Howard R. DuFour: The Cold War Aerospace Technology History Project (Interview 3)

James A. Kohler

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Howard R. DuFour
Interview 3
Cold War Aerospace Technology History Project

Interview Conducted by James A. Kohler
Special Collections & Archives
Wright State University
James A. Kohler: Good morning. Today is Wednesday, May 31, 2006. We are talking this morning with Mr. Howard DuFour. This interview is being conducted in Studio A in the Center for Teaching and Learning at Wright State University as part of the Cold War Aerospace Technology project. The interviewer is Jim Kohler. Thank you very much for talking with us today, Mr. DuFour.

Howard DuFour: Glad to be here.

Kohler: Um, during what years did you work at Monsanto?

DuFour: I started in the fall of 1945. I took a year off back in about, uh, ’48, and then came back and then left Monsanto in 1952.

Kohler: Could you briefly describe your background before you started working at Monsanto?

DuFour: You haven’t got enough tape! [laughs] No, it, my background more or less has been tool and dye work. I wanted to advance myself, of course, and go up there, and by the time that the war started, I was a foreman of the tool room of making the, the tools and so forth for a fifty-caliber machine gun. And there’s where I spent all my war year time. But my background is machine tools. I’ve loved machine tools ever since I can remember. I went to Wilbur Wright Boys Technical High School in Detroit to learn my trade, because I knew I didn’t, we didn’t have enough money to send me to college or anything like that. So it’s, it’s all been machinery. It’s all been with my hands. It’s all been with my mind, and I would say that’s about it.

Kohler: Um, how did the job at Monsanto come about?
DuFour: Well, uh, right after the war, they cut me back to troubleshooting at Frigidaire. They went on a strike. I didn’t, couldn’t afford it, and I knew a friend that worked at Monsanto, over at the old Bonebrake Seminary. I got in touch in with him, and he says, “Oh yes, we’re hiring. Come on over.” So I interviewed, a nice interview with the supervisor of the machine shop, and it went very, very well. And he hired me on the spot. I even brought a friend of mine along, that we called bench-buddies, of course, because we’d done work together. And he even hired Larry Jewett. So Jewett and I started at the same time.

Kohler: I think you’ve mentioned before that there’s a question he asked you during the interview?

DuFour: [laughs] When I went in, he asked me, “What’s your background?” And I said, “Well, I’m a tool and dye maker, been a foreman over at the gun plant.” And he said, “Okay, yeah. What’s your hobby?” And I said, “My hobby right now is photography. It has been for all the years that I can remember. I built my first camera when I was about ten years old, with a little shoebox and so forth.” And he laughed at that, and we talked cameras, I talked cameras, we talked darkrooms and everything else. And for about a half an hour was what the interview lasted, why, well he said, “Okay. I’ll see you.” And I said, “Well am I hired or not hired?” And he said, “Oh, you were hired the first time you opened your mouth!” So Pittinger was his name, Clarence, and one wonderful man, I learned an awful lot from Pitts, a tremendous amount from him. And we’ve become very, very close friends, exceedingly close friends.

Kohler: Um, what were your duties at Monsanto, and what were some of your early, early projects you worked on?

DuFour: [sighs] There is no what you’d say “duties.” You were handed a project with very little information, maybe a hand sketch, maybe just words – this is what we need. Okay, let’s take an object, shall we? You’re an old camera bug, DuFour, he said, make me a camera. I want a camera about this size [gestures] square. I want a post sitting up there with some pins on it to put a little tiny ball in there. I want to be able to put film on all sides of this, put a cover over that, fix it so that it’s tight, and then we can put this ball in there. And we need a pinhole about oh, anywhere from four or five thousandths up a little bit on all six sides. This was to check the radiation from this ball containing plutonium. We’d leave, we would leave it in there for so long and then pull it out, and then they could make a count as to the amount of material that busted up on the film. But this was it. You were supposed to know everything and even in design just from words. This is what you call a model-maker, and this is what I was. It was a model-maker. It’s one step higher than a tool and die maker. You have to be able to visualize what he talks about and...
visualize it into your mind. And this was, this is what we were all there for, because we had very, very few drawings on it. Drawings were something that, because there was not engineering done at this time. Because this was all experimental, and an engineer would know what experimental was because the man who was doing the experiment didn’t have time, and we didn’t have time. We didn’t have time to have an engineer on the job or a draftsman on the job. So anything that we worked on and was given assignment for, we had to be capable to take that and run with it. And this is what we did. It’s a learning curve at the same time. You learn while you work. One time Pitt came out and says, “Howard, have you ever welded platinum?” I said, “I never had a piece of platinum in my hand, so how do I know how to weld platinum?” “Well,” he says, “I want you to learn how to weld platinum.” And I asked him, “Well, what kind of flux do you have?” [laughs] He laughed. I meant he had a laugh that came clear from his tummy, and it was, it was, it was wonderful. And he says, “Howard, that’s pure metal. You don’t have flux for pure metal. You just put the metals, two pieces of metal together, put the torch to it, bring it up to temperature, and it will fuse itself.” Well I learned tremendous amount about that. I started in putting two pieces of metal together using a regular acetylene torch. It had to [sound]. It just went to pieces. Then I started making tips for the torch, and they got smaller and smaller and smaller. It still didn’t work. So, okay, I’ll make a whole new torch. I’ll make the whole thing from the very beginning. So I started out pulling quartz tubing down, made it small, real very, very small tip. It worked. See what I’m saying? We had to research as well as they had to research, because here they wanted just a piece of platinum, when I finally found out what they really wanted. Take a piece of platinum, roll it until you’re about the size of a pencil, lead that is, the lead pencil itself. And actually weld that, because we wouldn’t be able to set up dies and, and anything like that in order to form it, then welded the bottom so that they could put plutonium in the inside of that piece of platinum. In other words, it was just like a little tiny small cup, and you put the plutonium in there and sealed it off. But what that was for, we never asked. What experiment they were going to do with it, we don’t know. Because this was part of it. You do your job, and for your own safety and for your own knowledge, don’t ask questions. We even couldn’t say plutonium around it, we had to say “postum.” That was the word for plutonium. We don’t even mention plutonium. But it was secretive, yes, but at the same time, we were given the freedom of thought and what to do with it so far as our work was concerned. It was marvelous, it was wonderful. You just had a good experience every day. You were right on, on the ball there. I’ve mentioned before that there was times when I got so interested in what I was doing, my wife would call up and say “When you going to come home for supper?” I didn’t even know what time it was. The fact of matter is we were not, we weren’t even supposed to wear watches. We couldn’t. We had to remove anything like that. Our clothes, yes. Our clothes was taken all off, right down to the skin, and we put on fatigue uniforms. Army fatigues is what we worked in, because
we couldn’t take the chance of having any of that plutonium on our clothing and then taking it home. So it was interesting.

Kohler: When, when did you learn what the plutonium was for?

