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K-25 Oral History Interview

Date: 4/12/05

Interviewee: Robert Clouse

Interviewer: Jennifer Thonhoff

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[1:01:01]

Thonhoff, J.: Okay, perfect. Can you start with your name, and spell it, please?

Clouse, R.: Robert J. C-L-O-U-S-E.

Thonhoff, J.: Okay. Where were you born?

Clouse, R.: In Graysville, Tennessee.

Thonhoff, J.: Where did you live prior to working at the K-25 facility at Oak Ridge?

Clouse, R.: Oh, where did I live prior to K-25?

Thonhoff, J.: Uh-huh (affirmative)

Clouse, R.: I was -- before coming to K-25, I didn't work. I'd gone to school.

Thonhoff, J.: Where did you go to school?

Clouse, R.: At Tech, Tennessee Tech. And from there, I went to the military. And from the military, I had been contacted by the War Man Power Commission and they had demonstrated an interest in me. And I didn't know for what. And as time went on, it became pretty obvious. So all at once one day I was called to the -- and I was in the military, in uniform then -- called to the orderly room, in the company commander's office, and he told me, he said, "We decided to make you a civilian, and you're going to Oak Ridge." And I had no idea what Oak Ridge was. I lived near here. But I didn't know what Oak Ridge was.

[1:02:52]

So to make a long story short, I've been in and around this industry for a long time and in it for over 60 years.

Thonhoff, J.: When you were going to college, did you have a degree, did you get a degree?

Clouse, R.: Yeah.

Thonhoff, J.: What was it in?

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Clouse, R.: Chem. engineering.

Thonhoff, J.: And then what years did you work at the K-25 facility? When did you start?

Clouse, R.: I started in 19 -- let's see I ended in 194 -- I left K-25 in 1968, and I went to Kerr McGee and worked -- and was the nuclear plant manager at their nuclear plant. And we made fuel elements.

Thonhoff, J.: How long did you do that?

Clouse, R.: Eight years.

Thonhoff, J.: Okay. And when you were at K-25, did you ever transfer to X-12 or Y-12 or X-10 or anything?

Clouse, R.: Not until I returned. When -- well, Clark Center, who was our head of our three-plant operation, he told me one time, he said, "You ever decided to leave. You call me. I want you to be here." [laughs] So I said okay. But I called him and he said, "You've got a job whenever you want it." So I went to work with him -- I went to work, at that time at Y-12, making weapons.

[1:05:05]

Thonhoff, J.: Okay.

Clouse, R.: Before that, I had spent all my time -- primarily all of my time doing decontamination, cleaning uranium off of stuff. And the other part of the time I spent developing chemical processes that -- and I've written several papers that have been published on that.

Thonhoff, J.: And that was the main work that you did there at the K-25 facility?

Clouse, R.: Yeah. And as we -- you know get on, in the interview -- with the interview, you'll discover why, because that level of our activity was not too great. And so I decided, you know, we need to do something about this. So we did. And then I got the place that it was so -- then we started seeing people getting into the nuclear industry that had not been in, only a few people. Goodyear got in it and few others, you know.

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And so then they started -- industry decided they wanted to learn something about it. And the ghost in the closet was criticality safety.

[1:06:28]

Thonhoff, J.:

Was what?

Clouse, R.:

Criticality safety, trying to prevent a nuclear accident.

Thonhoff, J.:

That's important.

Clouse, R.:

At the plant, yeah. And as a result of that, we spent a lot of time helping people train their people. We spent a lot of time doing a better job with our people here. We had people that knew nuclear safety pretty well. And that's the reason K-25 didn't have any criticality accidents. That's the reason Y-12 did. [laughs]

Thonhoff, J.:

They didn't have your people.

Clouse, R.:

Huh?

Thonhoff, J.:

They didn't have your people.

Clouse, R.:

They did -- Well, I was doing all of it because I felt most of them I did help because I felt the need to do it.

[crew talk]

Thonhoff, J.:

Okay. What are your first recollections when you arrived at K-25?

[1:07:37]

Clouse, R.:

Well, first I came to Wheat School.

Thonhoff, J.:

Pardon me?

Clouse, R.:

I came to Wheat School

Thonhoff, J.:

Wheat School?

Clouse, R.:

Wheat School was an employment interviewer -- that's where the interviewers were and all of that. And I was greeted then by Bill Wil -- not Bill Wilcox but Jim Gabbert and another guy by the

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name of -- who finally because assistant plant manager, and he interviewed me. And by that -- by about noon that day, I went to work.

Thonhoff, J.: That's fast.

Clouse, R.: That's fast. And I was at work at 3025 in the Cascade. And I had never been in it before, been there before, but that was a starting of that career.

