5-17-2006

Howard R. DuFour: The Cold War Aerospace Technology History Project (Interview 1)

James A. Kohler

Howard R. DuFour

Howard R. DuFour
Interview

Cold War Aerospace Technology History Project

Interview Conducted by James A. Kohler
Special Collections & Archives
Wright State University

Special Collections and Archives
Wright State University Libraries
Oral History Transcript

Project: Cold War Aerospace Technology
Narrator: Howard R. DuFour
Interviewer: James A. Kohler
Transcriber: James A. Kohler
Interview Date: 17 May 2006
Interview Place: Dunbar Library at Wright State University

Tape 1 (Video)

James A. Kohler: Good afternoon. Today is Wednesday, May 17, 2006. We are talking this afternoon with Mr. Howard DuFour. This interview is being conducted in the Dunbar Library 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: You're welcome, young man.

Kohler: I would like to get things started with a little background on yourself. Um, where were you born?

DuFour: Connersville, Indiana, January 10, 1915. It was a very small town. The town is actually built around a huge manufacturer that's there for furniture at that particular time. Back into that particular area of time, I should say. But, didn't stay there too long. But, first grade and, since I'm a war baby, they skipped me and put me into the third grade, and I lost phonics, so I have a hard as hell time of learning how to spell now. But, anyway, from the third grade I went to Anderson, Indiana, and was there for one period of time of my time, and we moved to Detroit. And, there's where I lived in Detroit until 1937. Here's where my education actually took place, more than anything else. And so did the Great Depression.

Kohler: What was your education like?

DuFour: [sigh] Well [pause] I disliked school. I, I've had- because nothing that they had interests me, except history, mathematics; I was good at math, and the use of my hands, because that's, that was me, my hands. Until my grandfather put tools in my hand when I was only four years old, and he said that when you have a tool in your hand no matter what it is, it's just the extension of your hand. And I didn't have anything like this in school. But I had that opportunity to take a test, and what is the, ah, thirty, let's see, was it thirty? No, it was sixty-four students out of the entire District of Detroit, which rounded around two thousand five hundred, to go Wilbur Wright Boys Technical High School. I knew I didn't have a chance to go to college, that's all there was to it. So, I wanted to be a tool and dye maker. And, so I studied for that.

Kohler: And, ah, what, what types of jobs did, did you have?

DuFour: You're talking about a period of time, well, Detroit was, um, [laughs] my first job in Detroit was five bucks a week in coffee, if you can [unintelligible] that. A go-fer boy, because I was in my teens, yet. And, a little later on I wound up with a job, there's a few jobs in between, but it doesn't matter about them. We'll talk about the ones that, when I was twenty years old. Ah, that was back in 1935. I was hired by the Associated Press to be a wire photo operator. So, on January the first, a few minutes after twelve the wire photo came into existence. So, wire photo and photography just came like a natural thing. I was happy with the job, but not real, real pleased, because it wasn't working with my hands, to tell you the truth. It was interesting, fascinating, I learned a lot, I, ah, had opportunities to see history made. The first time that fingerprints was ever put over the wire photo, I was involved in receiving those fingerprints for a murder suspect, and for a crime that was committed in Detroit, and it worked out fine.

Then, [laughs] I think the most humorous part was that a, a lar, very large man, a very large man, and he was a black man, came in, and he says, "Is this the wire photo room?" And I said, "Yes." And, he says, "I'll be right back." And, he, he came back with about three others, and Joe Louis.[1] And, it was an interesting interview from the standpoint that he wanted to know how his picture could go over a wire. So, I had to explain [laughs] to him the sending and receiving of pictures over the wire. A very, very intelligent man, by the way, he was very, very intelligent, and he understood what I was saying. Because, he asked some questions that, ah, I knew that he was absorbing what I was telling him. But, I stayed there until 1937, and left there to come to Dayton, because my dad had gotten a job at Frigidaire,[2] and my fath- so my family moved here. That I have a good memory of, it was January 7, 1937 at twenty minutes after eight, riding on a Greyhound bus. And this is where, and this is where I've been all my life, the rest of my life.

