National Educational Technology Solutions LLC

K-25 Oral History Interview

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Interviewee: Mike Lundin

Interviewer: Connie Callan

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[1:00:02]

Callan, C.: -- documentaries with DOE, because I'm right close to Sandia and Los Alamos and DOE sites across the country.

Lundin, M.: My son will be going out -- His wife is a native of Albuquerque.

[crew talk]

Lundin, M.: Yeah. He'll be going out there next January. He's going to be teaching at the University of New Mexico.

Callan, C.: Oh. See, I actually retired from the University of New Mexico after 25 years.

Lundin, M.: Is that right?

Callan, C.: From the School of Engineering.

Lundin, M.: Why you don't look old enough to do that. What school did you say?

Callan, C.: Are we ready?

[crew talk]

Callan, C.: Okay. The first question is simply to state your name and spell your name. And give us an idea of your title at K-25.

Lundin, M.: When?

Callan, C.: Well, give us all titles right now, because we'll go into more detail in a minute.

Lundin, M.: My name is actually Myrin, M-Y-R-I-N L-U-N-D-I-N. No one but my mother and my wife call my Myrin. The world knows me as Mike. So if we deal with Mike, we'll be all set there.

My titles. I came in as a lowly vacuum test engineer. Worked my way up through various functions until eventually I was head of mechanical design and at the replant, engineering operation. And many titles in between.

Callan, C.: Thank you. I'm just going to state for the record that I'm Connie Callan, and I'm the interviewer today. And today is March 9, 2005. Okay. We are going to start with some background questions. And we've kind of designed the questionnaire to start you recalling in order of the years. So we're going back in time

here. And these questions all deal with your place of origin.

[1:04:49]

So first we're going to ask you where you were born. And please expand if you wish.

Lundin, M.: Born in New York City, October 9, 1923. Educated at the City College of New York, graduated in 1943.

Callan, C.: And one thing I forgot to mention is that no one will hear my questions. They'll only hear your answers. So if you wanted to kind of paraphrase my question in your answer.

Lundin, M.: Your questions to get the relationships.

Callan, C.: Yeah. It's not normally a problem, but occasionally you'll start in the middle. Where were you living prior to coming to work at K-25 in Oak Ridge?

Lundin, M.: That cannot be a direct answer to the question as to where I was living. One has to go into the question of how I arrived on the project. I was actually working in Philadelphia for the General Electric Company when the war manpower commission said, "Get your tail to New York on Monday morning."

[1:03:58]

Arrived in New York and went to work for the Kellex Company at Columbia University at the Nash Building doing vacuum testing. And from there, the entire group eventually, except for a few of us, moved to Oak Ridge with Carbide and Carbon Chemicals Company.

So at the time I actually moved down to Oak Ridge, I was living in New York City. But at the time I got onto the project I was living in Philadelphia. Confusing?

Callan, C.: No. I think there are similar stories that I've already heard about this letter you got and you had to report. What was your work background prior to coming?

Lundin, M.: Prior to getting on the project I was a test engineer with the General Electric Company. In that capacity, General Electric lets you move every three months to a different job in a different plant

or where have you. You don't get a raise, but you have the opportunity to see the country. See different types of work situations and determine where you want your permanent assignment to be. When you get a permanent assignment; that is when you start getting raises.

[1:05:18]

Callan, C.: As far as education, where did you attend your high school? And where did you graduate?

Lundin, M.: I graduated from David Clinton High School in the Bronx, New York City.

Callan, C.: Do you mind giving us your age and where you were born.

Lundin, M.: 10/9/23; makes me 81 years old.

Callan, C.: It's amazing. You don't look 81 years old. Everyone looks so healthy.

Lundin, M.: That's because of our -- We look healthy because of our exposure to radiation. Joke. Joke. [laughter] We're not part of the group that's suing.

Callan, C.: As far as your degrees, do you want to go through the degrees you earned and the colleges you attended?

Lundin, M.: I'm a bachelor of mechanical engineering. That is I have some advanced work at University of Tennessee, but primarily my final degree was Bachelor of Mechanical Engineering.

[1:06:26]

Callan, C.: Do you want to go into your family origin or your heritage or anything like that?

Lundin, M.: Well, I'll go as deeply as you want. My father and mother were both immigrants from -- It's hard to say whether it's Poland or Russia, because at various times it has been both. I think in the final analysis one would say Russia, Minsk. And I'm a first generation American. And you might ask me some questions as to what about my background do you want to know.

Callan, C.: Just anything that you think relates to how you happened to work

at K-25 and how that enhanced --

Lundin, M.: Oh. Well then you want to go past the General Electric portion of my life onto -- The name of the building -- Actual company we worked for was Kellex, but we were assigned to SAM Lab (Special Alloy Material, at Columbia University). We were intensively trained in vacuum test. The Nere - spectrometer. We designed -- we were able to design them, take them apart, build them, repair them. It's a system by which one envelopes a piece of pipe that welds a joint with helium and picks up the helium peak on a mass spectrometer to determine whether it's leaking or not.

[1:08:26]

The entire system at K-25, the success of it depended on being leak-tight as so far as possible. And the helium mass spectrometer was the tool developed by Nere at the University of Minnesota that we used in doing our vacuum testing.

Vacuum testing was fine. We were well-educated. We got down to Oak Ridge and couldn't touch a thing because it was a union function. We were non-union, so although we knew what was wrong when you had problems, we could not fix. And that's interesting; it's an attitude that we kept encountering.

But we successfully managed to vacuum test the plant, and it went into operation and successfully produced enriched uranium for the second atomic weapon.

[1:09:32]

I stayed in New York for an extra four months after the group came down here because the neighborhood was not -- It was a pretty rough neighborhood. And they needed some night shift people for the test loops. Many of the pilot loops were in the Nash Building at Columbia University where a lot of the basic research on the process was taking place. And we stayed up there to assist in the testing of the test loops.

Then came the time about, September of '44 I guess, is when I finally permanently came down here and was assigned to a shift in vacuum test.

At that time in spite of the importance of the effort, our people were being drafted, sent to Camp Claiborn in Louisiana for basic

training and then sent back on the job as GIs. I left for three days; got as far as Georgia when the big push came on to finish the first building. So back I came and rehired. Had no place to live, but managed to get a dormitory room. And since then -- soon thereafter -- Well, that was the interesting -- The date there was very easy to pin down. It was December 7th, 1944 that I left and came back on December 10th and been here ever since.

[1:11:30]

Callan, C.: Well, thank you. You went through the whole questionnaire with that one question.

Lundin, M.: Well, we'll go back and fill in the details.

Callan, C.: Let me turn this phone off. I'm so sorry.

[crew talk]

Callan, C.: If you don't mind, I'm going to get into more detail on some of this.

Lundin, M.: Let's get back into the detail now. I've skipped an awful lot.