DuFour: That’s a good question, because I can’t remember exactly what time it was, but I was there for oh, maybe two, maybe two or three years before I knew what the plutonium really did and what it was really for. That’s when I learned that the little small beryllium ball, which was about the size of my thumb, and machined that so it had opened up, then we could bore it out to certain diameters and so forth. Then plutonium was put into that, the ball was put out and it was sealed. This is the ball that went into the fusionable materials to set off the atomic bomb. So it’s just nothing but a slug, you might say, that goes in and makes the fusion material ignite. But it was interesting. I didn’t know what, what the score was as far as using it, what, what it would do or anything like this. That didn’t bother us. We were so intense on what we were doing that a bomb, well a bomb’s a bomb, you might say, because well that was all that there was too it. But what the atomic bomb did, why we had, but we had no knowledge. We didn’t have it.

Kohler: Did your opinion change of what, what you were doing once you found out what the atomic bomb was and what it did?

DuFour: No, my opinion did not change. For the simple reason that—you have to remember this is brand-spanking new. And you didn’t know what the catastrophe was under one of those bombs. You couldn’t fathom, there was no way of fathoming what disasters that could be brought on. I didn’t know until oh what must have been six months or so or better than that when I saw my first pictures of what it did. Then is when I, when the realization came in to the fact of what we had and what we’d done. I think Truman did the right thing. I think it cut the war short, I know it did. In the history will now prove that. I do know that after reading several years later the books and so forth on it, it had to be. It’s one of those things that had to be. And it was a time, how do I explain this to you? It’s hard for me to explain things because I have a philosophy that things have to come in its own sequence of time. All of this, this stuff that’s all here that, everything has to become in a sequence of time, and we, we, we develop it as people have intelligence to go to this height of learning. To me, it was something that had to be done, and it had to be done now to actually settle a war, to stop the killings. Yes, we had to kill off a few people, more than a few, in order to make it stop. Otherwise it would be perpetually going on and on, and anything that has a beginning has to have an end. And this was the thing that brought the end about. There’s an awful sorrow, sorrow feeling, yes, that I have for the Japanese, but at the same time, who started it all? And what did they do to the people that rava- they ravaged the Philippines? And took on China? I mean, the killing was fantastic. They killed just to kill them almost. They were, thought they were a superior race
just like Hitler thought they were a superior race. Something has to stop it, and we did. So I felt that no sad, no bad feeling for us, but a sad feeling for them that we had to use it to make them stop this war.

Kohler: Um, at working at Monsanto once you started, did you receive any additional training?

DuFour: Oh, training. Training was something that you did yourself right on the job. Training, the job actually did the training for you, for the simple reason you had to think. Right now, I don’t know how people think, because all they do is to go to a computer to solve their problems. We didn’t have computers to solve the problems then. We had to think it out, and we had to do it long-hand sometimes, so far as mathematics is concerned. Oh, we had a little, a few calculators and so forth. They were all mechanical calculators that had all that, but nevertheless, the training, in so far, no. It was up to you to train yourself, more than anything else. [sighs] How can I express it other than the fact that that was what we were hired for, really, is because we had this ability to, to go forward with an idea. I feel sorry for the kids today, I really do. I feel very, very sorry for them, because they’re depending upon a electronic device to solve their problems instead of actually solving them with their mind. And this, to me, is sad, because I think we’re losing. We’re losing out on development. We’re letting something mechanical take over. Not so much mechanical, but electronic, I should say. But you want to remember, I’m ninety-one years old, and I can remember back over my history clear back. I have a beautiful memory. The Lord’s given me a beautiful memory. And a few of us old timers get together, and we discuss the things that we have accomplished during our lifetime, and we wonder, and we wonder about our kids trying to accomplish the same thing more. All they have done and now, right now, they’re sitting, they’re sitting still. To me, they’re sitting still. All they’re doing is reproducing, reproducing, and going to this micro, micro-business. Micro, micro. Well, shoot, we did micros way back in the what-you-call-it. But the thing is that everything has to be smaller and smaller and smaller. I had a computer given to me [gestures] in my hand, and I, there’s no way I could use that. I’d have to have a sharp needle or something to press the buttons, because there’s just a mass of them there. Ahhh. It’s confusing, to me now, it’s confusing. Of course to the younger generation, “Oh, that’s neat,” you know. “Oh, we can take care of that.” But does it take care of the mind thinking? No. It doesn’t.

Kohler: When we had talked before, you had mentioned, um, getting some education in Chicago?

DuFour: Oh, yes. Now there’s, there’s a different story. I hadn’t been there at, oh, about a year. I loved doing micro work myself, making small things and so forth. And Pitt says, “Howard, I want to show you something. Come on.” You know how a stairwell comes down [gestures], and there’s a door
there, and he opens up the door there, and on a big slab of steel sat a, a balance of some kind. I didn’t recognize as a balance, but it all made out of quartz fibers. He said, “How about you going up to Chicago for a whole summer at the University of Chicago and learn how to make those things?” And I go, “Wow. That’d be great.” So he said, “There’s a fellow by the name of Dick Olt we’ve hired to be the engineer. He does not have ‘Q’ clearance yet, so you’re going to have to keep your mouth shut while you two are together.” And I thought, “Okay.” “He lives at such and such a place and so forth and you’re going to have to go over and pick him up, and he can’t come here yet because of the fact that he doesn’t have his clearance.” So Dick and I went up to Chicago. I went over to his home, picked him up, met his family, said “Hi, I’m Howard DuFour.” And he said, “I’m Dick Olt.” And off we went. We had a little hard time with conversation for a little bit, then we started on family things and so forth, so we did okay. Went up there to the central shop, and met a man by the name of O’Donnell, the most brilliant man I’ve ever met in my life. Oh, I get tears want to come. This man had a mind that I have never, never met before. Sharp, and knowledgeable, the knowledge that that man had was, it was absolutely terrific. But he had designed and had some girls there and taught them how to use the torches and so forth to build this microbalance. Now, what kind of a balance was this? It’s the same principle as the old balance back in Christ’s time, just weight on one side, put some weight on here and make it balance, and that was it. But we said this. We made this so accurately and so fine that if a fly had toenails, we could cut off his toenails and weigh them. What we were actually doing was weighing the molecules of matter of plutonium-235. I had to make a very, very small, exceedingly small die that would punch out a piece of platinum, and we would put it into solution because we didn’t know what we had in solution, and plate it, plate it out, this heavy metal called plutonium. And then we could weigh it, and in weighing it, we could weigh the actually the molecules of matter. To know what we had in solution. There was things that we did not know, a lot of things that we did not know. And we had to develop, develop all kinds of instrumentations, all kinds of theories, knowledge, the whole thing, in order to know what we had for that material. So I spent the whole summer up there and came back. I had made a balance, and I put it in a case. I was quite, really delighted with all of this, and I saved that. I saved it over there at Mound, and when they got ready to throw it away, I got a hold of it. And I’d had it a number of years, and then when this business of Mound trying to make a museum, well it’s down there now. And all in one good piece of which, which is amazing. Maybe somebody that was will be listening to this, the hang-downs, the down, the hang-downs to the little plate that we had, was down to 6 μ in diameter. Now you can’t see that. You could only see the light reflected off of it, of the crystal itself, of the quartz. It is so fine, and we would pull these, and they would, it would be in the air and you would look for the light to shine and you could just actually pull those things out of the air. They were so fine that they’d float. But this is what I worked with. My, my, my work bench there at Mound, they had put a
hole in the floor. They had gone down to rock bottom. They had then put a
concrete slab, built it up to bench level, then put a big, huge concrete slab on
top of that, then there was cork all around that, so that the train, which was
about a mile and a half away, when it went across the trestle, it would not
shake my bench, workbench. This is the things we had to go to, we had to go
we said to extremes, yes, but the things that we accomplished doing this was
fantastic. And just to prove it, I put the balance out on the floor of the
building, and we could tell when that train was passing by, because we could
see the, actually shimmering of the quartz balance. But, how do you explain
something that is so new, not only to your mind but to people of all of us that
was working there? It was marvelous. It was a marvelous time.