Kohler: How did you end up at the Monsanto Chemical Company?[3]

DuFour: Well, that's- I started working at Frigidaire, and, there's some stories that go on to there, but we'll just stick to the, what you want to know. From 1937, when I started at Frigidaire, and the war came on the schooling that I had, and my abil- the availability, I think, more or less, of men of my age at that time, I was made foreman of the tool room. And from there, why, after the war, I went with, still with Frigidaire down to the other plant down in Moraine. They were going on a strike, and I couldn't afford it. So, I looked around, and a friend of mine said, “Why

[1] Heavyweight boxer in the 1930s and 1940s, and was heavyweight champion from 1935-1936, and from 1937-1949. The Official Site of Joe Louis, “Biography,” http://www.cmgworldwide.com/sports/louis/bio.htm (accessed June 20, 2006).

[2] During World War II, Frigidaire stopped production of refrigerators to supply the United States military with .50 caliber Browning machine guns, aircraft propellers and parts, hydraulic controls for airplanes and other military items. Wright State University Special Collections and Archives, “MS-262 Frigidaire Historical Collection,” http://www.libraries.wright.edu/special/manuscripts/ms262.html (accessed June 20, 2006).

[3] Originally founded in 1901 as the Monsanto Chemical Works of Saint Louis by John Francis Queeny, the Monsanto Chemical Company was instrumental in the development of chemical production in areas such as explosives, fine pharmaceuticals, and atomic energy research. University Archives, Department of Special Collections, Washington University Libraries, “Finding Aid for the Monsanto Company Records,” http://library.wustl.edu/units/spec/archives/guides/pdf/monsanto.pdf (accessed June 21, 2006).

don't you try Monsanto?" And, I thought the old Bonebrake Seminary[4] on First Street, see if they could hire me there, and, that was the mo- one of the most peculiar interviews I ever had. The man's name I learned later on was [Clarence H.] Pittenger, and he was the head of the shop there. The shop was comprised of about four or five men, and what our assignments was to make anything that they required for the Atomic Energy Commission.[5] Which meant that you had to do you actually developed them. There was no engineering. None. A person would come in, and said we're interested in doing, getting from A to B, or A to B, C, whatever. We had to sit down and actually draw out what the man wanted, and then make it. So, this become what you call a model maker. There's where I took on the, the ah, shall we say, the name as a model maker. Pitt when he interviewed me says, "What, can you run machinery?" And, I said, "Yeah, I was foreman of tool room. I came from Detriot at, Wilbur Wright Tech High School," and he says, he didn't ask me any more questions, other than, "What's your hobby?" I said, "Well, photography's my -" "Oh," he says, "mine too." And, we sit there, and for half an hour talking about photography, cameras, and so forth, and, he said, "Well, okay," and then he got up, and I said, "Well, am I hired, or not?" He didn't even give me an answer. He said, "Oh, you're hired. You were hired the first time you opened your mouth." "Because," he said, "your mind is what we want." And, so I started out there with Monsanto. This was before even Mound[6] was even considered. I have a feeling they were negotiating for it, because it had to be done. But, that was in the fall of 1945, is when I went to Monsanto. We called it Monsanto because that's the contract for Mound Lab was run by Monsanto.

Kohler: The thing I'd like to concentrate on today a little bit is the different facilities that Monsanto owned and that you worked at.

DuFour: Um--hm

Kohler: Just to get an idea of, kind of, the work environment, safety procedures, security, that kind of thing.

DuFour: Okay.

---

[4] Bonebrake Seminary (Dayton Unit III) was located at Bonebrake Theological Seminary, 161 West First Street in Dayton, Ohio. It was acquired from the Dayton Board of Education in 1944, and returned to the Board of Education in 1950. The facility was used for polonium research and production. Floyd R. Hertweck, Jr., ed., *A History of the Department of Energy Mound Facility, Miamisburg, Ohio*, "Part I: An Introduction and Background Information (Draft)," (CH2M Hill Mound, Inc., June, 2004), 2. Howard Shook and Joseph M. Williams, "The Bomb: It Wasn't Always Fun and Games At the Playhouse," *The Magazine, Dayton Daily News* 23 Sept. 1983, 4.

[5] The Atomic Energy Commission (AEC), established by Congress in 1946 to not only regulate the safety of nuclear energy, but encourage its use. The AEC was the forerunner to the Nuclear Regulatory Commission (NRC). U.S. Nuclear Regulatory Commission, "Our History," http://www.nrc.gov/who-we-are/history.html (accessed June 20, 2006).

