National Educational Technology Solutions LLC
1524 Eubank NE, Suite 3
Albuquerque, NM 87112
Phone: 505/271-1333 Fax: 505/271-1334
Alt: 505/350-1433
Email: CCallan@netsamerica.com
http://www NETSAmerica.com

Oak Ridge Form 5: Oral History, Deed of Gift Release for Interviewee

DEED OF GIFT RELEASE FOR INTERVIEWEE
K-25 ORAL HISTORY PROJECT
U.S DEPARTMENT OF ENERGY'S ORAL HISTORY PROGRAM

I, PAUL VANSTRUM *(Name of interviewee)* residing at 104 OGDEN LANE, OAK RIDGE, TENN *(Address of interviewee)* do hereby permanently give, convey and assign to the United States Department of Energy (DOE) my interviews *(or oral memoirs)*, and the recordings, tapes *(audio and or video)*, and any transcripts of my interviews conducted on 3/10/05 *(date)* at 104 INN LANE, APT. 1L3 *(location)*.

In doing so, I understand that my interviews *(or oral memoirs)* will be made available to researchers and the public and may be quoted from, published, and broadcast in any medium that DOE shall deem appropriate.

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I, ~~PAUL VANSTRUM~~ CONNIE CALLAN, *(Name of interviewer or agent for or duly appointed representative of DOE)*, accept the interview *(or oral memoir)* with PAUL VANSTRUM *(Name of interviewee)* for inclusion into the DOE Oral History Program.

Signature of DOE or its Representative: [signature] Project Director
Date: 3/10/05

Signature of Interviewee: [signature]
Date: 3/10/05

Signature of Interviewer: [signature]
Date: 3/10/05

National Educational Technology Solutions LLC

K-25 Oral History Interview

Date: 3/10/05

Interviewee: Paul Vanstrum

Interviewer: Connie Callan

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[1:00:08]

[crew talk]

Callan, C.: And the best way to -- Wait, turn it off one more -- 2005 and I'm Connie Callan, the interviewer. And my first question to you is state your name and spell your name and just kind of give a title that you had at K-25.

Vanstrum, P.: All right. I'm Paul Vanstrum. P-A-U-L V-A-N-S-T-R-U-M. And I worked at K-25 for a long time. Actually, the last several years I also managed the Y-12 and Paducah plants as well. So, some of my attentions were directed in those directions. But I ended up as Senior Vice President for Union Carbide, working for the President of the Nuclear Division, Roger Hibbs.

Callan, C.: Well, thank you. Okay. We're going to start with going back to where were you born? And just anything you want to talk about -- where you came from.

Vanstrum, P.: Okay. I was born on August 3rd, 1920 in Minneapolis, Minnesota. And I grew up there, went to school all through the grade school, high school, and so on, and then went to the University of Minnesota, which is also located in Minneapolis. I graduated as a chemical engineer in 1942.

[1:02:50]

And Minneapolis is a beautiful city. I enjoyed living there. I still wouldn't mind living there even though it gets cold in the wintertime. It's a very scenic place. There's a lot of lakes in the town. So there's a lot of children's play and entertainment there. It's just a wonderful place to grow up. They have good schools and so I enjoyed growing up there and living in Minneapolis.

Callan, C.: So, you were living in Minneapolis right before you came to K-25? Or were there any other locations?

Vanstrum, P.: No, when I graduated from the university, I went to work for Union Carbide, but the place I was located was Indianapolis. It was a settle and research division of Union Carbide in Indianapolis, which was right across the street -- the plant was right across the street from the international speedway there in Indianapolis. I was there for a couple of years and, of course, during that time the war was on and we never knew whether we were going to get deferred or drafted or whatever. And all the work I was doing was for the military, but that didn't make it -- a lot of difference.