Thonhoff, J.: And how would you describe the atmosphere of the plant in general?

Clouse, R.: Of the what?

Thonhoff, J.: Of the plant.

Clouse, R.: Our plans?

[1:09:01]

Thonhoff, J.: No, your plant. The K-25 plant.

Clouse, R.: The plant, oh. A big mystery.

Thonhoff, J.: Big mystery.

Clouse, R.: To most people; because people didn't know anything. And they were surrounded by secrecy, although this group of people they brought in, and I'm talking about Union Carbide went out and hired these people. I was one of them. They were terribly sharp people. Bob Dyer is one of them. Ed Sternberg, you might have met Ed Sternberg.

Thonhoff, J.: Not yet.

Clouse, R.: Ed was another one. And Joe Dysktra was another. Joe and I have been friends for 55 years. And it's a close relationship.

Now the other good part of this was this, they were all people who were not -- who were very friendly, not only friendly but willing to share what they knew with anybody that wanted to hear it. In other words, you could go up to one of those guys and talk to them, and they would tell you what they knew about a subject. It wasn't

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competition between them. There was a pure free exchange. And I think that's what made it go. And to tell you the truth about it, I think Union Carbide created that.

[1:10:59]

Thonhoff, J.: That's really great.

Clouse, R.: They created it. And there are others that believe the same thing that I believe because they didn't create -- they didn't put competition between them. And you could come out in this plant and -- many a time, I worked four shifts without going home. We had to do it. There wasn't a choice because we were doing things that we had to keep track of. And through it all, I almost got fired because they found me sleeping on the desk.

Thonhoff, J.: Was it after one of those four-day shifts?

Clouse, R.: [laughs] The guy from the shift superintendents office came walking and said, "You can't sleep on your desk." I said, "It's my damn desk. I can sleep on it if I want to." [laughs] And that morning at 8:00 they had a meeting to see if I was going to be fired or not.

Thonhoff, J.: Well you obviously were not. [laughter]

Clouse, R.: The guy that was my department head went to that meeting and said, "You fire him, you fire me."

Thonhoff, J.: That's that closeness you were talking about.

Clouse, R.: That's that closeness. And what was the subject now, I'll get back on it.

[1:12:37]

Thonhoff, J.: Well, we were just talking about the attitude and the atmosphere and the building. And if people inquired what work was done there, how would you describe it?

Clouse, R.: I wouldn't.

Thonhoff, J.: You just wouldn't talk about it?

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Clouse, R.: I'm going to have to go through this bit anyway because it --

Thonhoff, J.: Sure.

Clouse, R.: When I got here, I didn't know what was going on. I had no idea what was going on. But I was in a position where I was looking at molecular weights. And I was taking samples of UF_6 in the cascade, and I could see strange things on the changes in the molecular weight of the material I was using. I was getting. And I was what the hell is going on here? You know, molecular weights don't change.

And so, this created some concern for me. I didn't know what was going on. And then at a point in time, there was an article that appeared in the *News Sentinel* and that article said that the people at -- in Chicago have caused fission in the U^{235} isotope. I thought oh my God! That's [laughs] what we're doing; but I never said anything about this. The only thing I ever said about it was when I went home the night that they dropped the Hiroshima bomb, I was working night shift, and my wife at that time, I gave her a clip out of the *Knoxville News Sentinel*, and I said, "You'll hear something that might frighten you today, but just read this. And when you read it, I'll go through as much of it as I can." And she did that.

[1:14:56]

But that appeared in the *Knoxville News Sentinel*. And later on, I read that it was mistake. They don't know how it happened. Nobody knows.

But anyway that gave me a clue. That says to me, "Hey, what they're doing out there could be dangerous." And that's why I got busy and started doing those things that we needed to do that would make the people more comfortable -- not more comfortable handling uranium but more sure of themselves. And I spent a good deal of time talking to them about what it was about. And that was maintenance people -- that was everybody.

Thonhoff, J.: So you basically trained people on how to deal with the uranium.

[1:15:55]

Clouse, R.: Yeah, and I did some other things that they said was the reason we didn't have any criticality accidents here.

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Thonhoff, J.: What are those other things?

Clouse, R.: We had nuclear safe containers that were like five inches in diameter and four feet high. That was designed that way because that geometry is totally safe with any enrichment. You can put two of them, two of those containers with fully enriched uranium in it. You can put them within four feet of each other, and you're not going to cause a reaction. You get it closer together; you're going to cause one. And so we just stayed with that geometry.

And where you could put them together, we painted green on the floor; where you couldn't put them together, red.

Thonhoff, J.: That's very good.