Callan, C.: Yeah. I figured. Let's go onto just the general questions at K-25. Why did you come to work at K-25? What attracted you to come, and how did you hear about it? I know you just mentioned that.

Lundin, M.: I was sent. I was basically told that this is where I'm going. In fact, I was -- Backing up a few months, I was told I am staying in New York to assist in the work there. Mainly I guess because I was a New Yorker and it didn't scare me to stay in New York. And we worked night shift until the job was done. And then after our job was finished we quit.

[1:12:44]

Caused some problems with our supervision in that they didn't particularly care for us not to put in eight hours a day. We would put in three hours if there wasn't any work to do and go home and put in twelve hours if there was work to do. We managed to get more than 40 hours worth of work in each month -- each week. But then came a time when I was transferred from the Kellex Company to the original predecessor of Union Carbide, which was Carbide and Carbon Chemicals Company at K-25. That's how I

got down here; was essentially told.

Wasn't much choice in those days. I don't think I've ever objected. I was on a leave digression. It has nothing to do with what questions you're asking. I was on a leave of absence from General Electric Company. Supposedly had a job from them at such time that my work here was completed. I'd been down here a while and figured it was about time, so I checked just to -- I was married already. Then I checked on coming back, and they offered me less than I was making here by a substantial amount. So I says, "No thank you." I am not coming back to the generous electric company.

[1:14:12]

Callan, C.: Now when you were chosen, do any of you know how you were selected at all?

Lundin, M.: Yeah. We were alive and single and slightly educated. The group that was taken was a diverse a group as you've ever seen, every kind of engineer. We were all engineers pretty near. In this group from General Electric and Westinghouse. Two groups were taken for this particular effort. And there were about 70 odd people in the two groups. And essentially that's the way we were picked, because we had degrees and some technical training.

Callan, C.: Now did you all stay friends during the whole period? The original group?

[1:14:59]

Lundin, M.: A lot of them are still here. Some of them are still here. Many left the first opportunity. You know, everybody's got a different viewpoint on things. And some are still here. We scattered all over the country. Maintained contact with some of them. And they were in every state of the union from that original group, from Florida to California to Maine.

Callan, C.: Now that we've got you thinking back in time, think about the very first day or the first week that you came to K-25. Do you remember some of your first recollections?

Lundin, M.: My first recollection is driving here from Knoxville. Flying was not a question at that time. You came down by train. And you took one of the old roads to the plant. It had been raining quite

substantially for God knows, 30 days and 30 nights or something like that. And the road was literally littered with carcasses of dead animals. [laughs] That was my first impression of the South.

[1:16:12]

Actually, my first impression of K-25 was that it was a bustling place. There was over a hundred thousand people working here at the peak in various forms of construction, operation. And essentially we knew a job had to be done, and we did it.

Callan, C.: And when exactly did you come? Do you remember the year?

Lundin, M.: September 8, 1944.

Callan, C.: Okay. You said that already. [laughs] Sorry. Can you give the exact years? You worked at K-25 from when to when? And did you transfer around to Y-12, to X-10, or any other organizations?

Lundin, M.: I was physically at K-25 in various aspects of test, of operation, of development, of design, of advance design, science fiction work on the new plants, construction. That time we got to handle some magnificent construction projects here. Paducah, Kentucky, Portsmouth, Ohio; the gaseous diffusion plant derivatives of the work that we were doing here at K-25.

[1:17:36]

I stayed in that effort for approximately ten to twelve years and then transferred to Oak Ridge National Laboratory, or X-10 as it's known at the Y-12 plant into reactor development work. And how much further do you want me to go into my history at this time? Is that enough at the time being? Or you want to go on?

Callan, C.: Just keep going.

Lundin, M.: I'll keep going. I stayed in various forms of reactor development work and worked my way to the head of reactor design department doing the design work on Homogenous Reactor tests, Molten Salt Reactor. And then I did several projects. Pulse reactor work. That's where I became quite acquainted with the people at Los Alamos. Pulse reactor is a bear. Reactor Godiva. It's called a Godiva type reactor. It's a sphere of uranium to which you put excess reactivity. It goes super prompt critical. You get a burst of radiation, which simulates a nuclear weapon. And then it shuts

itself down safely.

[1:19:01]

Designed a system like that for use in health physics at X-10. And the Army wanted a very similar system at Aberdeen Proving Ground for testing weapons and personnel and personnel carriers. I found their resistance and attenuation of radiation from exposure to a weapons burst. So I was fortunate enough to be project manager for those projects.

Stayed in design and reactor division for about ten years and then transferred to Y-12 into weapons work. I won't talk much about it except that I was head of mechanical.

And then after for a period there was back engineering transferred back to K-25. And towards the end -- I'm skipping a lot of years. Had a lot of very, very interesting projects, including the design and construction of the new plants at Paducah and Portsmouth that I alluded to several moments before.

And then we started to study what it takes to D and D, decontaminate and decommission the existing K-25 plant, which was shut down as the newer plants came on and the need for a full range enrichment capabilities went away. We're no longer interested in producing weapons grade material, but you're interested in producing reactive grade material. And therefore, you no longer need the top that the K-25 plant was.

[1:20:59]

We did a lot of studies on decontaminating and decommissioning. All of which the powers that be decided it was too expensive. Our reports -- Some of them were published, but most of them were never published because our numbers disagreed with what the Department of Energy wanted to hear. Since then, they have spent many, many, many, many more dollars in hiring outside engineering companies to do the same studies and come up with methods for D and D in the plant.

Back to green field, which means that everything essentially is pure and pristine as it was before the plant was ever built. In fact, even more pristine because the United States is one of the few countries in the world that doesn't have a deminimous value. If you can detect traces of radiation of uranium, the uranium

materials, plutonium, you can't put it out to industry here.

[1:22:17]

You travel around the world. Every other country has deminimous values. They can recycle materials after they're finished. We have to store them. So we have the Yucca Mountain controversy and things like that that are -- Until the congress sits down and gives you an actual -- sets an actual deminimous, this country is not in the best of shape. We're handling waste.

Now all you can do is store it and develop a priesthood to watch over it for years to come, generations to come, not just years on that.

Callan, C.: That was amazing. That was very interesting. Let's go back again in time to just when you were at the K-25.

Lundin, M.: Fine.

Callan, C.: If people were to inquire back during the Manhattan Project and around that period about what you did there, what were some of the stories you all told?

Lundin, M.: Well, in my first assignment of vacuum testing down here, my shift consisted of 117 women and four men. Men were at a premium. They were all off fighting somewhere. I went from there into operations, operating the plant that had just been vacuum tested; going through pre-op testing and the actual operation. And then from that, I went into development effort trying to develop new pumps and new materials for use in the plant.

[1:24:08]

From that I went into design where we called ourselves the science fiction group, because essentially we were looking at methods of building new gaseous diffusion stages.

