area and in many cases, that area was the only area that your badge gave you access to. Mine would let me go to different areas, but there were sections of the plant that you had to have special clearances to get into and your access was limited. And your communications -- you worked with a group of people that had little contact with others in other part of the plant. They might ride the bus. I was here just a few months and I came out to go home -- most of us rode. Cars were not readily available. And we rode buses to the plant. And I noticed a guy looking at his hand, rather pudgy sort of a guy and not -- not young. And when I got on the bus to come home, why, he got on and got on the seat beside me and started asking me a lot of questions about various things in the plant and I just -- somehow I didn't know much. And when he left, got off the bus, he said, "Don't be so tight-mouthed. You don't know enough to tell anybody anyway and they're going to pump you to get everything they can out of you." [laughing] Which is what he was doing.

[1:12:36]

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And some of the guys -- one of the guys that I worked with told me that, as you know, we had a large attachment of U.S.E.D. United States Engineering Detachment people here, and he -- he was in that detachment. And his job was to question people for any information he could get out of 'em and filed a report that night about who said what and when. And he said he got kind of tired of that. [laughing]

Callan, B.:

So he kind of ran around on the buses and talked to people?

Henderson, W.:

He worked at K-25 which is how I knew him. And I knew him later on. We had contact later and he was telling some of his memories of the time. We talked to people we knew -- knew fairly well what their background and training and such was. You didn't mind talking to them because you knew that they had at least the same clearance that I had. But ordinarily, you talked to no one. That's why I said I did a lot of fishing and hunting and one thing and another. 'Cause they can't -- can't get very many secrets out of a guy that goes hunting. He doesn't tell where his hunting place is. [laughing]

[1:14:20]

Callan, B.:

There you go!

Did you pretty much stay in touch with the people you worked with at K-25?

Henderson, W.:

Well, frankly, no. So many of them now are gone and I wouldn't have any way to get in touch with 'em and I hope I don't for a while. [laughing] There are a few of us that still get together, but most of us, well, you put 60 years and you have a guy that was in his 20s at that time, and the chances are pretty good that he's not around anymore. A few of us are still here, but Wally Davis, I worked with. Keith Lowery and several others, but most of the ones that I worked with are gone.

Callan, B.:

What were the physical working conditions like at the K-25 facility?

Henderson, W.:

Well, if you know anything about the K-25 building, it was -- the heat was from the equipment, and the equipment gave off a lot of heat. And you had your basement level, then your mechanical level, then up above, you had your control rooms. And the control room's one big floor with all the control equipment up there. And

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as you know, it's about a mile -- that U is about a mile from tip to tip. And if you had any distance to go, you rode a bicycle. I got to where I could ride a bicycle fairly good up there. It was reasonably comfortable, not air conditioned of course, but wintertime, you had plenty of heat, summertime; you had fans enough that it was reasonably comfortable.

[1:16:32]

Callan, B.:

Can you describe the control room and the controls that were up there in as much detail as you can recall because we haven't really gotten any good description of what that particular floor was all about.

Henderson, W.:

Well, each -- it was one big building, but each building had a number of -- well, the building itself was divided into a number of - - called sub buildings. And each of those sub buildings had the valving at their cells and valving and all, and each two of the sub buildings had a control room and the control room had instrumentation that allowed you to detect in the heat into the cells and the pressures and all. This was -- if you know anything about UF₆, uranium hexafluoride, you know that it is gas at reasonably low 2 or 3 pounds absolute pressure. And you followed the pressure and the pressure gradients in the cells and through the cascade. They had instruments there that would allow measurement of not only pressure in other things, but of -- in (indiscernible) cascade, which is about as good a description as I can give you now.

Callan, B.:

Thank you!

[crew talk]

Callan, B.:

What rules and regulations were important to follow at the facility?

Henderson, W.:

You wouldn't like my answer all that. [laughing]

Callan, B.:

I might, actually.

Henderson, W.:

C-O-Y-A is probably one of the best.

[1:19:13]

Callan, B.:

What is that?

Henderson, W.:

Well, I thought that was universally known.