[6] The Mound Facility (Dayton Unit V) is located at 1 Mound Road in Miamisburg, Ohio. The facility was owned by the Department of Energy, and operated by the Monsanto Chemical Company. It opened in 1949, and Monsanto occupied the facility until 1988. The facility was used for polonium research and production. Much of the work centered around military applications, as well as civil defense planning, and medical research. Currently, the Department of Energy is concentrating on the decontamination of the buildings in hopes of converting the site to commercial use by 2007. Hertweck, Jr., ed., *A History of the Department of Energy Mound*, 3, 33.

Kohler: Anything you can tell us about the Monsanto Dayton Unit I?[7]

DuFour: Monsanto's Dayton Unit I started back in the, the twenties as a research corporation. The fact of the matter is that's where Ethel gasoline was first started. And, it was, I shouldn't say it first started, first researched. Thomas and Hochwalt[8] had a laboratory there. It was excellent from the standpoint that they had, really had, and grew some very, very interesting people to do research. And, they were doing good, very, very well. They were doing so well that they became noted, pretty well had a good reputation for around the country for the type of research they were doing. Then there was a man by the name of [John Francis] Queeney[9], who had started up the company down in St. Louis, which was, ah, called Monsanto after his wife's maiden name. And, it was the Thomas and Hochwalt Lab here in Dayton. And then, he let some of his contracts out to them, and he didn't [clears throat] he thought they were doing so well, he just incorporated Thomas and Hochwalt Lab, and they became Monsanto. Ah, it was a wonderful research facility, and there was some very, very outstanding people, very outstanding people that was there. I had a brother-in-law who worked there, and started there in the twenties, and, I can vouch for the fact that Joseph Hyde, that was his name, came up a very well fellow in, in the hatchery, shall we say, and, done a lot, a tremendous amount of work with the Atomic Energy Commission, because we was actually just sucked in, shall we say. They needed people. They needed people for research. This is the reason for Mound. And, so it was- it's a wonderful opportunity just to, to be there, and that was the start of it. Then I- because I was in connection with them from the Bonebrake Seminary. We did some work, both back and forth. But, later on I was re-hired when I left the Mound, shall we say, when that closed down in '52 to start a research shop there. So, I started an engineering and research shop from ground one, but I had twelve people working for me.

Kohler: What was it you mentioned- the Bonebrake Seminary- what was that facility like?

DuFour: [laughs] Bonebrake Seminary was an old school dating back into the 1800s. And, it was a religious order, and when it was built, it was built on the outskirts of Dayton, and [laughing] they just swallowed it up. And, it got so big that they had a larger school built off of Salem Avenue. They just held that name, and it became a building for, shall we say, all of the schools in Dayton for their materials, and so forth was out there. And, anything that was available and the city of Dayton was gobbled up by the Atomic [laughing] Energy Commission for their facilities. It was a good facility for the simple reason that was a durable building without a lot of, oh, asbestos and stuff like that in it. It was- it was built way back before that

---

[7] Acquired by the Monsanto Chemical Company in 1936, Monsanto Dayton Unit I was located at 1515 Nicholas Road in Dayton, Ohio, and starting 1943 was used for polonium research and production, and recruiting personnel. Ohio EPA, "Unit I," http://offo2.epa.state.oh.us/DOE/FUSRAP/Dayton/UNIT1/unit1.htm (accessed June 21, 2006).

[8] Thomas and Hochwalt Laboratories of Dayton, Ohio was founded by two chemists, Charles Allen Thomas and Carroll A. (Ted) Hochwalt, in 1926. The lab was acquired by Monsanto in 1936 to firm up their research and development department, and "much of Monsanto's proprietary and patented chemical knowledge traces back to Dayton." Dan J. Forrestal, *The Story of Monsanto: Faith, Hope, and $5,000: The Trails and Triumphs of the First 75 Years*, (New York: Simon and Schuster, 1977), 83-85.

[9] John Francis Queeny founded the Monsanto Chemical Works in 1901. The company was named after his wife, Olga Monsanto. His son, Edgar Monsanto Queeny, would become Monsanto president in 1928. University Archives, Department of Special Collections, Washington University Libraries, "Finding Aid for the Monsanto Company Records," http://library.wustl.edu/units/spec/archives/guides/pdf/monsanto.pdf (accessed June 21, 2006). Forrestal, *The Story of Monsanto*, 12.

time. And, I have a feeling that the, that the walls were heavy, the walls were thick, we could have, um, research in some of those places where it got pretty hot for- with plutonium, and, it was kind of contained. However, the shop was laying it on one side, and on the other side was, was a large laboratory where the walls were quite thick, because it was all made out of stone, cut-stone. And, one day the guy come in there and told us to get the [gestures] out of there, because they had an accident on the other side that had spilled some plutonium that was coming through the walls. [laughing] We, we had, we had to get out of there for a period of time until they got it cleaned up. But, this is, and we put other facilities around it, other buildings were built. We even had an old quonset hut there for machinery and other things that the- was needed. In fact the matter is a lot of stuff was stored there while they were building Mound Lab, which all this stuff was going down there, including fire engines, and so forth that was it down in there.