I don't suppose the terms rabid badger and that sort of thing have any meaning to you. But they are alternate configurations of the barrier and piping to attempt to get the last inch of molecule of productivity out of the plant. Make the best use of the power that you can.

And what made life interesting in those days is you got to work

with the architect engineers who were actually designing the plant, did a lot of traveling. And the manufacturers who were building the equipment in the plant; they were scattered all over the United States. So life was quite interesting in those days.

Callan, C.: This isn't one of my questions. Can you describe the gaseous diffusion process in a way that isn't classified? Or is that getting --

Lundin, M.: Yeah.

Callan, C.: Okay. Let's go for it.

Lundin, M.: It's quite simple actually. The museum pieces on it show a piece of barrier. You pump a mixture of uranium -- Well, it's all in gaseous form at that point. So for separation. Through the barrier, the lighter component, the uranium 235 passes through the barrier. The heavier component doesn't and gets recycled down to the stage below. And things go back around in circles time and time again. And little by little, with a lot of power, your lighter component gets separated by the barrier.

The smaller particles pass through the barrier much easier -- much more readily than the heavier particles. That's a very simplified explanation to what's going on. And these separation factors and things like that are what we were trying to beat. Trying to get as good a separation factor as one can with a minimum expenditure of power, because any power you put into it essentially has to be taken out in the cooling system.

[1:26:51]

Water towers of which you saw plenty. And you saw fogs every morning. And you came to work, because a lot of heat is being rejected through the cooling system. That's as simple an explanation I can give. I don't know how thorough it is, but you can get more erudite ones from other people.

Callan, C.: I've seen some of the diagrams in the book, and I can just picture the diagram. But that will be very helpful if we ever do a documentary. We could actually use some of your words with the documentary. So that was very good. This is not in my list of questions, but -- I shouldn't have you be drinking. Well, you can drink coffee while I'm asking. That would be fine.

[1:27:35]

Lundin, M.: I won't. I can't talk and drink at the same time.

Callan, C.: Yeah. That's true. [laughter]

Lundin, M.: I get drunk. [laughter]

Callan, C.: The gaseous diffusion process is not what has been decided as the best approach.

Lundin, M.: It's expensive. It's expensive. Centrifuge is much lower power requirements. I worked in the centrifuge program for quite a while. I skipped all that, because you were interested in the early days. But in the centrifuge program basically you whirl a stream of uranium, hexafluoride around circles, and the heaviest stream gets thrown out. And the centrifuge, the lighter stream is pulled. And again, it's recycled. The heavier goes back. The lighter goes forward. And a number of stages like so.

But the main advantage of centrifuge is any nation can develop a centrifuge. And even though they don't do it in efficient fashion, it means almost anybody anywhere in the world can build a centrifuge of a sort and get enriched uranium and develop weapons grade material.

[1:28:58]

It may take them a longer time. It may take them a lot of money over time. It may not be the most efficient or effective way of doing it, but they can do it. So this fallacy that countries can't produce uranium, it's nothing but a fallacy basically; because any country that has a molecule of technical development -- They have to be able to build materials. They have to be able to build equipment. Can make a weapon. I don't know if that answers the question or not, but that's one of the --

Callan, C.: We're going to switch tapes.

[End of Tape 1, Begin Tape 2]
[2:00:08]

Callan, C.: I know that that's all in books, but whatever would be interesting.

Lundin, M.: Well, there were a lot of high powered -- Are you on yet?

Callan, C.: No. We still have colored bar right now. We're waiting.

[crew talk]

Callan, C.: Talk about the different processes and the pros and cons.

Lundin, M.: There were a number of competing processes that were taking to various stages of development. There was the gaseous diffusion for which much money was spent for K-25, Paducah, and Portsmouth. There was thermal diffusion which had a pilot plant, the S-50, the power plant located at the outskirts of K-25. There were reactors that would produce products that were a little different way of doing it. Rather than enriched uranium, you would get your weapons grade material by cycling them through reactors, nuclear reactors.

That was the work that X-10. It started at the football field, at Stag football field at the University of Chicago, transferred down to Oak Ridge National Laboratory and used for development of the Savanna River and Hanford type of operations.

[2:02:01]

There were other methods of getting enriched uranium. Anybody with a good chemical engineering background could figure ways of obtaining separation of isotopes. The basic equations involved in gaseous diffusion or any of these processes are standard chemical engineering.

The details, however, and the materials used in order to make them successful are considered classified to some extent. And that's what your classification man was talking about. But I don't want to touch on some of the details.

Callan, C.: Talk about what was learned at K-25 that does help today in science.

Lundin, M.: I've got to refocus a little bit and try to -- Almost every process -- Well, I'll back off just a very little bit and say something about barrier that's not classified to my knowledge.

The original patents barrier probably belonged to the Ford Motor Company. They were used on the Ford Tri-plane as wing deicers. There was a system there to permit the icing fluid to pass under pressure out into the rubber boot at the tip of the wing, enable it to keep it to deice the wings. That shows you an example of a type of

work where separations were being used commercially.

[2:03:50]

Uh, oh, the ramifications. Any time you tried to develop something, there are a lot of subsidiary efforts that take place in getting the point where you're actually in production that can spin off.

The alloys developed are now commercially available. Haynes Stellite makes a lot of them. I don't know if Haynes Stellite is still in existence. But the seals of course are used in everything. And while I can't discuss the particular seals, won't discuss the particular seals that were in use in the K-25 plant, offshoots are used all over the world anytime you have rotating equipment. So, seals are in use.

The valves that were used, double disk wedge and spreader mechanism type of valves that were developed for this project are actually in use all over the world again. It's a method of getting full flow through a valve and yet sealing tight in such a manner that you can even put a buffer in between two sets of seals to prevent any leakage of valuable material.

[2:05:41]

I'm trying to think in an off hand manner of applications. Any time you need a buffer, this type of valve. And it was the subject of suit for many, many years. The government took the patent, built the valves; told another company to build the valves and the gentleman who invented it never got paid until many, many, many, many years later.

Callan, C.: That was very good. Thank you. I've got little notes all over my page. Thinking back again about Oak Ridge and K-25, what were some of your most vivid recollections? And might have already stated some of them. What do you remember when you think about K-25?

Lundin, M.: In what way?

Callan, C.: Sometimes there's just like a memory that comes to you like the cafeteria or the food or the heat or the facility. Who was most vivid when you walked in the building every day?

[2:07:04]

Well, we designed one plant, which at the time was a brilliant idea. And we convinced the management that was the way to go. And in retrospect it was probably not the smartest thing in the world to do.

All the original plant was divided into cells. A cell consists of stages. Six is the basic ones in K-25, or basically six stages in a cell. That is six stages where the light stream goes up. The heavy stream goes down. And they're isolated. If something goes wrong, you can isolate a group of six stages called a cell to do work. In order to prevent condensation of materials, you have -- They put a cell housing around each of the cells to maintain an atmosphere, a dry air atmosphere around these six stages.