00:25:04 Kohler: You mentioned working with, um, quartz fibers. Can you describe
that in a little bit more detail, and what the quartz fibers were used for?

00:25:14 DuFour: Well, [sighs] quartz fibers, what is quartz? Nobody knows. Quartz
is sand, and in essence, it’s been ground off during a time when the glaciers
came to the earth, and it just ground and ground the stones into little pieces of
looks like clear crystal, looks like clear crystal glass, which is quartz. The, the
temperature for melting it for it is you have to get around anywheres from
thirty-one to thirty-two hundred degrees. If you want to melt any lot of crystal
at all. Let’s take glass, it’s the same thing, only it’s a different, it has a little
different make-up. Glass is, what I want to say, how do I want to explain it to
you? Oh, the best way to do it is this. Go to an old farmhouse. It’s, say,
eighty, ninety, one-hundred years old. Take a piece of pane, plane of that
glass out of the window and mic it up at the top and you’ll get a measurement.
Mic it down to the bottom, and it’ll be almost half again as thick. Glass
actually is liquid. It is only fused because of the air that we’re in. Therefore,
crystal, quartz crystal is a little more solid in construction. It has a better
gripped of molecule strength in it. Oh, yes, one of the best parts about it, the
coefficient of expansion and retraction is almost zero. And if you heat it, it
doesn’t expand. If you put it in freezing temperatures, it doesn’t get smaller.
The coefficient is almost at its point zero something, oh, one or two,
somewhere in there. Anyway, this is one of the things that why we used the
quartz because of the expansion and contraction. Because it’s around, see it
was around plutonium, but plutonium’s hot. There’s heat there. So it did not
affect the motion of the balance itself, and this is very flexible. It’s
exceedingly flexible. It was a, was a neat substance to work with because it
challenged your mind, and I loved that.

00:28:21 Kohler: What, what it used for in, in relation to the plutonium?

00:28:26 DuFour: I don’t think that there’s any kind of a relation to pluto-, to it, itself.
No, we didn’t have any, there’s no, nothing there that would be in any relation
to plutonium.
Kohler: So, so what was its, when you made the quartz fiber, what was it specifically used to, to do?

DuFour: Make these quartz balances. Just to, they were just to make, fused it together to make these balances. This was the only place that we used it. Stirring rods, we used it sometimes in just a big old rod of quartz, we used them as stirring, as stirring rods, but I don’t think there was anything else that we used quartz for.

Kohler: And, uh, when you moved into the new, uh, Mound facility, what was the atmosphere like, moving into that new facility?

DuFour: [laughs] Well, let’s see. Having an old farm house and you’ve in it for a long time, you come in and without some, with, say, the old backhouse, candles or lamps or something like that, and here is a brand new home. It’s the same difference. You have all the facilities, the nice facilities that you needed and wanted. Everything was on hand. We developed benches that was new technology on those parts and so forth. Remember my telling you about the time that Dick Olt and I had to, this was at the Bonebrake. There were guys at the Mound, and if they had a spill of plutonium and they get it on the workbench, everything had to be thrown away. Everything had to be taken care of by putting it in barrels and taking it down and burying it and so forth. How do we stop this flow of plutonium getting into the cracks of wood and all the rest of it? Do you want me to go through this?

Kohler: Sure.

DuFour: Okay. Herculite, herculite is the glass, the very, very glass that your, the store doors are made of right now. And if you hit that thing hard enough, and I mean it’s going to have to be an awful, awful bang, a tremendous bang, it will explode. But you, it doesn’t have sharp edges. You can take all the material and with your hands, and you can even scrape it up with your hands, real carefully. It won’t cut you. This is herculite. How’s it made? Well they cool it as it comes off, up the rollers, they cool it. In other words, it’s a hardening process. So I said, “Let’s see what we can do with that particular herculite.” But what it does, it goes wham. [gestures] It just goes all over. So we had a room, and we cleared it out. It was about twelve, no about fifteen foot square. And I had a whole series of blocks, four by, six by six, made up of hard wood, and we put that down in the center of the floor. We put a glue, a substance over the top of it, and then had the herculite, because I had ordered from the Corning people, six by six pieces of herculite. And you want to remember this. The priority for this project was tops. Anything you ordered was done now, because we needed it now. And so then I got that within just a few days, I had these pieces come in from Corning. We set the daggone thing down on glue, and I would stand there with a hammer and hit the things and watch it explode. Then we would measure
from there where the glass went. We, I wanted to keep coming down, keep coming down, until it would not. And for oh, almost a week, we were busting glass, that herculite. We were getting some results. Some glues would hold it so that it would not spread, because we didn’t want it to spread if it was contaminated, then it would spread all over. And one morning, Dick came in, he says, “Let’s try the old-fashioned stuff. Let’s take the, the black substance that they put on roofs, roofing tar.” And we put the roofing tar down, put the thing on the site again. I whacked it. Not one piece flew. Every bench down at Mound was made like that. So you see what we’re doing? We had to, a new field, new, it’s so new that you had to go experiment in order to do the experiments. And, so every bench where they handled plutonium was a piece of herculite with tar underneath it so if you broke it, it wouldn’t spread the materials.

00:33:56 Kohler: Were there any other safety precautions taken down at, down at Mound?

00:33:58 DuFour: Oh, my, son. Safety precautions. Safety was the factor, the big factor like that. Tremendous factor. We had to make sure that they, the elephants—I’m using words now that you wouldn’t understand—but the boxes that we worked in with the herculite glass and so forth on it. We had big, heavy rubber gloves coming out, just like big trunks of an elephant. And you’d put your hands in there, and this is where we had to work. We had to make sure that the seal around those where the connection was made to the stainless ring that held those gloves was tightly sealed. So we had to make sure of the material that when we squeezed down the clamp on it, it would clamp down there, so there was no leakage whatsoever. And there was always positive, for instance this room. If we were to use this room for any particular purpose for experimentation with material, we would pump air into it so that there was a positive pressure in that room at all times. Because with that positive pressure, then it, anything would go through the boxes would go out and through a filter system. They had a huge, huge, large, it was very large, smokestack sitting down there in the Mound, at the Mound. Everybody wanted to know when the, when’s the smoke coming out of that thing. But there was never any smoke ever come out of it. The reason for it was it was the air that came out of all of these hoods after it was filtered. So we had to have this air go someplace that we were pumping in, it had to go out. So it came out, had very high filtration so that there was no radiation coming out of it. Then the rest of the air was passed out into the atmosphere. And that was monitored, oh boy was that monitored. It was highly monitored, so that there would be no radiation coming out.