[1:04:35]

But in 1944 my supervisor said, "You know, we're not going to be able to get deferments for you, but there's this big, secret project down in Oak Ridge and we can't tell you anything about it, but they need people and they might also be able to get your deferment for you." And so I said, well, let's go, and so I went to New York where they had some facilities that they were operating for the Atomic Energy Commission at Columbia University. I went there and I think it was May of 1944 and worked at Columbia University. And one of the buildings, I think it was Schermerhorn in Columbia, and they were doing barrier research work there. So they said, "This is where you'll be until you go down to Oak Ridge." And one interesting event that I might mention -- when I got there, of course, I didn't know anything about the project. I knew it was secret and they couldn't tell me anything. But I went to the personnel office and the guy said, "It's about time to go out to lunch. Let's go out to lunch." We went out to a restaurant on Broadway right near Columbia University and he was making conversation. He said, "You might know some of the people that are here." He said, "Dr. Nier from Minnesota is working with us." And I said, "Oh yeah." I said, "Al Nier. He first isolated some uranium 235 when I had him for physics." And this fellow almost slid under the table, you know, you just didn't say uranium about anything. And so I knew before I ever got in the front door what the general nature of the project was or what the general subject matter was.

[1:07:13]

So, it didn't take me long to figure out what we were trying to do and why it was important.

Callan, C.: That was a great story.

[crew talk]

Great. I really like that story.

Vanstrum, P.: Well, it's a little different.

[1:07:30]

Callan, C.: It is. I like to hear different stories. Let's see. Did you tell me what university you graduated from and what degree you --

Vanstrum, P.: University of Minnesota, also located in Minneapolis, where I grew up.

Callan, C.: And what was your degree in?

Vanstrum, P.: Chemical engineering.

Callan, C.: And how far? Ph.D.?

Vanstrum, P.: No, Bachelor's degree in chemical engineering. I had some course work in business management, also, that -- but I didn't get a degree.

Callan, C.: Well, that was great. Do you want to talk at all about your family background? Where they came from originally?

Vanstrum, P.: Well, I can. It's -- in the Minneapolis area there are many Scandinavian people there and all of my grandparents were Scandinavian people that had come over when they were young as immigrants. And my parents, of course, grew up in Minneapolis, attended school there, and I had two sisters. They also grew up with me. My older sister is still living out in California. So I'm in touch with her.

[1:09:04]

But pretty much I've gotten away from the family, unfortunately, because I like the family -- the younger people in the family are great. They all have nice families. And I used to go up -- the last time I went up I offered to take them all out to dinner and ended up taking 24 of them out to dinner [laughs]. So I have a lot of relatives there and they're very nice people. My parents were very caring, loving parents so I was very fortunate. We went to church regularly. Again, it's -- people are Swedish or northern European origin and the church I went to -- when I started going there they had the preaching in Swedish and then they had a smaller service where us younger people could go and that was in English. Over the years it switched around and the young people went to the English service and the old people went to the Swedish service. But it was a very nice church, very friendly, very caring ministry. And I guess I've continued not in the same denomination, but with the same outlook in religious activities.

[1:11:06]

Callan, C.: Let's see. Talk about how you happened to come to work at K-25. I know you mentioned some of this, but do you want to talk a bit more about how you happened to get on this project?

Vanstrum, P.: Okay. Well, as I say, I worked for Union Carbide and they were charged with the responsibility of operating K-25. And so that was why I moved into the K-25 area. It had very little to do with choices at that point in time. I was a young engineer and you just went where you were assigned and did what you could. And when I came to K-25 we started off at a little place -- I think it was called Wheat School where they had kind of a headquarter set up and I went there and they said, well you're gonna go over this part of the plant and I ended up working for Hank Nowak (phonetic sp.) who was heading up an organization called the Line Recorder Division. This was an organization to operate mass spectrometer instruments that would monitor the process stream. And in the event (indiscernible) or unusual behaviors, you could spot the effect of these things on the impurity levels that we were measuring, kind of asbestos. Incidentally, that line recorder was -- is a mass spectrometer that Dr. Nier, the fellow I mentioned earlier, devised and applied in the process. And so that's how I started.

[1:13:22]

And we had to learn about the process, how it worked, where things went, why they worked the way they did. And then we had to train operators for these line recorder stations, which were located one in each building. And that was a chore. I had never done anything quite like that. These were generally young ladies, some with degrees or partial degrees, others totally uneducated in the usual sense of the word. But they were, they were quick to learn and we enjoyed working with them and over a period of time they became the operators then of these, what do they call -- emergency analytical stations. Down the road we actually used the information from these line recorder stations to operate or to use the information for charting the whole plant concentrations in a central control room. So I got involved in the central control facility, which was new to me and very interesting and used the very latest and greatest instrumentation, some of which today would be very antique, but at that time it was very advanced.