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Callan, B.: Oh. C-O-Y-A? I got it.

Henderson, W.: [laughing]

Callan, B.: Okay. What was your supervisor like?

Henderson, W.: We had good supervisors. People I had -- some of them I had known for a good many years and some I had just met, but they were capable people and, in most cases, considerate people, and some of them, I had contact even within the last 15 or 20 years. They were still alive and available. But they were good considerate people, capable people.

Callan, B.: What about your co-workers? What were they like and did everyone pull their weight?

Henderson, W.: Well, they were like folks that you run into and -- where you got a group of people, you have all kinds that go into that. Most of them were capable, able people and willing people.

[1:20:29]

Callan, B.: What kind of health facilities were available to you out there?

Henderson, W.: Well, at that time, I didn't have to have much. And I'm glad. We had -- you had your normal industrial poke and prod doctors and nurses and your routine physical examinations at that time, which would've been in the early -- in the late '40s that I was there. And they were capable people doing the routine physical exams that you usually do in an industrial plant.

Callan, B.: Were you ever hurt while working at K-25?

Henderson, W.: No. As I said, if you're careful, you don't have interesting things happen to you.

Callan, B.: Let's see. And you weren't working there during the Manhattan Project, but you were working at the explosives place, correct?

Henderson, W.: Yes.

[1:21:50]

Callan, B.: Okay. Were you familiar with K-25 prior to --?

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Henderson, W.: Nobody was prior by coming down there. No, the plant of that type had never been built and had never been operated, so no one is familiar with that technique or that equipment at that time.

Callan, B.: Even though you weren't here specifically, you were somewhere on August 6, 1945. That was the day the bomb was dropped. Where were you at and what were you doing, and what were your thoughts?

Henderson, W.: I was in Kentucky at the TNT plant. Whether I was actually working that day, I think, probably was 'cause we worked 7 days a week and 24 hours a day. We had a day off occasionally, but it was not often. So I would say I was in Kentucky working at the explosives plant.

Callan, B.: And what was your reaction to that news? Do you remember?

[1:23:07]

Henderson, W.: Relief.

Callan, B.: And what was the overall atmosphere like that day?

Henderson, W.: Well, I think everybody was relieved to know that we were not going to have to -- that the war was going to have to end, period. There's no way it could continue after the -- well, it did for the second, Hiroshima, was one day and then about 3 days later, the Nagasaki explosion and they knew then it had to end. And I think people were probably relieved to know that, that was essentially the end of the Japanese war. Regret? I don't think anybody had any regret of it because the way that things had been going, it saved a lot of American lives and a lot of Japanese lives.

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

[1:24:19]

Henderson, W.: I wish it had never been necessary. But since it had to be, since it was necessary, I'm glad that it worked out the way it did, that we got it instead of the Germans. Because I tried to study German. It didn't work real good. It's not the easiest language to understand.

Callan, B.: [laughing] No, it's not.

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We're going to flip out tapes real quick because we have just a few more categories to go through and I just wanna make sure that we don't have to pause right in the middle of the --

[End Tape 1, begin Tape 2]

[2:00:30]

Callan, B.: Okay, we're back on and I wanted to ask you, after the Manhattan Project, when you came to work at K-25, I believe that was called the expansion program or the expansion period of the plant? Are you familiar with the term "expansion program"?

Henderson, W.: You're talking about when they built the additional convert -- additional, well, K-27, 29, 31.

Callan, B.: Right. Can you explain what the expansion program is?

Henderson, W.: Well. Uranium mainly has mainly two isotopes, the 238 and 235. And the 235 is only about .7 of a percent. And since that is the element you want for -- for -- I mean, isotope you want for power and other uses, you try to get as much of that as you can out of the normal uranium. And in order -- your enrichment is very small, it's a matter of, I don't know, thousandths of a percent per stage or maybe even less than that. Those figures are gone and somebody that's real good with a calculator can figure out what they are. But in order to get -- get as much as you can out of it, you have to put your low assay, what we call tails, to very large enrichment program. You can get it down to some reasonable percentage with the K-25, but if you want to go down below what the K-25 could do, you had to go to much more enrichment stages than we had from K-25. So they built the additional sections of plant to strip the 235 out of the lower, what we call tails at the time, of the lower assay, depleted material, if that makes any sense to you.