Kohler: Did it take a lot of work to upgrade that building to be able to move into it?

DuFour: No. We took it over just, just as it was. They did come in and paint the place, because it [laughing] hadn't had any paint for years, and they, they scraped all the paint, and put some paint on the thing, but that was about the size of it. Because, the building was, was, it was so stable; it was so old, but was stable, it was good, it was built good to begin with, and that's, that's probably about the size of it.

Kohler: The next facility is the Runnymede Playhouse.[10]

DuFour: Ah, the Runnymede Playhouse. Well, what was the Runnymede Playhouse? It was the playground for all the rich and famous in [laughs] in the city of Dayton. It was their dance hall, it was their community senator, center. They put on plays, they had concerts there, small concerts, and so forth, there. And, [clears throat] let's see, Thomas and Hochwalt, there was somebody else, and I can't remember the name right now, who was a part of this, shall we say, the society, and he went and got involved in with the Atomic Energy Commission, and he offered this facility to them. It was one of these things that we need space. Okay, here, take it over this, this is for the war effort. So, this is how Runnymede Playhouse turned into the place where we actually, well, oh, I want to use the word, but it's not quite the word I want to use for it, but, it's actually finding out what kind of plutonium we really had, or how much we really had. This is a refining of, let's put it that way, the refining of plutonium - chemically wise, as well as electronically wise. But, we use it electronic wise by plating small pieces of platinum, and then we could measure the weight of this, and we were actually measuring the weight of the molecules in matter of plutonium, so we would know what we had, because we didn't know what we had. A lot of times we didn't know what we had.

Kohler: Did that facility take a lot of upgrading to-

[10] Runnymede Playhouse (Dayton Unit IV) was located on Runnymede Road and Dixon Avenue in Oakwood, Ohio. The property was a recreational facility owned by the Talbott family, until it was acquired by the U.S. Government under the Emergency Powers Act. The facility was in operation from 1944 – 1949, and concentrated on polonium research and production. The facility was to be returned the owners in its original condition, but the Playhouse was so badly contaminated the building had to be demolished. The AEC paid the Talbott family $138,000 for the property. Hertweck, Jr., ed., *A History of the Department of Energy Mound*, 2, 11. Shook and Williams, "The Bomb," 9, 11.

DuFour: No, it wasn't, we just, we just went in there and took over the place. Of course, there was a few little places made off for offices and things like that, but, no. It was just, we needed a big room, just like we're in here now, to set-up elec- electrolysis, and, chemistry tables, and so forth in order to do it. And, we had to have a lot of amplifications in there. We had a lot, we had to have, had a lot of power, because of the plating process we might have to, in fact the matter is, we couldn't get enough copper, so we had to use bars of silver. We took bars of silver to make the electric flow into a lot of plating populaces. So, there was just a lot of things happened during these period of time. You've got to remember, [sighs] this is something that's brand new. It's never been done before. We don't know what we're doing. We're, we're playing around with something that's definitely deadly, exceedingly deadly. We don't know how deadly we have to be to get it. But, it was an interesting, an interesting, very interesting project. It's never been done, of course, any kind of work other than the fact that we knew about plutonium. But, how do we enrich it? How do we get it to the point where we have enough of it to, to make something go boom. And so, the things we grabbed onto were something that was not really made for that purpose, because there was nothing. You were starting at ground zero was what it amounted to, and we worked from there.