We got the bright idea that you really didn't need it at the lower ends of the plant. You can do away with the cell housings and keep the building warmer. Say 80, 90 degrees. And you can, but is hot as hell to work there, and the people hated us. We were not the most beloved people in the world. That was the K-29 plant was designed that way. The K-31 was knocked. Went back to cell housings, and the K-33 can get into larger, more powerful equipment. Definitely had housings.

[2:08:48]

Lundin, M.: That's an example where we didn't do the smartest thing, in my opinion.

Callan, C.: Let's talk about what you liked about working -- It's two questions. One is going to talk about what you liked and what you disliked about working at K-25. So let's start with what you liked best.

Lundin, M.: People, always people. We -- This is what goes back into the basic town. We're all, every one of us that were engineers and my co-workers essentially come from someplace else. We've been uprooted from our family, our roots. We're down here. We're young married with similar problems. And we're all --

You didn't find an hierarchy where you had three million dollar houses being built. The housing system that was used in allocating houses here was a function primarily of the number of children in the family and the number of children with opposite sex. So you

can get a two-bedroom or a three bed-room house. If you had two children of opposite sex, you get a three-bedroom house. I got a three-bedroom house. [laughs]

On that, I was fortunate; working my way up from an apartment through a two-bedroom house to a three-bedroom house. I'm still in it; been in it now for a long time, over 40 years in the same house. It's adequate. Children are gone. It's more than enough for 81-year-olds. We don't need it.

But you asked me what was wonderful about here. All our friends are similar, similar in age, similar in outlook; just similar hobbies. Oak Ridge is a town of clubs. Anything you can think of, there's a club; if it's photography, environmentalism of some sort; you name it, there's a club. And you can join, become as active as you want to away from work. You can develop a full life. It was a town of churches and gas stations. More gas stations and more churches per capita than almost anywhere else in the world is the way I categorize it.

[2:11:30]

Callan, C.: Okay, let's get on to what you didn't like about working at K-25.

Lundin, M.: That's a harder question to answer because I'm one of those rare people that almost always enjoyed the work he was doing. Obviously, there was a lot of drudge work in doing the design problem. One had to do calculations and more calculations and more calculations and more calculations and make modification and do them again.

I can't say I was ever in the position of really feeling I was in competition with someone. We all felt that at that time, this is again things I liked, that we're here to do a job. And many of us were essentially going to get out as soon as they can.

As our work in the design of the diffusion plants started to slow down, many of our people and me included got antsy; started looking around for other jobs. Or bosses were far-sighted enough to say, "Hey, don't worry Mike. We're going over the reactor work. We're going to take you with us. So don't worry about having a job." So that set our minds at ease.

[2:12:58]

What you didn't like about it was some of the red tape that was present because of classification. One example, we wrote a report. The plant nine or plant ten report. I forgot which one we were -- we got -- when we formed this group of advanced study work, we were continuously up seeking to investigate how to upgrade the plant to a better plant. Lower costs per gram of uranium per dost.

We wrote a report. As soon as we wrote it, it became top secret. We were not permitted to read it at that time, because only one of our departments, namely me, was permitted to read it. And the report was in. Or I'd give you a side issue that you can cut out of your documentary at the proper time, because it really doesn't belong there, but I think it's interesting.

The report disappeared. One inventory went by. No report. Second inventory went by. No report. Search of all the cabinets in the building. No report. We were about to make a declaration to the Department of Energy that we lost the report. Bad, bad boys.

[2:14:28]

We go to the head of security to confess. The head of security looks at us and said, "You know." He opens his drawer, and there in the middle of a wooden desk, in the middle drawer of a wooden desk was the top secret report.

The guards had picked it up at five o'clock. He was leaving on vacation. He threw it into the wooden desk. Locked it, and forgot about it. No report was ever made. That -- No actual declaration was ever made that the report was picked up, and we were batting our brains out. Cut section out of the documentary.

Callan, C.: Okay. We're going into working conditions now. And this is about how did people communicate to fellow workers in a secret facility?

Lundin, M.: Uh, it was difficult, because we were compartmentalized to a large extent. Uh, those in our group of course were in daily contact with each other and knew what we were doing. And we could communicate. Those not in our group were just not privileged to have access unless they were properly cleared to what we were doing.

[2:15:59]

We depend upon those up on top to provide the coordination that was necessary to keep things going.

You asked us what we didn't like about the facility. I recall something very vivid. This was the days pre-dating central air conditioning. So what did our air conditioning exist of? We sent staff members up on the roof to sprinkle water when it got too hot. That provided a modicule (phonetic sp.) of, modicum of cooling, and we were able to continue work.

Callan, C.: We're back into communication. Talk about communication with your family. What was it like since you couldn't go home and talk to your family?

Lundin, M.: It was very, very, very difficult. And I was never able to completely -- I've never told my relatives in New York. And I didn't tell me wife very much. And I was doing a lot of traveling to architect engineers all over the country who were producing basically the building designs, the electrical designs, etc. And even there, you had to give them criteria, which were spelled out. This is what you have to do. They were not given the complete problem in many cases because of the secrecy.

[2:17:34]

Years later one of my assignments was to -- The files at Columbia University were bundled up and brought down to Oak Ridge. And I was tasked with going through them and determining what was classified and what wasn't classified and what could be released.

The scientists at Columbia University had a little bit different attitude on classification than we did. They weren't indoctrinated that this was classified. So one had to go through notebook after notebook, page by page, and determine this page is classified and this is not. Drawings were not stamped classified. A guy had thoughts. He put them down on paper. Their attitude was entirely different than the attitude out in the field.

Callan, C.: I work in a university so I understand what you're talking about. That was interesting. I haven't asked anyone else this, but I was kind of wondering what it feels like -- And I know today even people are working with classified material. When I have a really good work day and I feel like I accomplished a lot, I like to share it with my family. And you all accomplished so much. You must have been so proud of what you were doing and yet you couldn't share that. Do you think that was hard?

Lundin, M.: That was hard. It definitely was hard. And there were all sorts of jokes as to what we were doing at the plant. And fundamentally I approached it as a fact of life. This is it, and one will push the limits as much as one can. But one couldn't afford to violate them too openly.

Callan, C.: Talk about these jokes. I love the jokes. I want to add to my collection. What were some of the stories about what you all did at the plant? Tell us.

[2:20:08]

Lundin, M.: At this moment it's hard for me to recall any exact ones. But you hear the classic stories about the guy who -- Copper tubing was in very, very scarce supply at this time. About the guy who wrapped copper tubing around his body and then took a wheelbarrow of copper tubing and attempted to walk out the gate. And the guard says, "You can't take cooper tubing out." And he says, "Fine." He dumps it and walks out with the wheelbarrow and with the copper tubing that's wrapped out around; the stupidity of the guards in other words.