00:36:31 Kohler: Was there concerns by you and other employees about, about the safety? Was it something you worried about while you were working there?
DuFour: Sure I worried about it. We all did. We all had that. We were all taught, you might say, that this material—you cannot smell it, you cannot feel it—it’s in a state of air. It can be absorbed, not only through your breathing, but it also can be absorbed through your skin. And you won’t even know it. You won’t even see it. I was so “hot” one time that I was told I would be sterile for a month or so, that I couldn’t have any kids anyway. But the safety people, because we had a group of people down there that did nothing more than work on it from the standpoint of safety. They were physics people. We had dose meters. We carried dose meters around at all times. We had wrist meters, so that when you were working within in the box, the wrist meter on it. Then, if you did, why you got your finger pricked, and blood was taken. A sample of blood was taken. That was going into the lab. That was analyzed to see how much, if you did have it. Then there were urine samples. We would have a little ice cream, these little small ice cream pint boxes, I called them, and you’d take that home with you. Take a urine sample. Bring it back the next day. Then that was taken down to the GE Building, down on Third Street. And I made a die for a little piece of copper with a hole in it, and they’d stick that down into the urine and that would go into the flat, sample of that. That was plated. We would, could plate the, any plutonium that was in the urine could be plated on to that, and then that would be able to check it to see if you had any. So you see there were several ways of checking you, and constantly. You were constantly checked. We had a system by which they could do that. Each day that you were not subject to plutonium was a day in the bank, and you put days in the bank, and you had this bank account. Now if you got radiation, you had to take and subtract that radiation from the bank, in days’ times. We had it all figured out. So that there was sometimes you didn’t have any in the bank to go by, so you had to do something else. They put you on a different job where there was no plutonium available. Sometimes you could, you used up all your bank account at one time, maybe in forty-five seconds you could do it. I did. But, yes, we were very conscious of all of it. They were very conscious of it. We didn’t know sometimes what we were even working with, so therefore they were right there checking you, make sure. If you were going in and get into something, why they would have the physics right there by you, checking you with dose meters and so forth, yes.

Kohler: And what was security like at the Mound?

DuFour: Security? Well, um, security was tight, very much so. In fact the matter is they had secured people around the fence on the inside of course. They patrolled the fence down there, so that there was nobody could come over the fence. Mostly for their own protection more than anything else. [laughs] But security I would say that I was very fortunate. I married a girl, and her sister married a Dr. Joseph Hyde. Joe was one swell guy, and he knew security so well down there that any paper that came across or was to be published that came across his desk, it had to be done by him. And he would
mark out where no, this doesn’t go out. So security even in papers and written documents and so forth went across his desk. And he, he kept a good type on it.

00:41:46 Kohler: How about in the process of hiring people and, um, security clearances and things like that?

00:41:52 DuFour: Well, that’s, that was up to the FBI. It took approximately three, maybe about four weeks for me to get my Q clearance. I had to state where I was born—where, when, and all the rest of it. We always got a kick out of the fact that they probably would have asked when my mother and dad got together form, form, to form the baby if possible. But they were that tight. They even went back to your parents and checked on your parents, too. It was, it was good, only it was sure wrecked by just a, the big, the big people. That was sad thing, when it was leaked out. But that’s another story.

00:42:52 Kohler: And how, how did you and other employees respond to the, the pressure of the work environment you were in? Was there a ways to alleviate that, that stress of the job?

00:43:07 DuFour: I can’t say that there was any pressure. We took it on. We knew we was doing something that was worthwhile. We knew that there had to be answers to it, but the job itself was so intriguing that the pressures itself, I, I can’t say that there was a lot of physical pressure on it. The pressures probably were more on the people up in the front office than there was the workers themselves. The pressures themselves of getting things out, but there’s no pressure put on us. This was most marvelous way of doing things. There was no tension. Let me give you a story. We had down there what they called a think-tank. And the think-tank had a huge, large oval table in it, for about twenty or twenty-so people in there. A problem would come up. How to solve this problem? So they would bring in the physicists, the electronic people, the mechanical end of it, the chemistry end of it. They’d have all of these men with the Ph.D’s and so forth in there. My supervisor, Dick Olt, had a mechanical engineering degree from Cincinnati U., and he says, “Howard, I want you in on this thing, too.” And I thought, “Oh, okay.” And I go in there, and I sit down and I look around, and I knew every daggone one of those guys. Here I am, high-school kid, drop-out, so forth [laughs], all Ph.D’s. What in the H-[gestures] am I doing here, you know. I wanted to crawl under the table because I, it was something else. But they had come up with a new daughter. Now a daughter is where they [sighs] chemically change the molecules of matter of plutonium and other chemical things, I don’t know all of it. But it would be a new matter. It’s never been done before. And we want to know about this matter. We want to know what it can do and what it can’t do. Do we use this for something this way or that way? Who knows? But one of the things that they had to know was if it was put into a nuclear reactor, would it expand? In other words, would the molecules expand in that
reactor? Now we made up a little small sample, which was very, very small, about that long [gestures] and about the size of oh, maybe half the size of a diameter of a pencil. And in that matter, we would take it down to Tennessee and put it into the nuclear reactor down there itself to see if it would expand. All right, we can not have any wires coming out of there. We can not have any kind of metal of any kind coming out of there. We have to put it into the hole, into the reactor, take it off, and seal up the hole. Leave it in there, and then take it out. Okay, here’s the formula. Here’s the things on the blackboard, because they had blackboards all around. Everybody got in on it, the physicists, the chemists, anybody and everybody. And it came down that there was nobody had come up with a solution for it, and the monitor said, “Okay, DuFour, you’ve been sitting over there. I see you sketching. You got something on your mind, on you want to talk about it and say about it? Just come up here on the board and show us what you think.” The, the sweat was coming [gestures] you know [laughs]. Just a normal thing, normal reaction, I guess. I got up there, and I started sketching on the board, and I put this little piece up there that they had there. I said, “If we put a diaphragm in here,” and I put a point on this with a steel on it, and I put a piece of aluminum up in here, and if it expands it will put a point into here and we can measure the diameter of that and we can measure what the pressure is and so forth back there. “Yeah, that’ll work. Okay, DuFour, you got it. Everybody dismissed.” Make the samples. That was it. I mean, no drawings, only words was given to you. I put the draw-, a sketch up on the board, and that was the sketch. I went out and made the parts. This is the way we worked. This is how we accomplished things. We worked as a team. We worked together. There was no patting on the back, there was no, well, congratulations. No, there wasn’t anything like that. It was your job. And Dick was the only one that said, “Well, DuFour, that old mechanical brain of yours come in handy again, didn’t it, for you?” And I said, “Yeah, it did.” That was it. I didn’t take pride. I never felt that I had done a great deal. I just solved a problem, and that’s all we were down there for was to solve problems. That was part of the job. It was fascinating to be doing something like this because you are right on the cutting edge of discovery all the time. And then, and you got so used to that, that it became part of your life. It was wonderful. It was wonderful.

Kohler: Did the work atmosphere change from the period during the war to what is the Cold War period? Did you notice a shift in the way people were carrying on their jobs?

DuFour: Yes, yes I did. I think that we were scareder during the Cold War than we were making the first one. It became now a necessity. Before, it was something that we had to do. Now, they’ve got it. We’ve got, we have to do better. We’ve got to, we’ve got to enhance all of this. We’ve got to expand it. We’ve got to see what better things that we can do with the whole thing. Yes, it changed.
00:50:49 Kohler: Was there more of an urgency?