Clouse, R.: And it worked! But that was a group of people that just did it. And after we did it, we got a lot of credit for doing a lot of things, you know. But we didn't have an excursion. [laughs]

[1:17:25]

Now the people I trained that went to Portsmouth to start up that plant, the plant manager there was a good close friend of mine, and the first damn thing he did was have a nuclear accident at Wood River Junction. He is without corneas now because of it. He has had four -- he has had eight cornea transplants. Still can't see.

Thonhoff, J.: That's horrible.

Clouse, R.: It is. He almost -- he was very close to lethal limit of radiation because he was standing right in the middle of it. So I don't know.

Thonhoff, J.: Not one of the smartest things to do, I guess.

Clouse, R.: Huh?

Thonhoff, J.: I said that's not the smartest thing to do.

Clouse, R.: Nope.

Thonhoff, J.: What are your most vivid recollections of the time that you spent at Oak Ridge?

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Clouse, R.: There are lots.

Thonhoff, J.: I'm sure.

[crew talk]

[1:18:49]

Clouse, R.: That question makes you focus on the most critical things that happened and the things that could have the most far-reaching impact. So that's what I'm going to talk about.

Thonhoff, J.: Absolutely.

Clouse, R.: During all this time, I was the guy that looked at things from a criticality safety point of view and did something about it, and I had a crew that did that. And I trained them to do it.

One day -- one night, Paul Hubert called me and said we had a problem. Paul was plant manager. He said, "I don't know what's going on here, but I got an axial flow compressor that's on a truck headed to Poplar Creek." And he said -- I said, "Paul, what are you gonna do?" He said, "I'm going to take it down there and do something with it. I don't know what to do with it." I said, "I'll tell you what you do. You bring it over to me in 1420. I'll take it and I'm going to put in the dryer room."

Why? Slow neutrons require hydrogen. Water has got hydrogen in it. Okay? [laughs] So, I wanted to get it dry.

Now that was a safety thing because I couldn't figure anything else to do with it, but I knew if it was dry, it would be in the best place. Once I got a look at it, it couldn't be wet. But getting it over near Poplar Creek, where in the evening it would turn cool and be foggy [laughs] that wasn't the place to put it.

[1:20:47]

Thonhoff, J.: No.

Clouse, R.: So we didn't put it there. I just left it in that dry environment. And finally, that night, during the night I started trying to see what I had. And I had the biggest damn mess I've ever seen in my life. The axial flow compressor, which is made out of aluminum -- they

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look like a jet engine, but the blades in it are aluminum. Those aluminum blades had melted and were down in the bottom of that compressor along with another aluminum compound, and what we had formed is UAl_3 , uranium/aluminum fuel elements. [laughs] That's what it turned out to be. We didn't intend to.

Thonhoff, J.: By accident.

Clouse, R.: Huh?

Thonhoff, J.: By accident.

Clouse, R.: Yeah.

[1:21:51]

Thonhoff, J.: Wow!

Clouse, R.: Well when I got that thing over there and started looking at it and see what we had, I got the shift superintendent to bring me down a steel bar, his people. And I hit that thing, and fire flew everywhere. Why? -- because it exposed the uranium to oxygen.

And so I settled down then. [laughter] Because I really didn't know what the hell I had. And I'll be honest with you; I was scared to death because there was all the elements of a reactor. And it was all melted in the bottom of an axial flow compressor. And I didn't know why much critical mass was there. I had no idea.

Thonhoff, J.: Wow!

Clouse, R.: But we got it solved.

Thonhoff, J.: You got it all taken care of.

Clouse, R.: We got it taken care of and got it cleaned out, after we started -- What we did; we started taking it out in pieces, doing it to keep the critical mass down as much as we could. And we did. We did a pretty good job of it.

Thonhoff, J.: What did you end up doing with the compressor and everything?

[1:23:17]

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Clouse, R.:

Well, the compressor was in pieces then because we broke it up. So we put it in separate boxes and maintained spacing on the containers. I don't know whether it was boxes or what. I don't even remember. But I know we got it taken care of. And the critical safety people stayed with us all night until we got it done. But that was a touchy one.

Thonhoff, J.:

Yeah.

Clouse, R.:

And enough to make you gray-headed. I didn't get gray-headed, I got white. [laughs] But it sounds scary, but once you work in it, it's understandable. You become accustomed to it, not too accustomed to it. It makes your blood pressure go up once in a while.

[crew talk]

[End of Tape 1, Begin Tape 2]

[2:00:33]

[crew talk]

Clouse, R.:

I guess that compressor thing did a lot to raising our sensitivity. And as a result of that, we started looking more carefully than we'd ever looked before. And we had -- we would, we would -- if there was even a suspicion of a critical mass, we would go in and look at the system and see what it looked like. And we never had one. We had -- we came close two or three times, but you can't really judge close in that one. I didn't see a blue haze, so we weren't that close. [laughs]; if you know what I mean? It was all safe.