Kohler: Okay, the next facility is Warehouse A - the General Electric Supply Corporation building.[11]

DuFour: [laughs] That's quite a building. It's right now, it's still quite a building even today. Ah, that was grabbed by the by the Atomic Energy Commission. Anything they could get their hands on where they could put stuff, and when I mean stuff [sighs] tools, tools of all kinds - knives, measuring sticks, anything. Machinery, facilities for- we knew they were going to have down at Mound. They also had a laboratory down there, a very large one, and it was set-up for- we're going to have to measure anybody's and everybody's urine samples when they get into Mound, when they're there. So, they set-up a laboratory down there with a whale a lot of beakers, a whale a lot of mixer type of things, and so forth, and another set of whale of a lot of electronics materials, and so forth, for plating purposes. We would come to work after going home with a little ice cream cup, one of these ice, the small size ice cream cup. You were to take a [gestures] and have a urine sample in that to bring it in the next day. And, there was a big table in there, and they put your name on it, and so forth, and we would stack these daggone things. They all go down to the company, the General Electric Company, and the girls down there would take your urine samples, pour it into a beaker, take a little round piece of copper, which was valuable, ram a hole in the thing, I made the dye and everything else for those darn things, and it put it in the urine sample, and it would be in there for a while stirring around there. They could take that off, and measure how much was in your system as far as plutonium was concerned. And, this had to be done almost every day. And, when we were in certain areas it was done every day, but, in certain areas it wasn't required. But, where you were close to plutonium, you had to have those samples in. And, of course, [laughs] my wife says, "What is this for?" I said, "Well they just want a sample of my urine." "But, why so much?" [laughs] "Well they just want a sam-" I couldn't tell, see, I could not- uh-uh, no, anything that we would do like that was

[11] Warehouse A (Downtown Dayton Warehouse) was located at Third and Sears Street in Dayton, Ohio. "This facility was leased to provide space for the operation of the new Biology Program, and for the processing and analysis of worker and environmental samples." Hertweck, Jr., ed., *A History of the Department of Energy Mound* , 2-3.

never, you could not make it out. Finally she got wise, "Oh you're doing something that's secret." And, I says, " Well, let's put it that way, yes." [laughs]

Kohler: Ah, and finally The Mound facility itself.

DuFour: Oh, The Mound facility itself. What a, what a wonderful place to work. Um, we knew- we didn't know officially, okay, officially, we did not know that we were working on atomic bomb, period, we did know that. Unofficially, we did. [laughs] We had a [laughs] one man got himself into big trouble, I remember that. And, he mentioned, he just happened to mention, Jiminy Christmas we're working on this, this, this atomic stuff, let's see, ah, so-and-so did this, and so-and-so did that, and he was talking about, books that he had read on atomic matter, just on atomic matter. He said, "What they gonna be doing with thing? They gonna make a bomb out of it?" Just out of this [laughs] whoa-ho, that was a word you did not do, gone it. Boy, he was right in on it, he went in on the carpet, and they were [unintelligible]. He says, "I just wondered." [laughs] He says, "I didn't know anything about it." Well, from now on you're not to pass the word on.

I mean, things like this happened, and you could not control it, other than to control in-house. Not to get it out, but to control it. Ah, so therefore, security was tight, exceedingly tight. Ah, we had large buildings out there, long buildings with a aisle way down there with facilities on both sides of the aisle. And, one room did not know what the other room was doing, and the other room did not know that. For your own safety, for your own safety don't get nosey. Okay. The simple reason, you don't know who you're talking to at the man at the bar. You don't know who you're talking to with a man at a party. So for your own safety you don't want to know anything, so nothing will slip. It wasn't a thing that you do it, I'll shoot ya sort of thing. It was done in a manner in which you volunteered not to do it, because we were working on something that is so tightly secured that we don't want to lose it, and we don't want to lose you. This is the whole thing. It was done very professionally, very professionally. And, when we would be at a table having lunch, or something like that, again, our conversation was not what we were doing, but mostly a conversation of family. The only time that I got involved in a, or in conversion was, "We're doing such and such as this, and we need this. DuFour, can you help us out?" Because, they knew from my background of my mechanical background that they needed a mechanical device to do something. So, this is the only time that they would, "Hey, I caught ya. I was gonna try and look you up," and all this sort of thing. And, then, they'd have me there, "Can you fix me up this type of a device?" To get from A to B, you might say. And I'd say, "Sure, come on over to the lab, and we'll talk and discuss it," and I would write, draw them a scale, or make a drawing, or a hand sketch - whatever you want to call it. And, I would then make it for them. But, this is the only time. But, security was wonderful, and it never got out. It never got out until [Klaus] Fuchs[12] came along, and that's another story.