[1:15:23]

And so I had an interesting time doing things that I hadn't done before, but utilizing some of my experience, I think, in chemical engineering because I was process oriented and enjoyed that a great deal.

Callan, C.: Do you remember when you first arrived at K-25? What your first recollections were? What were your first impressions when you came down here?

Vanstrum, P.: Since I arrived at this little Wheat School, it was a country school that had been converted to a personnel office, so to speak, and it didn't amount to much, but off in the distance you could see the plant, which was under construction at that time. And it, of course, was a massive plant. I'd never seen anything like it.

[1:16:32]

The, the main building in K-25 was a U shaped building with each of the legs of the building being a half a mile long. So it was a gigantic facility and I was really taken by that whole magnitude of the thing when I went out to the plant to work with Ed Nowak. Since it was under construction, there was still a lot of construction people around, a lot of people, welders and others, climbing all over the place. And many places where the operating floor, which was at the top of the building or near the top of the building, there were still sections where they hadn't put in the floor in yet. So it was quite an experience and with the realization of what we had to do, it was challenging and exciting and I thoroughly enjoyed it. We worked long hours. There were times when I worked for weeks on end without a day off. So we worked hard, but we felt we were lucky. We weren't over in Germany or someplace like that. We were home or near home and so we were anxious to do all we could.

[1:18:20]

Callan, C.: Do you -- you brought up the construction and I haven't yet found anyone that was a part of a construction process of that plant. Is there anything more you can add to that construction period?

Vanstrum, P.: Well, there were, of course, a multitude of different activities going on. There were welders. There were all types of construction people, but a lot of welders since the piping was -- had to be leak tight and so they had to have very good welders. And then they also had to have capability to leak check the piping as they

completed it. They would use what we know as helium leak detectors. What, what they do is to evacuate the equipment during leak checking and then they can -- with the helium as the gas and the leak checkers looking for helium they could sniff out, so the speak, the leaks in the pipe, even though they were very, very small. And that was, of course, critical to have the plant leak tight because any air that would leak in after the plant was built would react with the processed gas such as uranium hexafluoride. That would be very detrimental to the whole process.

[1:20:28]

Callan, C.: Were you ever -- the years -- what years did you work at K-25 and did you then transfer to any of the others like Y-12 or X-10 or --

Vanstrum, P.: Well --

Callan, C.: -- Oak Ridge National Laboratory?

Vanstrum, P.: -- I was at K-25 for quite a while. The first two years I was in this line recorder organization that did the -- monitored the leak and leakage in the plant. I had been interested in research and development and so they ultimately, at my request, transferred me to the laboratory where they were doing a lot of analytical research, but also doing work research on some of the components in the plant. In particular, the barrier research -- barrier being the ~~fusion~~ diffusion membrane that's used in the separation process. And so I transferred over there, I think it was probably in '47. I think that's (indiscernible).

[1:21:50]

But, I did a variety of work, primarily administrative work initially; budgets, personnel evaluations, a whole variety of things concerning the people in the laboratory. I also did work on the programs in particular with Bill Wilcox who you'll be talking to before too long. He and I did a lot of work on evaluation of the programs -- the research programs that were underway there and trying to pick out the ones that were most profitable and beneficial to improve the process. And I did that then for, oh, I think until 1960s before I was given the responsibility for the, uh, some of the other plants. So, I was at K-25 for quite a long time, mainly involved in, in the research and development activities at the laboratory at K-25. Ultimately, I got out of the, what you might call, strictly administrative side of the laboratory and got into

directing some of the research programs and enjoyed that a great deal. We had -- ultimately we had barrier research (the diffusion membrane), compressor research, which we did work on improving the performance of compressors -- the whole gamut of process development that went on there at K-25.

[1:24:04]

And, uh, I guess while I was still doing work on the gaseous diffusion process, we came across this gas centrifuge development and got into, well, recommended programs to do work on gas centrifuges and tied different process, but it also enables you to separate the isotopes of uranium. I think that was in 1960 that I first worked on proposals for doing gas centrifuge development. So following that I was doing directing work both in gaseous diffusion and gas centrifuge. It was exciting time. I really enjoyed the work and had some wonderful people to work with. Bill Wilcox, I mentioned, was just a terrific guy and very able and very energetic and I think we hit it off pretty well together. I sure enjoyed it a great deal.

Callan, C.: Actually, Bill Wilcox is being interviewed right now in the other room, I think.