[2:01:30]

But we got to the place we could do -- there were things we would do. We knew that the body had water in it, and that was the thing that slows down neutrons. So we didn't get in and reflect anything back into the reactor.

Thonhoff, J.:

Oh, okay.

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Clouse, R.:

We just wouldn't reflect. And the reason -- the way we kept from it is we stayed enough distance from it so it wouldn't change it. And that was a judgment call; but it was a good judgment call.

I don't know. It's -- I think about half of it was luck and about half of it was God looking after us. [laughs] I'll tell you, and that's the truth. I really believe that.

Thonhoff, J.:

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

Clouse, R.:

Well, that's -- there's a lot of answers to that one. I guess the thing that I liked the most was the management at K-25 was as -- was a very honest management. And you had their cooperation. They spent a lot of money on doing things for me. They did. You know, painting the floor. Well, that's dumb. Sure, it's dumb [laughs]

[2:03:28]

Thonhoff, J.:

Make the world safe for themselves.

Clouse, R.:

We just getting -- edging up on it. Now the other thing about it is there was some politics in it for a while, but it -- they were still friendly people. They were still friendly people. As I said, Joe and I are still friends. Bob and I are still friends. We don't see each other as much as we'd like to, but we still go to basketball games together, Lady Vols. [laughs] But I, you know, I could -- Joe and I could talk about anything. And I, you know, it would be held in confidence. I knew that decisions -- most of the decisions that were made when I left and went to Kerr McGee. I talked to people at K-25 about it. I talked to Clark Center about it. And you know what his answer was?

Thonhoff, J.:

Uh-uhn (negative).

Clouse, R.:

I don't blame you a damn bit. Give me 15 minutes, and I'll go with you. [laughs] Now, that's a class act.

Thonhoff, J.:

That is. It's wonderful.

[2:04:54]

Clouse, R.:

And the last thing he said is, "I want you to promise me one thing. You're not going to leave this company again without letting me know." I said, "Okay, I'll do that." Isn't that great?

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Thonhoff, J.: It's really great!

Clouse, R.: And he stayed interested in me. He stayed interested in me.

Thonhoff, J.: What would you say you disliked the most about the K-25 plant?

Clouse, R.: What did I dislike?

Thonhoff, J.: Uh-huh (affirmative)

Clouse, R.: I'm not sure.

Thonhoff, J.: You want to think about it and we'll come back?

Clouse, R.: What I liked about it is the honesty. What I disliked about it is some of the things that started after that; they wasn't too great. There was an element that came in there that was totally different from the element that was there that started it up. Was I on the wrong side of the fence? I don't know. But when Kerr McGee came along, I knew damn good and well where I was going. And they knew they wanted me. So I just went. And I enjoyed it. I really enjoyed that experience.

[2:06:37]

Thonhoff, J.: I can really tell. How did people, as well as yourself, communicate to family and friends, or was there just no communication at all about what was going on?

Clouse, R.: Well, in the beginning, when it became kind of obvious what was going on and there was this feeling that I knew what was going on, you'd have some like Winkel -- were making butter. Okay? That's all we're doing. We're making jelly for peanut butter sandwiches -- anything to get out of the question. Those of that knew each other and knew each other real well, and Dysktra and I, and Dyer and I, and all the -- were out of the same dough. You know, we understood each other. It was -- we knew what to say and we knew what to ask. We just didn't ask questions a lot. And that has grown --

I reviewed a guy's paper he had written. He had went to UT, and he wrote this paper on that subject. And he says that it was a closed group, and it wasn't. And his grandfather was in it, was at

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the plant at the time. He worked for me. And I told him, "Man, you don't understand what you saw." But they're not going to get out of here and jeopardize their career by telling you what they're doing. They're not going to do that, and they didn't.

[2:08:58]

I think in general, the people that were in that plant were willing to help each other out anyway they could to make their job easier. I don't know how far it would go. Now that climate changed with the advent of a young generation that came in and we ended up with quite a few people that were sharks. Now you know what I'm talking about. They'd kill you just to see you die. [laughs] And that destroys a good organization.

Thonhoff, J.:

Sure.

Clouse, R.:

I had that happen to me at Kerr McGee. I had some sharks. And so I fired me some sharks.

Thonhoff, J.:

[laughs] Some shark steak, huh?

Clouse, R.:

Huh?

Thonhoff, J.:

Had some shark steak?

Clouse, R.:

Yeah. We had a shark kill.

Thonhoff, J.:

What rules were important to follow?

Clouse, R.:

What rules were important to follow? Well, certainly it was important that you followed those rules that had to do with prevention of a criticality. That was utmost in your mind. And you always gave any question like that priority.