A lot of the people from some of the more theoretical groups, and I don't know if you're scheduled to interview any of them, have been following the work being done in other countries. You alluded to that earlier and asked a question. And you perhaps ought to get them on your list to interview.

One fella -- Well, John Shacter you said, so your spokesperson indicated, was on the list. Sheldon Jacobs is another person in that theoretical group who did follow-up with evaluation of foreign capabilities. But that's an aside from what you're asking me.

[2:21:47]

Callan, C.: Let's talk about what rules were important to follow.

Lundin, M.: What rules did you say?

Callan, C.: Rules when you were at K-25. What were important rules?

Lundin, M.: Fundamentally, keep your mouth shut when you're away from the job.

Callan, C.: What were your co-workers like? Did everyone pull their own weight?

Lundin, M.: Like in any society, there were some that were harder workers than others. But by and large those who got weeded out as you worked your way into the advanced processes were interested in doing the job. And years later, as I say when I came back to K-25 and we worked on D and D of the plant, our team consisted of people that were really dedicated to the proposition of trying to help clean up the place.

[2:22:58]

And again, I'm going to mention some names. I understand that some of them may be on your list. Joe Dykstra was very active in that work. Jay Foster, Nelson VanWie, Jimmy Parsons was one of our brains, but he's deceased.

Callan, C.: We have many of those on our list right now. In fact, Joe we interviewed a couple days ago. Let's talk about health. Just in general I've kind of grouped these questions. What kind of health facilities was available in Oak Ridge and K-25? Was there an emphasis on safety and health? Did you ever get injured or were you tested for radiological chemical monitoring? Kind of talk about health and how it was addressed.

Lundin, M.: We had an annual physical examination. That was one good thing of working here. And you got to know your doctors. And you would arrange to get your examination at the plant where you had the best rapport with the doctor who was going to examine you.

[2:24:23]

A trip I had behind the iron curtain that I mentioned to you, the plant asked me to undergo a body count, a full body count before I left. I was scanned again when I came back, and absolutely nothing was picked up. And I went to Russia, Czechoslovakia, Poland, and countries behind the iron curtain just on a personal trip.

But health wise we were monitored fairly regularly. And I felt that we were kept informed of what we should check on with our own personal physicians. I don't know if you get the same attitude from other people, but by and large it was good.

But you got to remember one thing. A doctor at a -- What do you want to call them? A industrial physician is one who didn't make the grade in private practice. He either didn't want it, or he felt that it would be easier to have a sinecure of a sort of being a company physician in a practice like that.

So some of the doctors were better than others. One of the best -- You don't want names do you?

Callan, C.: You can give the best. [laughs]

[2:26:18]

Lundin, M.: To my opinion, the best doctor was a doctor Zanoli (phonetic sp.). Nick named Fingers. [laughter] Had the biggest hands you've ever seen on anybody. [laughs] His son is a dermatologist in Nashville now.

He's an interesting character in that he was an engineer working for Exxon I believe in New York City and then went back and got his MD. And he was already too old to begin to break in, in the private practice, so he got an industrial job.

Callan, C.: I feel bad I laughed over your comments. So I don't think they can use that. I'll try not to laugh while you're talking. [laughter] We're into the Manhattan Project, and you've already gone over it. We're talking about the years 1943 to 1945. During the war, did you have any idea what the enriched uranium 235 you were separating would be used for? And I know you talked about that, but do you want to go into that again?

[2:27:33]

Lundin, M.: That's a very difficult question to answer. Officially, no. There was -- No one official told us during those early days what we were doing. But there were five of us engineers that were asked to stay over and work the night shift and Columbia University. And we would discuss what was done. And we made some pretty good guesses as to what the project was doing in general.

There was a radio commentator who came on around six o'clock every night. And one night he gave a complete dissertation on the Manhattan Project; talking about its ramifications all over the country. Things being made elsewhere are coming together at Oak Ridge, Hanford, and Savannah River.

And the way he did that was by following car movements of train movements where material is loaded into boxcars that are shipped. And you see a preponderance of them ending up at Elsa Gate in the middle of nowhere in Tennessee. And he did some guessing as to how the project fit together.

[2:29:08]

You're supposed to be able to get a script of what he was talking about. And all of us wrote in to try and get one, but none of us ever got a copy of his script. As soon as he mentioned it, it was confiscated.

But you asked me did we know anything? We had some very smart people working at Columbia University in our group; the five of us that were there, and we had a pretty good guess as to what was going on. Were we told? No.

[crew talk]

[End of Tape 2, Begin Tape 3]
[3:00:09]

Callan, C.: -- the bootleg story. They heard it, and they want you to say it again. So could you -- Okay. Let's roll with the bootleg story. [laughs]

Lundin, M.: Okay. At the time that this particular incident took place, this area was dry. It was impossible to get legal liquor. You could get liquor through bootleggers or you can travel over to Morgan County and bring -- Which was a wet point within several hours drive from Oak Ridge.

[3:01:10]

One of our men, a young fellow from Pittsburgh used to travel up to Pittsburgh regularly and bring back a suitcase full of liquor and distribute it, sell it to his friends, co-workers, etc. until one day he had a knock on his door. And this gruff looking man in an overcoat says to him, "Are you such and such? Are you selling liquor?" And Manny said, "Yes." And he says, "Well, we don't mind you selling liquor, but we do mind you undercutting our price."

Apparently he was delivering it cheaper than the bootleggers were. But in itself that's not so bad, because the bootleggers would deliver a bottle of whiskey, good whiskey that came from North Carolina in general to your house at a price, which it turns out was less than the price that legal liquor -- When this area became wet eventually and state taxes were slapped on all the liquor, the price then went up substantially over what it was when you bought it from your friendly bootlegger. And your bootlegger was your friendly taxi cab dealer. [laughs] Would deliver it to your house.

[3:02:26]

Callan, C.: It's like a bottle of milk right? [laughter]

Lundin, M.: Right.

Callan, C.: Amazing. Gary out there just came in and said that we haven't had anyone talk about the Roosevelt cell in the K-25. And we didn't know if you could remember that particular part of the building.

Lundin, M.: Not the Roosevelt cell so much as the General -- Oh, gosh. Senior moment. The head of the Manhattan District, I can't remember the good General --

Callan, C.: General Groves?

Lundin, M.: General Groves. Leslie R. Groves was coming for a visit, and we cleaned up the inside of a cell, which was a musty, dusty, smelly place. Polished everything up and got it ready so VIPs could visit it. He takes one look inside, turns around to us, and says how many coats of pomade did you bastards use? [laughs] Period. In other words, he was denigrating what we did in wasting time cleaning that up. [laughs] But the Roosevelt cell I was not part of.