Vanstrum, P.: I see.

[1:25:34]

Callan, C.: If people -- I like some of the little stories here about if people were to inquire what work you were doing there at K-25 -- he's giving me how many minutes we have on this tape. What would you say? What were some of the stories you would tell the general community about what you did?

Vanstrum, P.: Well, you couldn't really tell them anything other than the people that were involved in the technology. We had code names for all the chemicals so you didn't call them by their usual name. Liquid nitrogen was -- well, I forget what it was. But, C16 was the uranium hexafluoride and we had code names for all of the chemicals. So you never referred to them as the chemicals they really were. So the people that weren't familiar with the process and didn't get involved in the technology really didn't know a whole lot. And my wife I never could tell her anything. So she

never did really know what I was working on [laughs]. She wasn't a technical person so I don't think she cared all that much. But it certainly limited the kind of conversations we could have.

[1:27:19]

Callan, C.: How did that make you feel, you know, to not be able to communicate what you did on a typical day? Did that bother you or did you just get used to it?

Vanstrum, P.: It didn't bother me. We knew the war effort was on and we were concerned early on whether we would get the nuclear weapons before the Germans or the Japanese. And so we were -- we had a stake in the thing. We were working hard to be successful and we didn't want it to go on to the general public.

Callan, C.: Should we change tape now? Or do you think we can get one more question in? Let's go -- we've got two more minutes, but the next one is kind of a big one. It's like, what is your most vivid recollections of the time you spent at Oak Ridge. We've got two minutes on this tape.

[1:28:21]

Vanstrum, P.: Well, of course, the job was -- came first and for a long period of time that's all I did. I'd work seven days a week, sometimes stay at the plant all night long. And so that was, that was the activity. Of course, I raised a family here so when my first daughter came along in '46 that was a big event also. And when my two sons came along in '51 and '52, I think it was, those were big events. But, life was primarily the plant and the work I was doing at the plant and the research and development we were trying to be successful at.

Callan, C.: I guess we're ready to change tape.

[End of Tape 1, Begin Tape 2]
[2:00:09]

Callan, C.: -- but you can't answer it until we get this rolling, but I'm going to ask you what you liked most about K-25 and what you least liked.

I always like that as one question. What was your -- so that's your next question. [laughs]. Are we ready? We still have color bar. I'll tell you when it's ready to start. Yeah? Okay. So let's talk about what did you like most about working at K-25 and what did you like least about working there?

[2:00:39]

Vanstrum, P.: Well, I liked the work because it was -- we had to be innovative. We had to develop new and better technology and that was something I was very much interested in and, and, uh, it was -- I feel very fortunate to this day for having had the opportunity to work at K-25. We had some wonderful people, very talented people at all levels and all technologies. We had physicists that were very competent. We have metallurgists, chemists, engineers, mechanical and otherwise, and I was just taken by the opportunity to work in that kind of environment with outstanding people and I could learn something about other technologies and I enjoyed that a great deal. And I enjoyed the management role I played. It was a challenge working with people like Bill Wilcox. We did some exciting things together, personnel evaluations, program reviews, deciding priorities for different research projects and that sort of thing. And I enjoyed that a great deal.

[2:02:44]

I can't say as I really disliked anything. I was so taken by the opportunity and I wasn't complaining about anything. I guess as I look back it might've been more fun if I had been able to talk about what I was doing on a broader scale. But ultimately I had that opportunity in later years when declassification provided the opportunity to talk about things more generally and we got into programs with the British and I got involved in classification matters for the AEC. I got involved in intelligent activi -- intelligence activities and would go to meetings at the CIA. I just had so many things that I enjoyed thoroughly that I didn't think much about the unpleasant aspects of it. But --

Callan, C.: That was really -- it sounds like an interesting career. How did -- you're looking great on camera. We've got you in front of the green screen with the K-25 plant behind you like your sitting out in the middle of the --

Vanstrum, P.: I see.

[2:04:16]

Callan, C.: [Laughs]. Or the weather board. Are we ready?

[crew talk]

Okay. How did people communicate to fellow workers. Well, actually you talked a bit about that in that in a secret facility? What was that like?