[2:10:38]

Does that suggest any other answer or question?

Thonhoff, J.:

That's fine. That's good.

Clouse, R.:

I don't know.

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Thonhoff, J.: You kind of went over what was expected of you and what you did as far as working with your rules.

Clouse, R.: Yeah, but we were given a lot of freedom. I'm sure you already understand. Turn a bunch of idiots loose on 4,000 pounds of UAl₃. [laughs] You know? You gotta be crazy to do that [laughs], but they did it. It was trust. That was trust. And I think there was a lot of trust amongst those people. But I think the trust started deteriorating with the advent of the Turks; the ones that would come in and destroy you if they wanted to. And they let it go on.

So I, you know, I just knew the people who I talked to, and those who I did not talk to, I just didn't mess with them. But that's the way they had lived. Y-12 was particularly bad.

Thonhoff, J.: So K-25 wasn't as bad for that?

Clouse, R.: Maybe I didn't even try to go through that Y-12 thing and look at it because most of the time I was in K-25 or in Y-12 or in organizations that had parts of the K-25 group in it or in Y-12 part of the K-25.

[2:12:55]

Here's a perfect example. I brought you an organization chart from back in 1940-something, and I thought maybe you would like to have that.

Thonhoff, J.: That is fabulous, yes.

Clouse, R.: But I'd like to have it back if you can get it copied.

Thonhoff, J.: I can get a copy of it.

Clouse, R.: And it even shows Joe and I. [laughs] I had just hired in.

Thonhoff, J.: Wow! That's wonderful. We can really use that.

Clouse, R.: It shows Winkel in there. [laughs] But it's something you can see. One of the things I did after I got more involved in management is I went back and got an MBA. And an organization chart tells you more than anything about the organization.

Thonhoff, J.: Right.

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Clouse, R.: And you can see the character of that organization in that organization chart.

[2:14:01]

Thonhoff, J.: Right because that's the backbone of it.

Clouse, R.: That's it.

Thonhoff, J.: Wow!

Clouse, R.: But I thought that would be a good thing for you to have to understand the character.

Thonhoff, J.: That is wonderful, absolutely. That's good thinking ahead.

Clouse, R.: Well, I had it. And you know, the guy that gave me that was a good friend of mine who went to Paducah. And before he left, he came to my retirement party. He made a copy of that and brought it to me as a gift.

Thonhoff, J.: That's a very thoughtful gift.

Clouse, R.: Isn't it?

Thonhoff, J.: What kind of health facilities were available to you?

Clouse, R.: Health?

Thonhoff, J.: Health.

Clouse, R.: I gotta be careful here. And let me lead it off and try to set the stage. We didn't know all about the human body then as we know now -- as they know now. I don't. Therefore, we, obviously, took some chances.

[2:15:39]

Now, did it affect us? I don't know. You know, I was pretty fair chemical engineer and I knew when I was in things I shouldn't be breathing. So a lot of times I'd hold my breath; nothing wrong with that. But I think there was a general and the word that I want to use is respect, but on the other hand, there was a lot of bad

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things happend because people weren't doing what they thought they'd do.

Example, I had a guy working in 1231. Now 1231 was the plant where we took UF -- we took uranium oxide and made it into UF₆. That's what we did; we fluorinated it. One day I was walking around the building looking and I had this guy working for me. He was a knot-head. And he was down on the floor with his respirator on. But he had cut holes in it. Well, he got fired pretty quick; but he deserved it. He deserved to get fired. He wasn't using the equipment that he had.

Now how much else was going on, I have no idea. I think Union Carbide did a damn good job on protecting the people that wanted to be protected. I believe that. Now there might have been several screws loose in it, like the guy drilling holes in his respirator. But it was, by and large, people -- the management of those plants, they weren't looking for those things. And you know, it seemed like a thankless job when you get down to it.

But I think there was -- I would say that it was as good as it was Kerr McGee; and Kerr McGee wasn't all that great. [laughs] But we didn't have the problem they had. We were taking UF₆ and making it into -- we were taking ash and making it into UF₆ or uranium hexafluoride. And then we'd take that and make it into tubes; tubes meaning the rods for reactors. We'd stick that in a reactor and you'd go.

[2:18:59]

Thonhoff, J.: What type of radiological or chemical monitoring was performed?

Clouse, R.: We went through two periods on that at K-25. We kind of went overboard in part of it. But, you know, it was as good as it was anyplace, during that history, during that time in history. It -- I think it was as good at K-25 as it could be. Maybe it was too strict, I don't know.

Thonhoff, J.: And you were informed of the results of the monitoring?

Clouse, R.: Oh yeah.

Thonhoff, J.: During the war, did you have any idea what the enriched uranium 235 that you were separating would be used for?