00:50:51 DuFour: More of an urgency. Yeah. There wasn’t any urgency since that we, to begin with, there wasn’t any urgency. Now we have this urgency. There was just, just a shift.

00:51:03 Kohler: Did your job significantly change or noticeably change?

00:51:06 DuFour: No, no, no. It was still the same. Just working and, and improving. Just working and improving. That’s all.

00:51:20 Kohler: You’ve talked before about, um, your work on the calorimeter.

00:51:23 DuFour: Uh-uh.

00:51:24 Kohler: Could you talk a little bit about that?

00:51:27 DuFour: Calorimeters. What’s a calorimeter? Well, a calorimeter measures heat. That’s one type of calorimeter. There’s several types of calorimeters, but this, ones that we worked on was just for heat. First of all, you’re going to have to remember that there’s two ways of finding out what you got, so far as plutonium is concerned. What you got in to solution, and we, now, I was on the end of, way ahead. Now I’m on the other end, of measuring how hot this stuff is. And it is hot! A little ball of that stuff put into one of these little containers, and if it sits overnight, you’ll find a brown spot. Right on the cardboard. It’s that hot. It turns it brown. And, we could put this into a twin-tube sort of affair. Twin-tubes have to be made identical, and we put a bridge in it, a wheat-stone bridge. That bridge consisted of wires here and wires down here. [gestures] I can’t explain it any more than that. Then there is a meter, a galvanometer, set across it. If these two wires detect heat, it will make the galvanometer turn. If these two wires over here is giving heat, it will make it turn the other direction. So what you do is put the little ball down into the one tube. It heats it up, and it turns the galvanometer. You have a bridge where you can produce heat, and you crank it up so that it turns that galvanometer back, because you put the heat in over here. Now you’ve got it balanced. Now, having it balanced, we can read on the wheatst-, read on the bridge, how much we’re producing, and we know how much heat there is coming out. Now, making these things takes several months, at times. And it was not a frustrating job, not at all. It was an exacting job. It was very much exacting, and it was beautiful. It was close work. It was exacting work. You worked for perfection, where you come up with a little here and there that weren’t quite, but we could overcome it. But, Kenny Jordan was the man who was in charge of all this. There’s where, again, now you talk about getting training. He set me aside and for about a couple weeks and had a training on how to make them. And then I started making the calorimeters.
00:54:51 Kohler: Did you enjoy that kind of precision work?

00:54:53 DuFour: Oh my good-gosh, yes. [laughs] That was a fun job. I mean, I enjoyed that mainly because it really tested your, it tested this thing up here [gestures] very, very much. Because I went to, I went to tremendous amount of lengths to make those things. I was even asked to make—“You did great, Howard, you did great on old number thirty-nine. Now let’s see how small you can make one.” So I made a very, very small one, exceedingly small, to find out how far down we could measure heat. We didn’t know. So I built that up, put it in the, in the tank, got it stabile, stabilized it. Went outside, got a little red ant, put the ant inside of the daggone, in there, because he created heat when he moved, so we were actually measuring his metabolism. And that we could tell it. And we made a whole big strip chart on the son of a gun. Here’s this aunt, moving. [gestures] Every time he moved all the way down. Pretty soon, it moved down to the point – [sound and gesture] – He’s dead. But this is what, look, look what the challenge is that you have in there, just to measure heat. We wanted to know, the knowledge of it. Yeah, it was fun.

00:56:18 Kohler: All right. I guess—

End of Video Tape 1.

Start of Video Tape 2

Time Log Transcript

00:00:00 Kohler: Getting back a little bit to the, the Cold War atmosphere at the job. Was, was there a feeling that it was a war against the U.S. and the Soviets and communism? You feel like it was just a continuation of World War II in a way?

00:00:18 DuFour: It was a continuation. There was no doubt about that. It was a continuation of the war. It’s been shown up now that it’s so. I think that probably the people who knew more about what the bomb was and what it did and what it could be done were scareder than normal people were, because they had the knowledge, the knowledge of the devastation that could be done when they dropped the bomb. I know I felt it, and I’ve talked to some of my friends, and they felt it, too. I didn’t stay down there at the Mound until after ’52 because that was when we thought that we were ten, fifteen years ahead of, of the Soviets, so far as them reaching the conclusion of the bomb. If you want me to talk about what I knew about how this applied, I’d be glad to do so.

00:01:35 Kohler: Sure.

00:01:36 DuFour: Okay. Britain wanted to know, wanted to know about the atomic bomb. And I can understand why that they would want to know all about it.
They wanted to have the knowledge, too, of how to make the bomb and the way it worked and so forth, in order to make a balance over there. They all, they were, that’s, this is the way British people think and so forth. There has to be a balance in there. They kept the balance pretty well. So they went a man over to learn and take the knowledge back to Britain. And when he came here, the man who did all the work so far as restriction of and all to get your Q clearance refused to take this man on. And he said, “No. Absolutely we will not take this man on, because I do not know his background.” “Well, he’s been taken care of by the same class of people over there in Britain as we have here, with the FBI at that time.” “I don’t care. I do not.” And he refused. Well, actually, an order came down from President Roosevelt, chief man, says “You take him on.” And he says, “Okay, Mr. President. Your responsibility, then.” We took this man on. His name was Fuchs. Now, he went back, and as I said in about in ’52, Mound went and dropped down, ’51 or ’52. And we do have some people over there in Russia, are counteracting intelligence and so forth, that learned what they were trying to do over there. And I’m getting just a little ahead of my story here. In order to know how much plutonium to put in this ball, it’s like hitting a barn door a quarter of a mile away. We have to have that much. So they formed a mathematical formula for how many barns had to be in this little ball. That was top, top secret. I mean this was the core of all of it. And they, for just a want of a name, they named it barns that it was brought up that this, you had to hit that barn. Okay. So our man over there in Russia says, “Yeah, they’re working on the atomic bomb,” but he says, “I can’t get anything, but they’re mentioning barns.” I think the lid on the White House blew off. This man was a double agent. Fuchs was a double agent. And he’d given them the secret, the top, top secret, barns. And that started your Cold War, big time, big time. And I used to have the story on that, I tried to look for it. I had a pamphlet with the whole story on it. I couldn’t find it, but it’s still stuck here in my memory of what really took place. And it, it was sad. It was a sad time, because then they had, we had to fire up everything again. That’s when the Mound started taking on more, and when I went back, and I did go back. I was with Monsanto on Nicholas Road. And I was asked to formulate a research engineering shop there, and that’s what I was doing. And I was happy in that.

Kohler: When you were at the Mound and, and the, your work during the war, did you feel a sense that you were serving your country in a way?