Vanstrum, P.: Well, among the technical people and the management people there was thorough knowledge of how the process worked and what the technology was and where we were trying to improve it and so on so there's no problem of communication among the technical people and the management people. The only area where we had to be restrictive was with the general public, like my wife. I couldn't talk to her or the people at -- that weren't technically skilled and some of the operations people that were just involved in doing what -- some limited area of work. So, there was free, open communications among the technical people and people that really mattered most to us. And the others you just sort of got used to the idea of not talking about any classified matters that they weren't concerned with.

[2:05:49]

Callan, C.: What were the physical working conditions at that plant? How did it -- what was it like to there every day?

Vanstrum, P.: Well, it was, it was quite acceptable. The K-25 plant itself is a gigantic plant with several what you might call stories. The operating floor was on the top part of the building and it was just a big, wide-open space. We used to ride bicycles around because it was far enough that you could save time -- instead of walking you would ride a bicycle. But, the working conditions were quite pleasant, I would say. They weren't like an air-conditioned office and the offices were like the outdoors. They were air-conditioned and so on, but they -- at that point in time of my life, it was quite acceptable. I didn't -- I don't remember ever complaining about it.

Callan, C.: What rules were very important that needed to be followed when you were there at the plant?

[2:07:33]

Vanstrum, P.: Well, during the line recorder experiences, it was alertness to what was going on by looking at the analytical results we were getting. If there was an in leakage in a plant, you want a go detect that as quickly as possible and take corrective measures, isolating that part of the plant or wherever. When they got in the lab, it changed substantially and the major mission was to try to improve the process, try to do it better, try to improve the efficiency of compressors or the efficiency of barrier or what have you. So there the concerns were the technology, both evaluating the technology and being innovative and careful and creative about how you might improve, what you might do to improve the process. Make it cheaper, better, whatever. So it was similar to what you would encounter in a laboratory concerned with improvement of technology.

Callan, C.: Did you meet any famous people that you can mention when you were there? Or do you remember the --

[2:09:19]

Vanstrum, P.: Well, over a period of time I met quite a lot of important people. Dr. Betha who just passed away a week ago or during the past week or so -- I think he was 98 when he died. But he was a Nobel Prize winning person. He was on one of the panels I was on in the intelligence area. It wasn't directly connected with K-25, but we were trying to help the intelligence community understand what the facilities were that they were observing in Russia and places like that. And so I was on a nuclear intelligence panel that -- where I could use my knowledge of our plant to help them understand what they were maybe seeing in their photographs. He was the kind of person that they would call on and I knew quite a few others, met quite a few others in that kind of circumstance. I was also on a classification review panel, senior reviewers they called it, and we would get with some outstanding scientists occasionally. But we had some people working right with us that were also very skilled and talented people. One fellow I had, Dr. Burman, he went to the University of Minnesota as a professor up there and the work that he was doing for us.

[2:11:42]

But, that was one of the exciting things was the caliber of people that we worked with day in and day out and that I met through associations were world class scientists. And I was just a BS from Minnesota [laughs]. So it was a thrilling experience.

Callan, C.: Now we're going to talk about the health conditions and the health at the plant. What kinds of health facilities were available in Oak Ridge and K-25 and just in general? Was there an emphasis the company and its supervisors placed on safety and health and monitoring and did you ever hurt yourself or know of any incidents? Just talk about radiological, chemical monitoring and those kinds of things.

Vanstrum, P.: Okay. Well, we strived hard to be the very best safety wise. Even Carbide was, itself, a corporation that was very safety conscious. So we learned safety and the importance of safety right from the beginning. And even when I came here from the other plant I was already well aware of Carbide's emphasis on safety matters. So it was nothing new.

[2:13:21]

There were, of course, new materials that we had to be concerned about and we had to learn about and in particular the radioactive components were new, but I would say we were -- worked very hard to have an outstanding safety record in all aspects. We had records that we'd keep on what they called lost time accidents -- any accident that a person was hurt and had to stay away from work was lost time. And we worked very hard to avoid accidents that were serious enough to come into that category. I think the plants, really all of Oak Ridge, particularly the production plants, K-25 and Y-12, were really outstanding in comparison to most industrial plants in terms of safety record.

Callan, C.: Okay, now we're going back again in time and we're going to talk a bit about the Manhattan Project, specific recollections and we're talking '43 to '45. These are just comments about -- did people know what the uranium 235 you were separating would be used for? Any comments about that? If you can recall August 6th, 1945, the dropping of the atomic bomb and what that was like there at the plant and what history will view that event as?