Kohler: Were there any other security measures, hiring people, hiring practices-

[12] Klaus Fuchs fled Germany in 1933, and worked on the British atomic bomb research project. He would later work at the weapons laboratory as part of Manhattan Project in Los Alamos, New Mexico, and admit to passing secrets to the Soviet Union. The Atomic Archive, "Klaus Fuchs Biography," http://www.atomicarchive.com/Bios/Fuchs.shtml (accessed June 20, 2006).

DuFour: Yes, the whole- well, I'm talking about security from the standpoint of letting out what we were doing. Security measures, yes, heavy on security measures, as to what you were doing, where you were working, so that plutonium wouldn't be scattered all over the place. Therefore, we, when we went in there for security purposes, now, we left every bit of our clothes in there, everything. There was nothing; we were in our birthday suits. And, we put on fatigues, army fatigues, inside and out. Some places didn't have to have the underwear taken out, but your outerwear did have to definitely. When you were working in tight places that all had to be done in security wise, and even the shoes. I had about three or four sets of shoes, and they were like a moccasin type of shoe, which you could just run your foot into, and they were all put into a cupboard with your names on it. Well, here's a big cupboard with some doors, some would say low cupboards, and so forth. And the reason for that, you didn't want us, security wise, did not want to transport anything out of one lab into the hallways, or down into offices, or anything else. This was very highly, very highly secured. And, we had what they called, physics type of men and women who checked us constantly, if we were going to a certain place. It was health, for your own health, your own health business. So, the security was very high on health. We didn't know that it was dangerous, we didn't know how much, but we thought we knew, we didn't know; I mean, hey, we're working with something we did not know.

Kohler: Was there a lot of concern about that with the workers?

DuFour: Yes, yes, there was a very large concern about this. This is the reason that that was almost, I could say that that was almost first security, other than the tight security of having a leak. The security was such that at times we would have to be even with our suit coats on, and so forth, when we went out. We'd have what we call a "cutiepie," gun-like affair, that would go over your clothing and make sure you didn't have anything on. Because we didn't want to take anything out. And, it was done, and done well. Let's put it that way. Because I do not remember of anybody, there was probably somebody who had a little dose of it on, but if it did, it never got out to the general knowledge. So, it was good. And, I have been hotter than a fruitcake. [laughs] I had to go into a place where the thing was so hot I- with radiation, I was only allowed forty-five seconds in there. Just to make a measurement, and I had double suits on me, air mask, the whole thing, throat mike, boy, they makes very, very- they taped my arms, they taped my feet, they taped [gestures] everything was taped, just- I mean you were in a secure suit, and then they'd sure it, and it wasn't just one person, there would be two or three doing it to make sure that I had complete security. Double gloves, all that sort of thing. It was, it was something. And, when I went out of there I had to drop the micrometer and my six-inch steel down in the thing, and take off the gloves, and that went in there, too. It's all buried down at Tennessee.

Kohler: Why was there a need for all these different facilities?

DuFour: Well, you want to remember, again, we were dealing with something that was, I would say, on the verge of being precious. And, anything pertaining to that, what can we do different? How can get this, or if we put this together, what comes out? If we put that and that together. In other words, what we were doing in a chemically way is making daughters. Daughters of plutonium. They were also hot. But, not the same, and they reacted the same, and not, not, excuse me, they did not react the same as plutonium. They come up with a new material. We were, we- this was a time to research. I mean we researched the heck out of this thing. I don't

know if you know it or not, but plutonium when it decays, what is it? It's lead. It turns into lead. This is the reason lead is a very, very excellent- by the way, they had lead bricks up sky high almost, covering everything where plutonium was. But, to come up with a new material, and you wanted to put it in the reactor down at, on Ten- in Tennessee, and just put it in there to see if it would expand. And, the reason for it, there was no formula. So, what literally speaking, what they were actually doing, they were creating new formulas for new work.

I made an aluminum capsule, one time, that, it was about the size of a lead pencil. A little smaller, and put the plutonium in there, and sealed it off. I made a huge box, four by four by four, and put borax, used borax, and tallow, and poured that all in, because we knew that borax is one of the best stop- stoppers for the gamma rays on it. And, stuck it in there, and sent it to Chicago. The first shipment that was ever made. The first shipment that was ever made out of our compound. And, they found that it was good for, stopping thyroid. The- [clears throat] when they got out of whack, and what was the other one? There was another, oh, what's the other thing that grows in mou- in your throat? Oh. It gets enlarged. The thyroid gets enlarged, but there's something else in there. Anyway, they sent it up there to the- for research purposes, to the Chicago hospital up there, University Hospital.