DuFour: There’s no doubt about that. There’s no question. Yeah, I felt very much so that I was serving the Cold War, now, not the war, because in the war I was making fifty-caliber machine guns, but the Cold War, yes. And as far as serving things, I talked about something with you a little while ago. I’d like to put that in right now. There’s two sides of a coin, and we all call a coin, when you flip a coin, heads or tails. On one side of a coin can be bad, can be very bad. It can be the atomic bomb. But if you turn the coin over, there’s the good side. Now what’s the good side? Of all the work that we done down
there at the Mound, what good come of it? What good did it come out of? We talk about the bomb, but what, what’s, what’s the good part? We got nuclear reactors now, from the work that was done. We got materials for medicine, were not, we have now atomic medicine and so forth, for healing and probably destroying some of the bad stuff. I had, I brought with me today something that we developed at Mon-, Monsanto Company on Nicholas Road, but it came out of the Mound. A quartz fibers, but quartz tubing. I discovered a way that I could pull not only quartz fibers but this quartz tubing. And it’s [...] Well what’s this going to be like? The quartz that’s inside there here is only three thousandths in diameter. There’s a whole down in there. But you put a hypodermic syringe on it, you can put it in and into a person who has say some kind of a disease which they don’t know, and we can pull molecules up into that and use that to find out what is wrong. So these little things, these little things that we discovered and made and all that have come out of the Mound, too. This tubing came out of the Mound. We also found out that if we made this tubing and made it in a little larger size, we could make a manifold of that and put natural gas, now the regular gas that you use at your home, past those tubings and have a vacuum on one end of all those tubings, we could pull all the helium out of the natural gas. So here we have a by-product of helium, taking the helium out, the natural gas will be hotter, because the helium is a free particle. Okay? Now, even Bell got a hold of this and they were going to do something about it. I even have a letter at home, and we were going to actually go in production on something like this. How it got stopped, I do not know, but it did get stopped. But Monsanto and Bell were going to get into this thing, but I think that, I think one part about it is that it was during the Cold War. This might have had some factor. But here we are, and we’re sitting on something, an idea, somebody’s going take a, picking this thing up some time or other, and find out that they can take the helium out of a natural gas, make the gas hotter, maybe ten percent, twenty percent hotter, and you can get more heat out of your gas than you’re getting now. But just this side things like this that you can think that came out the Mound itself. So not all, not all by the bad things came out of that place, but a lot of beautiful ideas that came out of it.

Kohler: Was there a sense of patriotism in the work from you and the other employees there?

DuFour: What is patriotism? Ask yourself what is patriotism. Homeland. Just because you’re born here, you’ve got patriotism. You like what you got. You like the freedoms, you like having all of it. If it’s going to be hurt in any manner, you’re going to do something about it. This has been from the day one. And it’s still going on today. Look at the Jewish nation, and how they’re fighting for their patriotism, their country, and so are the others, so are the Palestinians. They think they have it, too. And if you boil it all down, and if you really get down to the subject of patriotism, what is patriotism but the land itself. The land, that wonderful piece of land where you are, there’s your
patriotism, to me, okay. That’s my thoughts. As far as the other people are concerned, I don’t know what they want, and I could care less. [laughs]

00:12:27 Kohler: Um, I think you touched on this a little bit. When, when you finished a project, was there a sense of accomplishment, a sense that you’ve added, added something to the greater good?

00:12:37 DuFour: The accomplishment factor was actually here. [gestures] You finished it, okay. What’s next? What’s next? Because if you accomplish that particular project and made something good come out of that particular project, you had a feeling of satisfaction, but you wanted to know what’s going next. When I had the engineering shop at Nicholas Road, when the door would open, I always thought, here comes another problem to solve. Here comes something to do. Most generally, nine times out of ten, is that what it was, what it was for. That’s the interesting part from my life, but for somebody else, I do not know. I cannot talk about somebody else’s life. But for my life, is seeking knowledge, seeking knowledge. There’s something here, that, about myself, that I’m going to put into this. I never graduated from high school because I couldn’t go to the ninth grade, or the tenth, excuse me, the twelfth grade because there was no money up there to send me to school. We had enough money for one of us, my sister or I, and I told my mother go ahead and send my sister. I knew then and there that if I was to make any portion of my life count at all, I had to seek knowledge. I had to seek knowledge. And from that period of time on, I sought knowledge. I got cussed out, I got pushed out, I’ve done, the first job I ever had was five bucks a week in coffee, and I was the go-fer boy for the dirtiest, filthiest sweatshop up there in Detroit. But I got knowledge, and I worked for it. I sought knowledge, and I’ve always sought knowledge. And this is where it has brought me to that point is the fact that I have papers to my name, I have patents to my name, I got a book to my name. You see knowledge, and this is the thing I don’t see my, I don’t see the kids doing it. Knowledge from here [gestures], not somebody else’s, not somebody else’s that says “This is it.” Do they know that this is it? No. Not until it comes from here. [gestures] And this is what we did down there at Mound. We sought knowledge, knowledge to do what was established. Here is something that we know that can happen. We will show you this. We’ll give you the formula. Now, make it work. And this was it. No, I’ve had, I’ve had the most wonderful working life of any man would ever have. I’ve been real happy with myself, because I knew my talents. I knew my talents, and to me, this is it. I worked with Boy Scouts for years and years. I had eight Eagles at one court of honor, and I can tell you every one of the boys what they’ve done. And I could tell you ahead of time what they would be, because we knew what their talents were, and we fostered those talents. We wanted those talents to be growing, advancing, and those boys have done wonders, every one of them. And I don’t know, I get on my soapbox on this thing because I’ve been to the very bottom, the bottom of the gutter, for crying out loud. Three, two or three o’clock in the morning
with hundreds of men lined up to find one or two jobs. Good gosh. If you had to urinate, you’d just go over there and do it. It’s just, no, I’ve seen the worst of life, but I’ve also seen the best of life. And I’ve tried to improve that. And in doing so, this is what, I think, all of us thought about down at the Mound. We had to do something with the talent that was given to us, and we did the job.

Kohler: When you retired, were you satisfied with the, with the work you, you had done? Were you happy?

DuFour: Oh, I didn’t to retire. [laughs] I was working here at Wright State, founded, founded the instrument shop here, over at the Brehm Lab. Moved it over to the Engineering. And a good friend, an old bench-buddy of mine that Jim Earhart took over. I worked until I was sixty-seven, and my legs gave out, and, because I’d been on concrete most of my life. I just couldn’t hack it any more. I wanted to work until I was eighty. [laughs] But, no, I, I had a complete machine shop at home. I had about a sixty- to eighty-thousand dollars worth of machine tools at home, and, because machinery is my life, had been my life, so I worked on models, making steam engines and little gas engines and small engines. Oh, I meant to bring one in. I’ve got one in my car. The last engine I built was a five-cylinder radial engine. I was going to bring that in to show it to you. We’ll have to get that out and show it to you. But, no, I retired and I was happy with it.

Kohler: So you, you didn’t have any regrets about anything?

DuFour: Regrets? What’s regrets? Regrets is something that, it comes and goes. Everybody has what they think is regrets. No, it’s, what I’m thinking about as far as regrets, it’s a decision. And you’ve made the decision. Do you regret this decision? Oh, I probably think I could make do this here. Don’t. Don’t think of it as a regret. Think of it as a change. It’s a change. You have to change. You have to change with the times, you have to change because of your age, for instance. Regrets, yeah. I regret I didn’t marry that beautiful first-grade girl I ever met. [laughs] Sure, you can, you can think of a lot of things that you regret, and then you look back and say, hmm, I don’t think I would, oh, no, I did better here. [laughs] Yeah.