[2:15:11]

Vanstrum, P.: Well, I think again the technical people that were working on the project at K-25 knew what the objectives were -- to develop uranium 235 that would be useful in a weapon. But that wasn't well known at all. I was -- I happened to be in Minneapolis visiting my parents when they dropped the first weapon and I saw the headlines on the newspapers, you know. And I thought, oh goodness sakes. What am I gonna be -- what am I gonna say, you know? And I got home and my mother was the first one, she says, "Well, we know what you been doing in Oak Ridge." But that was the first word they had of what I was up to. And, of course, there wasn't much released at that time I was wise to just keep my mouth shut and say it was an exciting and interesting project.

[2:16:35]

But at the time there was very little known about the project and its objectives other than the people that were actually doing the work. It's interesting to me that security and classification were so effective because a lot of people that were pretty close to what was going on didn't know beans from apples about what really was going on. And, uh, it's -- it shows the validity of a good classification program, I think, and the fact that the information didn't get in a general way to the public.

[crew talk]

Callan, C.: Just the "it shows the validity of a classification program.

Vanstrum, P.: Okay. It shows the validity of the classification process in protecting information that you don't want to get out to the general public.

[crew talk]

Callan, C.: Okay. We're going to talk now about the transitional recollections between '45 and '48 after the Manhattan Project. Explain a bit about the expansion period of the plant and what was done then.

[2:18:30]

Vanstrum, P.: Well, we, uh, assumed that the success of the initial efforts really paid off and were -- we were elated about -- by the results. But at that same time they wanted more weapons materials because of all

the Korean conflict and other activities around the world where they thought they might need more weapons. So they started expanding the capabilities, using much of the technology that we had developed in the development laboratories. Ended up building large expansion facilities at K-25 and also the Paducah plant, which was a gigantic copy, essentially, of the K-25 facility. That also led to the decision to build the Paducah -- or the Portsmouth gaseous diffusion plant, which was, again, a duplication of the K-25 facility. It was different than the Paducah plant. The Paducah plant was really for low enrichment uranium to provide feed for K-25; the Portsmouth plant was a plant that would cover the entire range from low enrichment to full enrichment. And we were heavily involved in those facilities, in particular our engineering organization was heavily involved along with outside contractors and construction people.

[2:20:49]

But, uh, that, of course, was a whole new era in terms of quantity of production instead of relatively small scale production. They got into these gigantic plants where they were using large compressors and large systems to generate a lot more enriched uranium. So, that consumed quite a bit of effort. I forget exactly which years those would cover, but it was quite a length of time because they were gigantic efforts, tremendous plants.

Callan, C.: Well then let's talk about the Cold War era, which is '48 to '64. And this is -- you had said you wanted to talk about something in this period and I didn't write it down. But basically, what happened during that period at the plant and -- talk about your thoughts about how the activities accomplished at K-25 revolutionized the world. How was what you did there --

[2:22:31]

Vanstrum, P.: Well, much of the change in the plants and the ability to build Portsmouth and Paducah depended on the R&D that we had done in the laboratory. Also, there was a change in the technology. At K-25 they used relatively modest sized compressors to move the gas around whereas the new plants all used big, actual full compressors that are gigantic in comparison to the K-25 machines. And much of that technology came out of the efforts to improve the process that we had been working on with various groups, mechanical and in particular barrier development where the efficiency of the process was substantially improved. And that

enabled them to build plants that were much more effective and, and it was very timely, of course, since they said they needed a lot more, we were able to generate a lot more.

Callan, C.: Let's see. I've got just basic job category specific questions and I think you've talked about -- let me just read these over. I think you've talked about most of them, talking about what types of job that you did at K-25. But this one -- what would you say was your more challenging assignment as an individual and as a member of a group? And the most significant accomplishment as an individual and a member of a group. How would you?

[2:24:37]

Vanstrum, P.: Well, I guess I would say that -- I would judge that my efforts as a manager were probably the most important contribution I made. I hired some really outstanding people and moved them into jobs where they could make a contribution. And so I think the whole sphere of management where you hire people, evaluate them, have them work in an area where they can make a major contribution, and if you can know the places where you ought to be working and generally where the emphasis ought to be, you can do a tremendous amount of change with capable people. And that's what I was doing and I guess the most important part of my career. I would hire people and get them motivated to work diligently in these areas of greatest importance.