[2:03:09]

Callan, B.: It does, actually. I've done quite a few of these interviews and that's why I'm asking you. With the expansion program, was it to make the whole process more efficient or what was it that we were trying to do?

Henderson, W.: Well, they were trying to get as much of the 235 out of the available uranium as possible. I wasn't in on that part of it; I just know it was done. And I don't know whose thinking went into that except that K-25 would strip it down to some value. It doesn't

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matter what the value was. But you still had a great deal, comparatively a large fraction of the 235, was still in -- in the depleted material from the K-25. So in order to recover that you went to further processing to strip it down to even lower values, and even the -- I'm sure and I don't know the numbers, but I'm sure that even now, there is still a residual 235 in that depleted tails that you have from all the processing, but it's probably down to a low enough percentage that it's no longer economically feasible to recover it. If those -- if that makes any sense.

[2:04:52]

Callan, B.:

It does. It does.

What did you do in '64 when the facility was put on standby?

Henderson, W.:

I wasn't here then.

Callan, B.:

Okay.

What are your thoughts now about how the activities at K-25 revolutionized the world?

Henderson, W.:

Well, it was a job that had to be done and I think, frankly, that we're going to have to go to the use of atomic power; I don't think we can continue to use fossil fuels, coals and oil that we have available. We'll have to have energy to operate in the world. We can't -- we're past the time that we can use manpower and use animal power, so we're going to have to have a power source.

We talk about the hydrogen economy. Hydrogen is not readily available. It is not cheap, and you have to have a lot of power to make it. So although it can -- it's a very good fuel, you have to have fuel to make the hydrogen. So that means you're going to have to go to wind power, ocean power, atomic energy, something of the sort. We're not going to use -- and now you ask a TVA coal burner, oh, they don't contaminate. But you go back in the hills up here and ask a guy that lives along the -- back in the hills and he says, "Oh, my! I had a good well for many years, but now it's so -- got so much mineral in it, I can't use it anymore." What's happened is when they opened up your coal seams, it let water back into the underground aquifers and contaminated most of the underground water supply.

[2:07:26]

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And you ask a TVA, "We just put a little bit of stuff up in the air." But those numbers I've seen, it's something like about roughly 6% of the coal they burn is sulfur -- so you burn 1,000 tons of coal and you put about 100 tons of SO₂ in the air. Oh, they don't contaminate, but something goes somewhere. So I think we're going to have to go use wind power or atomic power for -- and they throw an awful lot of mercury, tons of mercury in the air from their coal plants, too. So we're going to have to have a source of power and it's going to have to be either atomic or something we don't know yet.

Callan, B.: Over at the plant, describe each job that you did and in as much detail as you can recall or as much detail as you can give me.

Henderson, W.: Well, I'll put it this way: I did what the boss told me to do. Sometimes there were jobs I -- a little bit unhappy working with, but the information we had, we did all right.

Callan, B.: What would you say was your most challenging assignment as an individual or a group out there?

Henderson, W.: Well, I wouldn't even want to go into that.

Callan, B.: What about your most significant accomplishment you did during your tenure at K-25?

Henderson, W.: Many years ago, I tried to get a report that I had written, and when I got to the people that had the say about the report, they said, "No. That's a secret report."

[2:09:51]

Callan, B.: What was your job title working out there?

Henderson, W.: Minor Supervisor, which covers a lot of sins.

Callan, B.: What sort of roles did women have working out at K-25?

Henderson, W.: Most of the women that I knew were -- worked in -- well, frankly -- A few of them worked as -- as control operators in the buildings, but comparatively, few women worked -- as I remember -- worked in the plant. Secretaries, a few secretaries and at the time I was there, it was practically all men working there.

Now, Y-12 used quite a lot of women. But I don't remember many in K-25.

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[2:11:23]

Callan, B.:

What about minorities and African-Americans? Were they working out at the plant? What sort of job roles did they have?