Kohler: I think you touched on this a little bit, but, to you, what are some of the important aspects and contributions made by the work that was done at the Mound?

DuFour: Well, I think I pretty well covered that. One thing that probably everyone down there has done and thought about, I think it has improved your thinking in life. And I know it did me. I learned that every molecule of matter has intelligence. I do know that. And to turn that, the reason for that is why is all this stuff, anything and everything and all of us, put together. What
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holds us together? There’s energy there. There has to be an energy to hold matter together, and if that energy is there, there has to be intelligence to do it. This is logical. So therefore, a lot of us got a deeper feeling, a much greater feeling for things, matter itself. It’s, it’s, it’s, it’s a deep religious type, maybe a feeling of itself of what has been accomplished. What, how the world was made. What it’s made out of? There’s just so many things. Because what you’re doing, you’re researching something here that is brand-spanking new to the nth degree, shall we say. Right down to the, the very essence of it. Therefore, then you, you apply that then to your life. And it makes a change in you, makes a big change in you. You can, you can recognize the hurts of people, you can recognize the difference in people, you can recognize intelligence, and what word intelligence applies, yes. I think that there is a change.

Kohler: Beyond the people that worked at the Mound, do you think that it’s had that kind of influence on society?

DuFour: The people that worked, I, I, well, let’s, let’s change that. Excuse me, scratch that. I think in myself that I have been able to change a lot of people’s thinking because of what I learned at the Mound, yes. Tolerance, for one thing. We had to have tolerance. We had to have the tolerance in order to do the job that we were doing. So therefore I think that yes, yes, we, there is a change. And in our, I think any and all of us had a change to being able to think differently about our lives, and we’ve made that change. I know I made a change of that, I could see the change I’ve done to my wife. I, I knew that, and it was from the Mound, and from my research work, yes.

Kohler: What, was there, do you feel there was a direct impact on the work you did at the Mound on the Cold War?

DuFour: Well, since I wasn’t down there, I was, I worked on the Cold War itself, you might say. Yeah, I would say so, yes. There would be, let’s put it this way. I’ll give you another story. This one happened on Nicholas Road. But the reason it happened on Nicholas Road is because of my Q clearance was still in force. There was a man who came in, Dr. Hardy was the director at that time. He called me to his office. I grabbed a, a board with paper on it immediately, because I knew, I, I had to have one of those every time he called me because I knew he wanted information that I’d have to write about. “Howard, let’s go over to the old cafeteria, where we can seal it off.” And I said, “Okay.” So there was four men, Dr. Hardy, and myself. And, we got a, we had a job here that requires your clearance. And one man says, “Do you have a Q clearance?” And I says, “Yes, sir,” and I gave him my Social Security number because they could look it up. He said, “Well, if you say so, we won’t, it won’t be necessary, because of your background. We have a problem. We need to have it solved immediately. It is quite large.” And it was quite large. “It needs a certain type of plastic. You people are capable of
making this particular type of plastic.” It was something like packing materials, only it was much denser. “And we need holes here, here, here, and here, and there. [gestures] And a great big circle of steel around it with two pin holes in it to put it up against something.” And it was called “Operation Mingblade.” I said, “Yeah. I would make a quote on this, but there, there’s not, no dimensions on these particular holes and where they’re to be placed and so forth.” I said, “Whoever drew it left them out.” And one man says, “Well, I’m the one that drew it.” And I says, “Oh? Okay,” but I said, “why leave them out?” He says, “I can’t carry them with me, with those dimensions on there. I will give you the dimensions. This is top secret.” So he gave it to me. And I said, “Yeah.” “How soon can you get it done?” “How soon do you want it?” He said, “Twenty-four hours.” And I said, “Yeah, we can do it in twenty-four hours.” Dr. Hardy says, “How much?” [laughs] I’ll never forget that man as long as I live. Anytime I got hooked and telling him what the Sam Hill we could do, it was always “How much?” So I figured out the hours, put down the manhours, put down our rates and so forth, and I told him it was almost three thousand or something like those. And the man says, “Go.” “Okay.” I left, went over to the shop. Jim Earhart was there, and I says, “Jim, we got a, I don’t want to put too many men on it because it would take them off the other jobs. I think we can do it ourselves.” And I showed him the, what we had to do, without the dimensions of course. And he says, “Yeah, we can take care of that.” And I said, “We’ll get the metal for the ring immediately.” We did. We ordered it, got the bits in there within a few, just a few hours. They were making the materials, and to go in a ring, the stuff was about oh, about yea-thick. [gestures] Got it all in. Now come time for the holes, so we had to put it up on a large boring mill, a very large boring mill to get the holes. And I said, “Okay, I’ll take the first shift, you take the second.” And I went over, I would say, “Take, put a hole here. Now move over so many, and put a hole there.” I could give them the dimensions, but I knew that they would not know the dimensions of it, until, because there was too many dimensions and nobody could write it down. So we put the things, got the holes all done and so forth. Midnight came, Jim took over and he finished up. I came back. I went home, took a shower and shaved, cleaned up a little bit and came back. And had it done. The men came in, in the morning, and I said, “It’s all finished.” And they checked it out and so forth, and he says, “You probably are interested to know what’s going on for this thing.” “Yeah,” I said, “it would be interesting.” He says, “Each hole where there are is an instrumentation, and tomorrow, it’s, is an atomic bomb to go off out there at the Flats. This is to set right up dead on to the bomb, and all these instruments will record what goes on inside of that bomb in microseconds, and part of microseconds, until the whole thing blows up.” Yeah. We were interested in what was going on. Cold War, yeah, yeah.
Kohler: I don’t think you’ve told that story today.