[2:26:12]

I don't know -- the gas centrifuge came along and was in that category, entirely different technology than gaseous diffusion. But in 1960 I, along with others, made a proposal that we do work on the gas centrifuge. The University of Virginia was active in the area and we became active and became, I think, technical leaders in gas centrifuge technology. And that was in 1960 and they're just now getting back to using that technology again. The whole technology bit and working with truly outstanding people would always just capture my attention and interest.

Callan, C.: I think we'd better -- well, we've got three minutes. I do -- I think you can answer this in three minutes, but let's talk about -- you kind of have a different twist on this because your saying you hired some of the best and some people said it was really hard to find people during this period to come here. How is it that you could

seek out and find some of the best people? How did you go about doing that?

[2:27:48]

Vanstrum, P.: Well, we had very active recruiting programs. We went away to the universities. I visited some of the universities and interviewed people at school before they graduated. And, uh, we were doing some extremely interesting work and although we couldn't discuss the details, we could explain it adequately to the point where they would capture some of the enthusiasm that we had and be intrigued by the opportunity we had. And, uh, then we could hire consultants. We could go to the university and, and hire professors on a consulting basis. And, uh, like when the gas centrifuge -- we got into gas centrifuge work, but there were people at the University of Virginia who were already pretty expert in the business and we were able to combine their expertise usually on a basic science level without engineering know how and come up with something even better than we might have otherwise.

Callan, C.: I think we're ready to change tape. We're getting to the last two pages. [laughs].

[2:29:25]

[End of Tape 2, Begin Tape 3]
[3:00:07]

Callan, C.: -- have these transcribed as well as having them in videos. We have all different kinds of format.

Vanstrum, P.: Well, I, I won't ever be concerned. You can cut it all or use it all or whatever. [laughs]

Callan, C.: That's what's so awkward about a documentary. Sometimes you use 20 seconds of one --

Vanstrum, P.: Yeah, well I under -- I understand that.

Callan, C.: But, talk about -- were there any conflicts that occurred between management and the workers and the unions that you recall? That you could describe?

Vanstrum, P.: Well, the unions, of course, wanted in and the oil and chemical workers at K-25 were the ultimate union representation and I think

generally speaking we had tolerable relationships with them. They were, you know, as we would view it, maybe a thorn in our side and we -- we probably felt -- they felt the same way about us.

[3:01:29]

But we had the usual pro and con arguments. What they wanted in relation to their job and what we feel was reasonable. I, I -- being involved in the technical program, I didn't get as involved with the labor relations activity as I might have. They counted on me more for the technical leadership rather than labor relations leadership. And we had good imputs from the corporate headquarters on labor relations. And I would say generally they were on a positive note.

Callan, C.: Would you describe to us what it was like for women in the workforce and how they were treated and just a description of the women workers?

Vanstrum, P.: Well, we had -- this group that I mentioned -- the line recorder operators were all women. And I, I thoroughly enjoyed working with them. We had some wonderful workers. We had some that weren't so great, but that's true in any population. But I always had a wonderful secretary and appreciated the contributions that they made. These operators were very dedicated and worked hard to do a good job.

[3:03:37]

In the laboratory we had quite a few analysts that were women. And as far as I was concerned we weren't discriminating [laughs] against them or anything like that. We -- I personally appreciated the job they were doing and hope I conveyed that feeling to them. You look back and you never know for sure, but that's the way I see it now.

Callan, C.: What about minorities? Where there Afro-Americans in the workforce and how were they treated?

Vanstrum, P.: Well, in Oak Ridge, of course, we were in the south. Initially at the plants they had colored toilets that were for the colored people. And before too long we did away with those. [laughs] But, I would have to say that that we went along with the sort of the way things were in Tennessee at that time. We had some wonderful black people that were very skilled and talented and very good at what they were doing and very conscientious and so on. Again, I

didn't -- I don't have any complaints or any ill feelings about what was done, but it was different.

[3:05:25]

Callan, C.: Okay, we're going to ask just a little bit about living in Oak Ridge the town itself with your wife and family and what you did during your off hours -- what it was like living in the secret city and what was it generally like in the secret city of Oak Ridge.