Henderson, W.:

Well, at that time, which was in the '40s, your -- first of all, minorities at that time, were black people. We had -- The Manhattan Project was sited here in east Tennessee because there were no -- almost no foreign population and almost no non-native, non-immigrant people. All of eastern Tennessee was a -- had been settled and the population was steady for a good 50 or 60 years. There were no -- no foreign-born element in this section. So we had no Japanese or Chinese or anything of that; that has come in in the last 50 -- 25 years, really -- and your minority were the black people. And at that time, most of your black people were employed in janitorial and this type of work, service work.

Now, we had a few Native Indian -- American Indians and I mentioned one morning I went into one of the friends that I worked with. I said, "Let's give it back to the Indians." He sort of chuckled and said, "As far as I'm concerned, the Indians already got it." I didn't know at the time, but he was one of our Native Americans.

[2:13:31]

And later, I ran into a guy that was talking. He was 1/300 -- or 200, or 180 something of Shawnee. He'd [laughing] chased his lineage back to a trace. But we had quite a few -- several American Indians working there with us and as I say, they -- they would work as operators along with other -- with other -- there was no distinction. In fact, I didn't even know the guy was an Indian. He was a guy I liked and worked with and enjoyed.

[2:14:13]

Callan, B.:

Were you married?

Henderson, W.:

I -- we were married about 18 months, give or take, when we came down here.

Callan, B.:

What was life like for your spouse living out here?

Henderson, W.:

We -- she had -- we'd lived, as I said, up on Delaware and she and her fellow young women would get together and took care of the

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kids and this sort of thing and have a -- they had a 'bout 4 or 5 of them had arranged it -- had youngsters about the same age. They would get together at one of the homes and a couple of the ladies would keep the kids and the other two or three would go shopping and do what they wanted to do and the next day, they'd moved down to another home and rotate around so that they had some -- some free time to do what they needed to do and work that young women -- young wives and young mothers have to do.

You might be interested in this, that at that time, you had boardwalks -- there were no sidewalks, but you had boardwalks down through the greenways from various parts of the -- of the residential area on the ridge and they would go down to what we call town-sites, what is now Jackson Square as they call it. And that was our main shopping center for the part of the town that we lived in. We'd walk down there occasionally. They had bus -- bus service on the main up and down streets: Delaware, Florida, California, and so on and had a bus run about every 30 minutes during the daytime. I don't know about after dark. You -- you were on your own.

[2:16:42]

Callan, B.:

I have just sort of broad perspective questions here. Describe for me what you think future generations should remember about K-25.

Henderson, W.:

I don't know what your history books are going to say about it.

Callan, B.:

It's going to be written based upon what you and your peers say about it, I guess.

Henderson, W.:

Well, it was a necessary part of the World War II and it served its purpose well. No longer -- no longer a viable option. I'm not even sure that -- now, Portsmouth was a gaseous diffusion plant and I'm not sure it's even operating now. And the Paducah plant was also a gaseous diffusion plant and I haven't contacted people there to know what they are doing, if it's still in operation. So I -- I think that K-25 served its purpose and is -- will it be remembered for that reason.

[2:18:13]

Callan, B.:

Describe the accomplishments here and what should be acknowledged.

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Henderson, W.:

What -- what we've learned in the last years and is taken now as something that is, well, true, was -- was put together by people working at K-25 and at X-10 and Y-12. We built a lot. At the time I was working at K-25, many of us didn't know what we were working -- really what the dangers were -- what the critical parts of the thing we were working with were. And we had to learn as we went along. We did a pretty good job of it. And people now look back and say, "Well, why did anybody pull that dumb stunt?" But the guy that pulled that dumb stunt was learning to do what the guy now is building on. If that makes sense.

Callan, B.:

That does make sense. You have to learn.

Is there anything else that you wanted to discuss, or say, or expand upon before the interview ends?

[2:19:43]

Henderson, W.:

No, as far as I'm concerned. That's -- if you're satisfied, I'm --.

Callan, B.:

I'm very satisfied. Those are all the questions that I had and I thank you for coming out.

[End of interview]