[3:03:44]

There were several cells in various parts of the cascade that were made accessible for VIPs. And I don't remember if the Roosevelt cell was in K-25 or in K-31 or in K-33. I think it was in K-33, because there was a demonstration in K-33.

Callan, C.: No. I think it was K-25.

Lundin, M.: In K-25. Then it must have been the cell we cleaned up.

Callan, C.: Yeah. Maybe.

Lundin, M.: I know they said Roosevelt never did see it. They called it the Roosevelt cell because they got it ready for him, and then he died before he actually came to see it.

Lundin, M.: I see. Well, I learn something every day. That's interesting. I'll see. Maybe Joe knows more about it. I'll ask him. You asked if we stay in touch. We do eat lunch together every three months as a group of retirees. That ever three months we'll get together for a luncheon; a whole bunch of characters.

[3:04:48]

Callan, C.: I liked your story about the Grove cell. So that's a whole new story we've got to add to our list. Tell me who other interesting and famous people did you meet over the course of working there. Can you recall some of the famous people?

Lundin, M.: I met some brains, but see I'm not a brain. And the brains would come down and look at the control room in 3037 and determine how things were going. And we started out -- Each building had a control panel above each cell. And there was one central control panel for each building. We had a girl manning each station.

Then we eliminated the ones manning the individual cells. Then we eliminated the ones manning the buildings and went to a central control facility. I remember Frank Shafron (phonetic sp.) as one of the brains behind the idea of a central control. But the idea being of course that one could manage a process.

[3:06:07]

And this is nothing more than a chemical process with a long column. And you can man it from one central point. And that central control facility eventually was the predecessor of the major plant control facilities that were built down at the head of the U that managed all of K-25 and all of 29, 31, and 33 from one location.

So you can see where the employment level went down. And of course the husbands were coming home and the women were quitting anyway. But these were all manned by women. I think I mentioned at one time that my shift consisted of about 115, 117 women and four men. And you had to be very fair in what you

did. And if you patted one and said good job, you had to do that to a lot of others who would get jealous. [laughs]

Callan, C.: We're going to talk about women, but you brought it up so let's talk about women in the workforce. What was it like for women in the workforce?

Lundin, M.: I'm not a woman. I can't tell. [laughs]

[3:07:24]

Callan, C.: How were they treated?

Lundin, M.: Uh, as I say, you had to treat them very carefully. Much like today when it's almost impossible to fire somebody. You couldn't fire people back then because you were continually demanding more personnel to fill out your requirements for the job. So if you were really trying to get rid of someone, you had to document it very, very carefully and build a case.

But by and large the women did an excellent job. Most of the jobs were unfortunately very routine, and the jobs were broken down into such a manner that they did not have to know what they were doing; just a question of doing, and as such, they did a fairly good job on that.

Callan, C.: What about minorities? Any minorities that you recall in the workforce (Indiscernible)?

Lundin, M.: There were a few, but you got to remember that this was about the time when their integration was first started to take hold. Oak Ridge, Clinton were one of the first schools to permit integrated classes. But segregation was practiced on the area to nth degree. An entire part of the community, the Gamble Valley area was hutments and the blacks were segregated into those communities.

[3:09:01]

They were not permitted to buy housing or live in housing elsewhere in the community originally. Now you find them pretty well all over town. I shouldn't use the derogatory term "them."

Callan, C.: I kind of skipped ahead, but do you remember August 6, 1945 when the bomb was dropped and what you were doing that day? What your reaction was that day?

Lundin, M.: Well, I was working at the time. It was announced at the plant. And there was an outpouring of people down near the post office and in the central sections of town just cheering and generally boisterous and happy over the part that we played.

This was a closed community; it was a gated community; one of the original gated communities. There were gates around it. You had to have a pass to get in. You had to have a reason for getting into the community. And then the town of course opened up with time.

[3:10:08]

In fact, and one side story. You asked about personal stuff. My wife went into Knoxville one day by bus. We didn't all have cars then; forgot her pass, her picture badge for getting in. So she had to get off at the gate. The guard looks at her and says, "What's your name young lady? Where do you live? What's your father's name?" "My father? My father's not here? My husband." He looks at her and says, "Are you old enough to get married?" [laughs] She got married at 21. She came down here. And they found that hard to believe that she had a house; bought it with her husband.

So another incident to show you how cosmopolitan the place was. Along the turnpike and coming out to Y-12 there are little guard shacks. I don't know if you can tell them or know what I'm talking about. Used to be that buses would stop at those guard checks and they would make a badge check. If you forgot your badge, you had to get off. Some of us had more than one badge, because we worked in different areas for different contractors. We were assigned with different contractors. So if somebody forgot a badge, it was very easy to slip an extra badge to someone to use it to pass through security.

[3:11:56]

But on the one occasion when I forgot a badge and there wasn't a spare badge available, I was called into the room there and they started to query me. The feller I'm speaking with had a recognizable accent. I asked him where he was from. "New York." "Where are you from?" "The Bronx." "Where in the Bronx?" "The East Bronx." "Where in the East Bronx?" "Uh, 181st Street." "Where in the 181st Street?" "Between Daily and

Honeywell." Well I lived and brought up on Daily Avenue and 181st Street in the Bronx. He lived in the house around the corner from me, my age. Went to the same schools at the same time, and we never knew each other 'til we met down here, small world.

Callan, C.: So did he let you through? [laughs]

[3:12:54]

Lundin, M.: Eventually. Getting my clearance. But I'll tell you, it was no harder to get into here than it was to get into Los Alamos. I don't think all the times I went to Los Alamos I ever got -- Even though I shipped my clearance ahead -- In fact, I have my clearance number in my wallet still. That they had my full papers at the plant at the gate to let me in. Always had to sit and wait while they call Washington or somewhere to clear me. So we're not the only ones that are inefficient.

Callan, C.: Well, Los Alamos is making news about it. I think that's it on the Manhattan Project. We've talked a lot. Unless there's anything else you think you might want to mention, because we're going to go onto the '45 to '48. Let's talk about how do you think history will view the Manhattan Project?

Lundin, M.: That's a very, very difficult problem. Fundamentally, the decision was made that the country would go ahead with the development of a nuclear weapon. Because of that decision, we're always viewed as a weapons producer, yet we never actually produced weapons here.

[3:14:30]

We made parts that were assembled at Pantex or elsewhere in the weapons complex into weapons. But we're still tagged with the idea that this place is a weapons facility. Excuse me. And you still find protests by people who feel that we're the worst people in the world because of our participation in a weapon of mass destruction, as our president puts it.

I don't know much more can be said about it. They'll always be a dichotomy there. There'll always be a difference of opinion between those who feel that we saved many, many, many lives in going ahead and doing what we were doing; that we shortened the war by a substantial amount even though it killed perhaps less Japanese than were dying anyway in hand-to-hand fighting

elsewhere. But still we horribly maimed some women who were paraded, even paraded down here. Because of what happened there. I can't answer your question as to how we'll be viewed. Only history will say whether there's a redeeming feature in what was done. I feel there was. I feel it was necessary. But then I may have been too close to it.