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[2:19:58]

Clouse, R.: Me?

Thonhoff, J.: Uh-huh (affirmative).

Clouse, R.: Yeah. After I read that article in the paper, I knew damn good and well what it was going to be used for. [laughs] The only way they could do it is they were going to blow something up.

Thonhoff, J.: What was your reaction?

Clouse, R.: I had the same reaction from that -- or similar reaction to that as when I first saw the first neutron trigger to an atomic bomb. It scared me. I -- and -- the reason it scared me, not in my lifetime have I ever seen something that size that would blow up a city. I couldn't imagine it. And I, you know, I guess it was too frightening to imagine. I didn't have many good sleep nights because of that. It -- I didn't feel guilty because I was doing it, because it was a necessity at the time, but -- and we did the best job we knew to do to make it. And to make it give out all the power it was going to give out, to make them -- you could do things with a weapon that would kind of tone it down. And so we would not do those things. But we tried to make everything that would be the best primary and the best secondary. That's what we had. [laughs] And that's what we did. And the people out west did a good job of testing them and telling us how good they were. We tested everything. And that's why those big, long trucks kept driving by, hauling them someplace.

[2:22:23]

I don't think that anybody felt like -- I think there were people that didn't feel too confident with the roll they had. But I guess they kind of, as time went on, they were more comfortable with it. Now, I don't know. After I came to the conclusion that if we didn't do it somebody else would, and that was ballgame. And you knew somebody was going to do it. I was pretty comfortable with it. It didn't bother me. What did bother me is how so much destruction can be in such a small package.

And if you've ever seen a nuclear warhead, you can understand that one. [laughs]

Clouse, Robert

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Thonhoff, J.: I have not, so --

Clouse, R.: It's an interesting experience.

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

[2:23:47]

Clouse, R.: I have no idea. I have no idea. But let me say this to you. Groves did the best damn job he could do; I don't know how he lived through it -- simple truth. That guy worked his ears off. He gambled his whole life history on the fact that a three billion dollar check wouldn't bounce. He wrote a check personally to the treasury department for three billion dollars to buy this stuff. If you ever get a chance, read that book. It'll make you a supporter.

Thonhoff, J.: What's the name of the book again?

Clouse, R.: I'm trying to remember it, but it's written -- it's about Leslie Groves. *The Secret of Weapons* or something like that. But it is a nice book to read. And it tells you some things about him and his character. He worked first for the Corps of Engineers and he got his third star before he went into the -- meaning, Major General, before he came here.

Thonhoff, J.: Wow!

Clouse, R.: But you ought to read it. You ought to read it. He made it go. He pushed the buttons that made it go. He took more chances on his personal career I think than any human being can be expected to take, or I think he did.

[2:25:55]

Thonhoff, J.: Could you explain the expansion program?

Clouse, R.: K-25?

Thonhoff, J.: And when did that begin?

Clouse, R.: Most of this happened in my absence.

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Thonhoff, J.: Okay.

Clouse, R.: Most of this happened during the time I was at Kerr McGee. Most of the expansion -- the expansion had the biggest impact at Portsmouth and Paducah, not really at K-25. There were certain things that were done at K-25 to make it happen, help it happen, but they weren't -- they didn't have the same emphasis as they did at other places.

Now, I guess it's had an impact at Goodyear too, really. I don't know. I wasn't paying much attention to that, to be honest with you.

Thonhoff, J.: What kind of work was being done at the facility after the Manhattan Project, during the Cold War Era?

Clouse, R.: At the plant, meaning K-25?

Thonhoff, J.: Yes.

[2:27:16]

Clouse, R.: Well I was not in it then.

Thonhoff, J.: Okay. That's good. Then we won't go over the Cold War stuff.

[End of Tape 2, Begin Tape 3]

[3:00:10]

Thonhoff, J.: There are just a few more questions.

Clouse, R.: Go.

[crew talk]

Clouse, R.: I should add a little something in there.

Thonhoff, J.: Sure. Whatever you like.

Clouse, R.: During part of this -- part of the so-called change in what we were doing at K-25, I was involved with metals with metal fishing because I could take the equipment that I had and do it. And we did a lot of contract work for NASA. And Bob Jordan was then

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plant manager. And Bob and I traveled quite a bit. We went out to Sandia to sell our wares. [laughs]

Thonhoff, J.: My neck of the woods.

Clouse, R.: Huh?

Thonhoff, J.: My neck of the woods.

Clouse, R.: Yeah. Out to Sandia. I'll find it in a minute. And went to Albuquerque and went to a lot of the sites; got quite a bit of work there. We were doing polishing. We were doing nickel plating; doing things like that.

[3:01:40]

Thonhoff, J.: That's what you needed to do with the construction? All of that stuff needed to be done, or what was that for?