DuFour: Oh, that was, that was with Kenny Jordan. Oh, when, that was when I went over—They asked me for, well, scratch all that and start over, will you. Kenny Jordan called up Dick Olt, when I was working on the quartz fiber room at that time. “Hey, I hear DuFour is one of those guys that likes to make small stuff. We need him to come over here and make calorimeters. Would you send him over?” And I said, “Yeah.” So he taught me all about calorimeters, and I come up with thirty-nine, and he said, “This galvanometer,” he said. “I’ve been doing work trying to stop that galvanometer,” and he says, “it’s just, it gets up there and it will never stay steady. It just goes back and forth a little bit. Weaves just a little bit.” [gestures] And I said, “Well, what have you done, Kenny? Does, take it—“ Well, he said that he spent I don’t know how many of thousands of dollars for a complete weather station, so every time that galvanometer moved, he would check the weather. No relation. He checked the phases of the moon. No relation. He checked the ocean, the waves and incoming and outgoing of the types. No relation. He checked anything and everything to see if there was kind of a relation that was moving that. He even got to the girls that were working in the lab and says, “When’s your period? Because I know that your period forms a heat. Maybe that heat is changing that galvanometer.” Well, the girls gave him that, but no, it wasn’t there. And, I kind of laughed about it, and he says, “That isn’t funny. I wanted to know what—.” I says, “Kenny, I’ll bet you a double-dipped ice cream cone I can make the next calorimeter and that thing will be just as steady as it can be.” [gestures] “The hell you can,” that was his answer. I said, “Yes, I can.” “Well, how you going to do that?” I said, “I’m not going to tell you. That wouldn’t be a bet.” He says, “Will you tell me when, afterwards?” And I said, “Yeah. I’ll tell you about it afterwards. Tell you exactly what the Sam Hill I was doing.” So I did. I built the calorimeter, stuck it in the bath, and put the heat source in there, and that thing just stayed straight as straight could be. [gestures] “All right, DuFour, what the [gestures] did you do to make that thing happen?” I had read a, I like to read journals. There’s where I get my education. Seek it and you’ll find it. Kids nowadays will go to the computer and try to find it on the computer, but I had to do it by reading a journal. Anyway, I had read it, an article that the Brits over there were losing cabin pressure in their airplanes. And they put a fuselage of the airplane in a whole big set-up of walls, put water in there, and put hydraulics in there and made the water going back and forth, like taking off and landing, taking off and landing. And they went into it, they had a doorway to go in there and be inside. There was cracks occurring right around the window, and this was causing them to lose cabin pressure. They gave the metal to the metallogist, metallurgist, and they were checking it out. What was happening was an old, old thing that I had known way back in school, because the, my shop teacher taught me this. You never
cut anything. Never, ever cut anything. He said you take a knife and you cut, no. You do not cut. You part the molecules of matter, because the knife blade, for instance, has molecules built up on it, so therefore how can a molecule cut a molecule. You don’t. You part them. So when you part those molecules down there, it causes heat, because you are separating something that is this way [gestures], so when you break it apart, there’s heat released. The atomic bomb, the same thing. Okay. So, anyway, they saw that the edge where they had machined it formed a heat on that area and it hardened and changed the relationship of the molecules, about three or four molecules deep against the molecules on the other side. So here you have a phase of something that is under stress, and this is not. [gestures] So you don’t have any stress back here, but you got stress on the surface. Now you’re winding wires around this thing, which is now against this surface, so when you put heat to it, what’s in there, it’s going to change this surface in here to try to bulge out. Well, when it does that, it was changing this, is what it was doing. [gestures] So when I made the whole, all the parts to go into that calorimeter, I’ll put them in an oven, put it up to about five- or six-hundred degrees, soaked all the materials that were machined overnight, took them out the next morning, let it cool down, put it all together. All the molecules that were in that thing, these ones on the outside now, were all normalized. There was nothing working in there. And that was the reason for this galvanometer changing back and forth. But this was part of the work, this was part of the knowledge, this is the part that you saw, this is the part that you want to make things work, and make them work right. But it’s just by chance I was the one that did it. And it was by chance. I called him up the other day. I says, “You still owe me a double-dip ice cream cone. You never did pay off. When are you going to do it?” He says, “Come up, on up to Maine. I’ll give you one.” He’s living up in Maine, now. He was quite a man, he was quite a fellow. He, he had a platoon that sought ways of setting up a radio station, advanced radio station, for Eisenhower. They’d go up and kill off a few Germans off the Alps, and then set up their radio station and so forth. And they were the first ones into France. They snuck in and got into France and then killed off the Germans on the Eiffel Tower and put the daggone radio station up on top of the Eiffel Tower. All the other boys were shooting at Germans that tried to get up, which they were running anyway because they knew the Americans were coming. And he was there with a radio station for Eisenhower when the troops come into Paris. But the stories that that man couldn’t tell.
down at Mound as a way that we did a demonstration to the people of Miamisburg at one time. When the people at Miamisburg found out that we were going to have this atomic energy plant down there that made the atomic bomb, oh, wow. People sold their property, they ran. They didn’t want to be anywheres close to that thing. They thought there was going, whole thing was going to blow up. So we put on a show. Dr. Herring, who was the director at that time, went clear back into history and made a notation of when the first molecules were thought by the, the great men of their time, Aristotle and the rest of them. They knew that there were certain molecules of matter. Then there was a German, and he was back in the 1700s, that made the periodical chart. And he left holes in the periodical chart. And, because he didn’t know them, but they’re going, they’re going to be there. He knew it, because he started out with helium and then all the rest of the ones that he knew about. But he knew that there was other ones to come. It was fascinating to note that we down there filled some of those holes in the periodical chart. That was a—See what I mean? The side effects, there’s just, there’s just so many things. It’s, it was a wonderful time. We fraternized, the families did, got together. We never talked shop. We talked family, things that was happening. It was, it was a good time. Pressures, we felt the pressures, but we didn’t show the pressure, maybe. But I’d like to see something like that happen down there. And I was saddened, very, very saddened, that they filled, they filled in the pool where we used to cool off the materials down, way down in the ground. Be interesting to take some people and have a tour of some of the places where we did some of these operations, and oh, man, that would’ve been a wonderful thing. That, that’d been, golly that’d been a, oh, man, I was down to see this big old pool, the swimming pool down there, and with all the stuff that they had doing the, the overhead cranes where we would drop all the hot materials and so forth to keep them cool. There was just, there’s a lot of things that could be done, even the stories that we could maybe reproduce that we did at the shows we gave. We gave all the kids, all the high school kids come in. I built a ping-pong pile, that was my first patent. They wanted to reproduce something that resembled a nuclear pile, and you have these neutrons flying all over the place. So I used a ping pong ball, would shoot the thing up, well a switch was put down there. So a ping pong ball would come down, hit the switch, and off would go three more balls. And, in a big plastic case, and so forth, it was one of the hits of the show, because I had a control rod that I could pull out. And to pull the control rod out meant that you were putting them into the pool, shutting the materials down, and it would shut off areas of switches so that pretty soon you’d have like a popcorn [sound] on the thing. But you’d push it all in, and whom [sound] all of them went. But what a time we had. It was so popular, yet so proper, that they wanted, other schools wanted in. So we put on maybe two, three shows a day. Some kids, busloads and busloads of kids coming into the auditorium over there at the school. Then, I got to go to Dayton, and we had to put it on at a big show here in Dayton. But by that time I was out. I had left. But, no, Dayton does not know what it really is. Dayton does not know. They do not know how many
patents. In 1937 when I came here, I read up on Dayton, and I wanted to
know all about Dayton. I wanted to know the history of Dayton. And I found
out that at the turn of the century there was more patents issued in the Dayton,
Ohio, per capita than anyplace in the United States, and it continued. Dayton
is a father of many, many, many products. I was sorry when I read that
Dayton didn’t hold on to the house where the Wright Brothers. I was sorry to
hear that they didn’t hold on to the shop that Henry Ford came down and got
and set up. I remember going to through that shop, and I remember going
through that home when I lived in Detroit when I was a teenager. And, NCR
and what NCR done, at the time in ’37, there was more back alley machine
shops in the city of Dayton than of per capita of any place in the country. This
was a mechanical town, and I was--. [sound] Wow, I loved it, because this
was where I really, really wanted to stay, and I did stay, because the
opportunity for a person with my mechanical ability, get a good job anyplace.
And I could walk anyplace and get a job, because it was, it was nice. And all
I can say is Dayton has been very kind and very gracious to me. I’ve made a
good life here in Dayton, and especially at Mound. It was a wonderful
experience. That’s about the thing I can end up with.

00:45:33 Kohler: All right. Thank you very much, as always.

00:45:34 DuFour: Been my pleasure to be here.