[3:16:12]

Callan, C.: Well, let's talk now about the expansion program and that's '45 to '48. And I know you've talked quite a bit about it. Is there anything else you want to add?

Lundin, M.: Yeah. I can give you a good story about it.

Callan, C.: Oh, good.

Lundin, M.: It tells you about the interplay of various factors on making decisions. I was on a committee, on a group that studied the requirements for building a new gaseous diffusion plant. Good transportation, cheap transportation, power, low cost power, good labor force, you name it. And one of the worst -- Two of the worst places in the country is Paducah and Portsmouth. In fact, the plant places we picked were out in the Dakotas near the peat bogs where you can build a power plant right on peat and have cheap power. You're near rivers that can be used for transportation.

[3:17:22]

But what we forgot about in our naivety was Barkley and Taft. In case you forget, they were two senators, very powerful senators. And essentially said if plants are going to build, they're going to be built here and here, Taft Ohio -- Portsmouth, Ohio. Barkley, Kentucky -- Paducah, Kentucky. And that's how the site decisions were eventually made.

Portsmouth is probably the worse labor area in the country at that time as far as union strike was concerned. But the decision was made to build a plant there.

Callan, C.: I think we've had some discussion about how it was decided for K-25. You haven't mentioned it. Do you have any of the background of how it was selected?

Lundin, M.: No. I don't have any background on that. I came into the program

after decisions were made. And I don't know the relationship between K-25, Y-12, and X-10. It doesn't appear on any grids that you can build. Even a logo rhythmic grid of some sort that will -- I think they're just arbitrarily names.

Callan, C.: Okay.

Lundin, M.: You may have heard otherwise. I don't know.

Callan, C.: Yeah. There's all kinds of rumors about the names. [laughs] Let's go into the Cold War era, '48 to '64. And you've given a lot of those kinds of things that you did during that period. If you want to talk about the activities that were accomplished that revolutionized the world. Anything that you want to add to that?

Lundin, M.: To me the most impressive things are the medical things that isotopes have produced for us. The work, the off spin of reactor work -- Now this is not what you're asking, but to me that is among the more important things. I presume as far as K-25 itself is concerned, you have read the Smyth report?

Callan, C.: I haven't.

Lundin, M.: I think his name was Allen Smyth of Princeton University published a report called the Smyth report, which is a very good history of the Manhattan Project, including the major decisions that were made and the participants. It says a lot more than you'll find anywhere else.

Callan, C.: Okay. That's when --

Lundin, M.: S-M-Y-T-H. I think there may be an E at the end of it. I'm not sure. He was at Princeton at the time that he wrote that.

[3:20:19]

Callan, C.: Okay. In your job category and your jobs, do you want to describe one of the most challenging assignments and most significant accomplishments as an individual and as a group? And I know you talked a great deal about both of those. Do you want to highlight anything right now?

Lundin, M.: Well, we were able to go from a single centrifugal compressor for a stage to a multiple stage axial flow compressor in the design of the 29, 31, 33 stages. Just a matter there. Once we made the major decision to go to this new type of stage scaling was not a very

difficult thing.

That probably is among the more -- And barrier. I am not going to say anything about barrier except to the extent that new methods of production enabled the quality of barrier to improve and the reproducibility to improve.

[3:21:46]

The people who worked in chemistry who did a lot of the work deserve a lot of credit for what they've done.

Callan, C.: Now is there anything you can talk about relative to the construction of K-25? Or should I skip all those questions?

Lundin, M.: Well, it was here at the time. But there was a whole community between let's see -- I guess it began about where the road -- If you're coming in here from Nashword (phonetic sp.). Ninety five goes into 62. From there north was a series of hutments where the construction workers lived. There were cafeterias. There was a dispensary. Tremendous number of employees, temporary employees lived there.

It's hard to -- I was not a part of that community. Therefore, it's difficult to put myself there and give you any insights into any of the problems that were associated. It's called the Wheat -- There's a Wheat School and the Wheat community. There's a schoolhouse still there in a little town called Dillus.

Callan, C.: We haven't found any construction yet. But we're in that area that's why I was just kind of reaching. We haven't found anybody that could talk to that.

Lundin, M.: Construction. Construction.

Callan, C.: Anyway, we'll keep looking for somebody that can talk to that.

Lundin, M.: Well, you see construction is temporary. They come in to do a particular job. And they finish the job and go to their next project.

Callan, C.: That's why.

Lundin, M.: Which is what an engineer does too.

Callan, C.: Yeah, but the engineers stuck around. And the construction workers left.

Lundin, M.: Because there always was a challenge. Now you're bringing it back to me. And I can talk about me. I mean, I moved from gaseous diffusion to reactor work to weapons component production back to advanced design, clean up and things like that. There's always an interesting job ahead. From an engineer's point of view, it was a wonderful life.

[3:24:37]

Callan, C.: And you built on your last job. Your background from your last job built you to the next.

Lundin, M.: Oh, yeah. Actually, as a side again, even though you don't know a subject doesn't mean you can't handle it. The Department of Energy entered into a contract with the Air Force to do a -- to build and design and build a commanding control system for USAFE, United States Air Force and Europe.

The contractor who was doing that work had been on the job for almost a year and hadn't even met his six month milestone. And the Department of Energy told the Air Force to get somebody from Oak Ridge down into Germany as necessary to find out what the problem is. And at that time, this was 1987, six, I was available. I was asked to go over. I spent a year to 15 months in Europe. Main job was to try to get the job moving.

[3:25:55]

I was not a computer man at that time. I didn't know what end from the other as to what they were doing. But it's people.

Let me give you an example at the interplay, your talents and why I say the job is always challenging. We lived in Germany in Gisesloten (phonetic sp.) for a year. Brought my wife over. I had a good time. She didn't because it was too cold and I had to get a shift care because I was in the mountains all the time. And I wanted something I had control of. Automatic shift would override and lose control if you drive over the speed limit. And everybody does over there.

Callan, C.: You brought up wives. But let's talk about wives here.

[crew talk]

We have three minutes on this tape. Can you answer something talking about what it was like for your family and your children here in Oak Ridge? And being with you and working at K-25?

[3:27:03]

Lundin, M.: The children, we think, got a good education through the Oak Ridge system. My wife had a lot of friends. They're still around, a good part of them. My children of course went away from home. One of them is a Federal Judge in Nashville, the one that's going to Albuquerque on a leave of absence. And the type of education they got enabled them to compete in the outside world.

Callan, C.: Okay. That sounds like they're very successful. Any other things you wanted to talk about about Oak Ridge in general? We've got two and a half minutes. Just about the town and the secret city and all of those things. Any more comments about that?