Clouse, R.: What was what for?

Thonhoff, J.: The polishing and the nickel plating and all of that.

Clouse, R.: We were doing it hopefully to build a market.

Thonhoff, J.: Oh. Okay.

Clouse, R.: We were trying to build up the market. NASA had a problem with getting the missiles not to destruct until it got back to Earth. And so we were doing things like we were plating plastics to give the plastics longer life in a hostile environment, like in their first -- when they were fired off and when they came back to Earth. They were going through some tremendous heat. And you know, you wanted to have some control over them, and that was bothering NASA.

And we had it -- interesting enough, we had -- knew some of the things to do, and so we did it for them.

[3:03:08]

But that wasn't a big business. That's wasn't a -- what we were doing is trying to keep the door open.

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Thonhoff, J.: And what types of jobs or how were you associated with K-25? Give your job title and approximately how many years you did that.

Clouse, R.: K-25. I can't even remember some of them.

Thonhoff, J.: Okay.

Clouse, R.: I started out -- in the beginning at 1410, I started out as a technical consultant for the organization. There was a lot of uranium processing; there was a lot of purification. We were trying to get stuff going so that we could make a cleaner UF₆, not have all the junk in it. We weren't doing a very good job when you got down to it of giving the fluorination people, good fluorides, we just weren't doing a very good job, and we started working on that. And there was a lot of work to be done there. But that --

And the other part we did -- the other part of the thing was like this. We weren't doing a very good job of cleaning things so that we would not get U²³⁵ other places. And we did a bad job in part of that. We almost did as bad a job as United Nuclear did up at -- near Wood River Junction. They left fully enriched uranium on parts -- stainless steel parts and God we were short on U²³⁵ during the period.

[3:05:33]

Before we fired the Hiroshima bomb, we were hurting. We were hurting for enough U²³⁵ to make a bomb. Matter of fact, it was close. The best I could see it is it was close. And I didn't have the inside track at all. But we were trying our best to save all the U²³⁵ we could. And get it into a warhead and fire that sucker. [laughs] That's what we were trying to do. That was our mission.

But the trouble is we started a little too late. And we could have done a better job there by a -- now when I got to Kerr McGee the first thing I did is I went in there and cleaned up every bit of that damn stuff and got it back into the fuel cycle. And we had a lot in it. But I didn't want that stuff in my plant. It just increased the hazard. Plus, it made you have more money in inventory that you couldn't use. So I had to do something with that.

Thonhoff, J.: Would you consider that your most challenging assignment?

Clouse, Robert

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Clouse, R.:

Oooh! What was my most challenging assignment? For the most part, we weren't -- we didn't operate from assignments. We saw something that needed to be done -- you went out and did it. And that's the way it happened. So I -- it's -- if you'd write -- if you were doing something and you did it, you wrote it. Then they'd publish. And that's what -- that's one reason I spent so much time on nuclear safety because we didn't have a nuclear safety accident. We didn't need it. And we spent a lot of time and a lot of energy and a lot of money preventing it.

[3:08:33]

Now, we could have taken another route, but I didn't -- we wouldn't want to take it, and that's have an accidental criticality because we had everything it took to do it. But I don't -- I can't tell you what my most critical -- what my most --

Thonhoff, J.:

Challenging.

Clouse, R.:

-- challenging job was. I don't really know.

Thonhoff, J.:

What do you feel was your most significant accomplishment, as an individual or as a group?

Clouse, R.:

I don't really know the answer to that. I really don't know the answer to that. I did a lot, I got patents, things like that, but that's just something and it seemed like to me they paid for it, time and time again.

[3:09:45]

All I can say is the K-25 people set the right tone for creation of self-starting people. And there's a lot to be said for that.

Thonhoff, J.:

Absolutely. What sort of roles did women have working at K-25, and how were they treated?

Clouse, R.:

Well I can tell you how my secretaries were treated.

Thonhoff, J.:

That'll work.

Clouse, R.:

Huh?

Thonhoff, J.:

That'll work.

Clouse, Robert

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Clouse, R.: Well, we were -- the secretaries and I had really separate jobs. And how they did their job was the way I could do my job better. And we worked together to do that. And we were all friends, very close. And they seemed to like that. I didn't look over their shoulder to see what they were doing. I knew what -- I knew when I hired them they could do the job. I didn't bug them. And they were very well -- they were very good. They were very good. And they kept me out of trouble.

Thonhoff, J.: [laughs] And did you have any contact with Afro-Americans or any minorities, and how were they treated?

Clouse, R.: Did I have any what?

Thonhoff, J.: Any contact with minorities, people of minority groups?

Clouse, R.: Yeah, I had contacts with them.

Thonhoff, J.: And how were they treated?