Vanstrum, P.: Well, it was different. [laughs] Uh, I remember when we first got to Oak Ridge they showed us what we called at that time the flattops. They were little cracker boxes with a coal burning furnace in the center of the room and they showed us one of these and said this is what you're gonna have to live in. And I said, well, not me. I said, you know, I'm just not gonna put up with that. So then they found another type of government housing that was available -- it was, what did they call it? K apartment. And everything was coded just to make easier to recognize, I guess. But we were shown a K2 or K1, I guess, apartment, which was part of a four-family apartment house and they were brand new, never been lived in. They had just, just completed the construction and that was quite a bit better. And so that's what we settled for initially in Oak Ridge.

[3:07:18]

You were given housing in accordance with your family situation and we had no children at the time and so we were eligible for a one-bedroom apartment and that's what we got. When our daughter came along in '46, I was then eligible for a two-bedroom apartment or a house. And uh, we ended up with a -- what is a B house - it's a two-bedroom house and it was really a big step forward as far as we were concerned. We moved into that house and really enjoyed it a lot. It's a -- it's not a big house, but it's a well-built house and laid out fairly nice and so it was quite acceptable. Then when our two boys came along we were eligible for a two-bedroom house and as it happened the house next-door to where we were living was a D house and became available while I was looking for a D house and so we moved into the D house. And that's a two-bedroom house and a really - quite a nice place. It has two bedrooms and a bath and kitchen, dining room, living room, porch area. So it's very nice. And we moved into that and I still live -- that's the house that I still live in.

[3:09:13]

I've done a lot to the house since then. I have a full basement and a lot of other things like that that have improved the general house, but the location is wonderful. I'm at the top of the hill overlooking mountains and it's really been a wonderful place to live.

[crew talk]

Callan, C.: We're getting to the very final questions. And these -- I'm just trying to get really tight comments, succinct, because you've said them in different ways, but I want something that we might use in closure or something. So, this one is just describe what future generations should remember about K-25.

[3:10:21]

Vanstrum, P.: Well, I think the thing to remember about K-25 is that it was a -- an adventurous effort employing new technology, risky technology. Some of the people that were around at that -- in the early days thought the plant would never work, but there were a lot of determined people and able people who did make it work and ultimately we brought materials for the atomic weapons, which I think settled the war, put the Japanese out of business and ended the world war we were in. And we should never lose sight of the fact that K-25 was an important element of that effort, which ultimately ended up in the end of the war. The people that were getting ready to help invade Japan are very thankful for that atomic weapon that stopped the war before they had to do that.

Callan, C.: Well, this is kind of question that -- it's just to help us on our research and synopsizing all of this material we're bringing forward in oral histories and I'm just asking everyone, if they were writing a book or a documentary about K-25, and if you thought in terms of an outline of major topics that we definitely have to cover or how you might cover it, and I know this is a massive question, but if you could give us any kind of approach that you think would be a good approach in telling the story of K-25.

[3:12:14]

Vanstrum, P.: Well, I think you have to indicate what the circumstances were and the vision that some people had of developing atomic weapons

which could ultimately be the decisive factor in winning the war. Certainly that groundwork has to be laid. Then the -- there has to be a groundwork on the concept of what -- how does one get enriched uranium or how does one get material for weapons production? And that involved -- it did in fact, looking at the different methods of isotope separation -- K-25 was, was gaseous diffusion, but Y-12 was electromagnetic. And so those decisions had to be made. What process could be used and what technology would be best suited for that? And some brilliant engineering work was done in the early, very early stages of K-25. People like Manson Bennet - Massachusetts Institute of Technology where the more creative people came up with some of the early concepts.

[3:13:50]

And then you had to assemble the force to carry out the thing. Build it -- build the -plants which were gigantic by any measure at that point in time and assemble the forces, have their capabilities to do the job and then, of course, work with the -- ultimately the weapons people in applying it. Something along that line. [laughs].

Callan, C.: I think you did great. I think you kind of wrote this book for me. Thank you so much. And I guess the final question is just -- is there anything that we didn't ask or anything that you didn't say that you really want to say right now that we did not cover yet in this interview?

Vanstrum, P.: I guess not. I feel extremely fortunate to have been involved in the Manhattan Project and particularly in K-25. I feel fortunate to have worked with some outstanding people and have been a part of an effort like K-25. It's -- I just feel very lucky and appreciate the opportunity I had.

[3:15:35]

Callan, C.: Well. Are we ready to turn it off? I'll tell you, I appreciate the opportunity --

[End of Interview]