Lundin, M.: Well, the town opened up of course. They took the gates down. And in doing that you found a pent up demand for housing. Unfortunately, it's not a lot of low income housing. But a lot of development work has taken place. A lot of housing has been built. I sometimes feel that the best thing and the worse thing that happened to us is I got a D house, a cemesto type house at a very early stage in the game because I had two children of opposite sex.

[3:29:08]

And we never had a room problem. And we always had enough room. And we were never tempted. We got such a bargain in buying these houses, because the government sold them quite cheaply and gave you additional 25 percent off if you didn't take the guarantee that they would buy them back in three years if the place folds or something like that.

So you consider that you got bargains. You took the bargains. All of us put a lot of money into the houses that we have, but they're still a house that was built in the '44, '45 period. It's an old house.

Callan, C.: How much did you get them for? What was the price?

Lundin, M.: I paid less than five thousand dollars at that time. It's probably worth about 75 now.

[crew talk]

[End of Tape 3, Begin Tape 4]
[4:00:05]

Callan, C.: I know the law school a bit. Like I said, I know the policy side. John Freedman.

Lundin, M.: I think the name is Freedman.

Callan, C.: I'm really pleased we got such a capable person at our law school. He's only going there for a leave --

Lundin, M.: He's taken a leave. A sabbatical is what he's taking. He's never had one in the 16 or so years he's been a judge. All because they need it. The people there need the type of --

Callan, C.: You're not kidding. I'll talk to you about that after the interview. But I don't want to get this on interview talking about New Mexico. I know you've talked about this over and over. But here is your last cap. What should future generations remember about K-25? Say it in as succinct a way as possible. If it were just a sound byte. What should we remember?

Lundin, M.: Well, as simply as I can put it is we had a job to do and I think we did it; [laughs] without embellishing. That sums it up, but I don't know how much deeper you want to go. We can go quite deep into a lot of aspects of it. But --

Callan, C.: Leave it to that. Let's talk about the great accomplishment. Succinctly talk about what was the great accomplishment?

[4:01:44]

Lundin, M.: The great accomplishment was building a plant that was tight. That did not leak. To me, that was one of the greatest accomplishments; because if there's leakage of outside air into the system, it will not work. It will not be able to enrich uranium.

The job was to enrich uranium of course. The great accomplishment was to enrich uranium. But as a subsidiary of the great accomplishment, you had to have a leak-tight plant. And being one of the drudges who helped make it leak-tight, that's the aspect I look at. [laughs] And that's a very narrow viewpoint. [laughs]

Callan, C.: If you were writing a documentary or a book about K-25, what are the key topics that we definitely have to hit on? If you were just writing an outline and just throwing out a bunch of words, what are the key topics you would have?

Lundin, M.: That takes a little thought to give you an answer of that.

Callan, C.: I know it does, because we have them throughout. I just thought maybe if you threw out a few words that we definitely need to cover.

[4:02:50]

Lundin, M.: I guess the question of course -- It boils down to people. Why did so many people stay behind and continue working in the area after the basic mission was accomplished? Why? And the only answer is I can't say that we were more patriotic than the rest. It's just that there were challenges. It was a good place to live in, a good place to bring up children, good schools, good friends, a lot of people in the same boat. And from that point of view, I'm never been really sorry in any way that we came down here and stayed here.

[4:03:45]

At this point, we're still in community service. I'm in charge of the VITA, Volunteer Income Tax Assistance Program. I run 45 people, eight computers five days a week. On Saturdays there is free income tax preparation, and we're mobbed. Everything from women who want Earned Income Credit to scientists who can't calculate, compute Schedule D. [laughs] You didn't want that in this, but you got it. Advertisement. [laughs]

Callan, C.: Okay. You listed a bunch of names of people. That was a question if you have any other suggestions of people. And I think you've given us that. So this is like the last question, which is basically is there anything that you feel that you haven't stated? Final closure statement that you want to state right now or a topic we haven't covered? Tell it now.

Lundin, M.: I guess I think I've alluded to it. From the point of view of an engineer, there always was a challenging job someplace on the area. And I feel that my management was always progressive enough to permit arguments. I am not a person who readily agrees with everything that's said. And I've been fortunate in having good bosses who will permit me to argue. Argue, discuss, call it

what you want, but are willing to look at alternate points of view.

And as such, I've always felt I've been happy in my work. In a way, that spills over to my home life. We've been happy here. We've been satisfied. And we're still here. End

Callan, C.: We did it.

Lundin, M.: Thirty.

Callan, C.: Hey, cool. I really --

[crew talk]

Callan, C.: Okay. We're rolling. And you're going to talk about --

Lundin, M.: The one incident that I think -- A sequence of incidents that I think may be of interest to somebody down the line is the operating contractor did not have any spare parts when he was trying to operate the plant. All the spare parts were in compounds that were controlled by the construction contractors.

[4:06:30]

So we got on to very good terms with the construction people. And when a valve failed, Carbide did not have any valves. Jones had the valves. J.A. Jones Construction Company. So what happened -- At that time I weighed 135 pounds. Visualize that. My boss was a gentleman called Johnny Murray who eventually became plant manager. Would boost me up over the fence, and everything was in place. I picked up the parts we needed and passed them out. And the parts were then able -- The Carbide was able to repair the places that leaked and that were in bad shape.

To sum this up, years later when I was at another plant I took a trip to Chicago and took my wife to Chicago. I did something unknown. I took my wife and I drove. Went through making an expense account up, and they were very, very cautious and very tight on paying me for what I felt were my justifiable expenses.

They wouldn't send me by plane. They said you had to take the train.

[4:07:39]

So I said, "All right. I'll take the train. The price of a train ride. But you're going to give me a taxi from the central depot to the hotel in Chicago." "Oh, we can't do that. You don't have a receipt." So I said, "But you don't want to send me any way that gives me anything better." Says, "You'll have to get the plant manager to approve this." I says, "Fine."

We went to Johnny Murray's office, knocked on the door, and the head of travel started to say, "Mr. Murray, Mike Lundin wants --." And Murray looks at him and says, "If Mike Lundin wants it, give it to him." I never had any trouble traveling thereafter. [laughs] Because I used to climb fences for Johnny Murray. At 135 pounds, I could do it. That's an amusing incident on the side, but it had repercussions years down the road. I don't know if that's what you want in it, but -- [laughs]

Callan, C.: That was cute. Do you know anything about the chicken coop story? They said they put chicken coops on the top of the facility, and that was a local farmer that ended up building it for ventilation. I'm still looking for that one too. Somebody to tell that story.

[4:08:50]

Lundin, M.: No. I don't -- All I know is that this doesn't belong in any documented story. But it's a nice secluded place if you want to go there. Climb up to the top of the facility. There's nothing up there but gravel and ventilation and blowers. [laughs]

Callan, C.: Well, I guess we're done again.

Lundin, M.: Okay. Sorry I --

[End of Interview]