Clouse, R.: I can't -- I don't know. I had people working for me that were black in Kerr McGee in Oklahoma. Now you're talking about a tough place for a black to work, that's in Oklahoma. [laughs] It's a tough place.

Thonhoff, J.: I used to live in Oklahoma.

Clouse, R.: Did you? Where?

Thonhoff, J.: In Edmond.

Clouse, R.: I lived in Oklahoma City, just a little bit down the road. [laughs] But you know the attitude.

Thonhoff, J.: I do indeed. What was life like for your spouse and for your children.

Clouse, R.: Where?

Thonhoff, J.: In Oak Ridge.

[3:12:35]

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Clouse, R.: I -- you know, it was fine. We lived a pretty normal life but we -- and we had -- but there was a lot of things around sports. I was -- I always liked to play sports. And Emily and I watch sports right now more than anything.

Thonhoff, J.: Is that your son?

Clouse, R.: My wife.

Thonhoff, J.: Oh Emma! I thought you said Emily.

Clouse, R.: Emily.

Thonhoff, J.: Emily.

Clouse, R.: Yeah. She and I watch more baseball and softball than anybody. My first wife was not that interested in sports. But Emily has -- she likes it. So -- I guess she's really more enthusiastic about sports than I am. She knows everybody's name.

Thonhoff, J.: What do you think future generations should remember about K-25?

Clouse, R.: I don't know. I know if people would read the right things, they would get good positive relations. I think anybody that reads Leslie Groves' book have to have a good impression. They just have to have it.

Thonhoff, J.: Well I know you talked before about the camaraderie with the people that you worked with. Is that possibly something that you would want people to remember?

[3:14:38]

Clouse, R.: Yeah.

Thonhoff, J.: The bonds that were formed?

Clouse, R.: Yeah.

Thonhoff, J.: Because it seems to me that's really important to you, the friendships that you have gotten out of it.

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Clouse, R.:

I'll tell you, I really believe what I'm about to say. I think I met some of the nicest people I ever knew in my life here. And when Emily wanted -- when we married, we both had a house. And I said, "Emily, what are we going to do?" And I had four houses, wasn't living in but one. [laughs] She said, "You know, I'd like to stay right where I am." I said, "Emily, that's your right, is to have a home and live where you want to live. So I'll go with you."

And so, not too long after that, we were on our way back from Columbia, South Carolina, watching a tennis match [laughs], and I said, "Emily, why don't you just write a few sentences that describes what you want this house to look like when we get finished." And she did that. And that turned out to be the guidance for us for our house. We wanted it so that it was comfortable. We wanted it so it would be low maintenance. We wanted it so that it was attractive from the inside and the outside. And so we built it. We hired ourselves a contractor and went to work. And we have been thoroughly and completely delighted with it.

[3:16:46]

Now, isn't that neat?

Thonhoff, J.:

That's wonderful.

Clouse, R.:

And I'll be honest with you. I've been the luckiest guy in the world. I married two women. I loved both of them, and there's no doubt about that. [laughs] And Emily and I get along like two peas in a pod. And she and her family and me get along great.

Thonhoff, J.:

That's wonderful!

Clouse, R.:

Isn't that great?

Thonhoff, J.:

That's beautiful.

Clouse, R.:

But when we started out, we said, "Okay, this is where we're starting from. Now, let's create a good family."

Thonhoff, J.:

Absolutely.

Clouse, R.:

So we created a good family.

[3:17:43]

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Thonhoff, J.: Is there anything else that you want to say about K-25 or is there anything you want to expand on?

Clouse, R.: Well, the only thing I can say is it's one of the best experiences of my life. I enjoyed the people there. I enjoyed the -- and I enjoyed some more than others.

Thonhoff, J.: Of course.

Clouse, R.: Sure you do. There's personalities in everything.

Thonhoff, J.: Absolutely.

Clouse, R.: And -- but in general, I think we all did a good job. I think we all did our best. Now maybe we didn't do a good job in some -- I didn't paint the floors everyday like I should have. I didn't do all those things. But we were just being ourselves. And I enjoyed K-25. I really enjoyed it. And I had some awfully good friends there. And didn't get fired for sleeping on the job. [laughter] Thank God for Flick. [laughter] He came back to me and when he said, "You didn't get fired." I said, "Well you didn't get fired either, did you?" He said no. [laughter] But he was a harelip guy. Hell, he was a crackerjack. [laughs] But Flick was something else.

Joe and I worked together great. We worked together great. And Bob and I worked together good. Matter of fact, we got along real good with almost everybody.

[3:19:50]

Well, can I do anything more?

Thonhoff, J.: That's it. That sounds good. Wonderful!

Clouse, R.: Okay.

[End of Interview]