This is the thing. People don't understand that what we were doing down there. Here's a new, something brand new. What is it? What can we do with it? How can we use it? What's it good for? Our- is it dangerous for this? Or is it dangerous for that? Can we use it in certain types of chemistry? Can we use it in health? You follow me? It was just innumerable things. Questionable. So, each portion of these labs were working on certain portions of that. And, then we were trying to see how, again, here's a big ball, can we get it down to a little ball? Like everything else today, like were talking about this camera. We have a big camera, now we got a little camera. So, this, the, we were doing things like that, you see, back there in the, you might say, in the ‘40s and ‘50s.

Kohler: Where did the need for these new facilities- who recognized that you did need these new facilities? Did it come from the people who were working there? Or did it come from the administration?

DuFour: It came from the administration. Directly from the administration. Um, [sigh] I can't, I don't know. I'm guessing now. But, I think the- [pause] before Pentagon, okay? The Army- cause this was run by the Army- had information that the German people were working on this sort of thing called the atomic bomb. So, our administration, under the auspices of the Army, jumped into full heart. Unlimited amount of money, unlimited. It's going take hundreds of millions, go for it. And, that's the way it went. Ah, under certain rules and regulations that were set-up, of course, by certain members of Congress, which did not know all of this. They were not entitled to know it. Only certain people in the Pentagon, before Pentagon, and the Army, only they knew it. It was top secret, son, to the nth degree, I'll tell you that. And, therefore, who was in command? Uh-uh, no, it was, it's a, it's a collection. So, it has to be strictly from the administration.

Kohler: I read a few things about there kind of being a rush to get The Mound built, and get it there and get it operating, um-

DuFour: [laughing] Good one.

Kohler: Did you feel that rush, and do you feel that, you know, even with that rush things got built properly, and the Mound was the kind of facility that it needed to be?

DuFour: Yes. Yes, even in the rush. Even with the mud, and all the stuff [laughing] out there, yes. Sidewalks, they had to put sidewalks in before they could build the buildings, I think, [laughs] to get out of the mud. Yes, it was, and it still is a very substantial building. It had to be underneath government control. There's where you get that, because it was built by government control. You're not going to put up a shoddy thing with the money that you could do with putting up a right building. So, it is, and it still is. I went out there, what was it? Last Sat-, last, no a week ago this last past Saturday. And, here's a building that's standing up there, and I can remember going in there, and the same building is still standing there, and there is nothing wrong with it, in all these years. It was just the building for security. It's where all the guards met, and the security people. There's one guards on there, then the security people were in the back around there. You're talking about security. There was a fence put all around there. There were guards walking the beat twenty-four hours a day around that fence. So, there, if you want to know how the security was.

Kohler: Armed guards?

DuFour: Armed guards. Yup, they carried an M-1. [laughs] No, that was just highly regarded on that thing.

Kohler: Was there some excitement with the workers moving into that new facility at The Mound?

DuFour: What was this?

Kohler: Were you eager to move in there -

DuFour: Oh, by gosh, yes.

Kohler: Was there some excitement-

DuFour: We could hardly wait to get into that place. Oh, my word, the facilities. Oh, my word, absolutely. The latest of everything there. We couldn't get that stuff into the old building, when we were on First Street. We couldn't, we just didn't have room. Okay? And, now, here's new facilities, new elephant hoods. All the stuff was set-up in production line to get done. It was just marvelous. [laughs] How did we get to this?

Somebody had to take on an assignment. We're going to have to put glass on top of the benches so we keep them clean. We can't not put a bench up, and then have a spill on there, because, if we do, we have to tear the whole bench out. Send the bench out, okay? So, we're going to use

herculite glass.[13] Now, Herculite glass is the same type of glass that's in the glass doors that you going into stores, and so forth, with. If you hit it with a hammer, it just [sounds] like that. It just disintegrates. And, you can take your hands, and scoop it up with your hands, because you can't cut it, it doesn't cut your hands. So, Dick Olt, my superior at, this was at Bonebrake, he says, "I'll take that on." And, "DuFour, you're gonna be my man to help me out." So, we took a room. Oh, it was about a, [coughs] I'd say the room over there in one of the buildings that was built alongside of the Bonebrake. About a twelve, no, fourteen, maybe. Fourteen by fourteen foot. Cleared it out. Nothing in it. And, I had six by six pieces of wood made up. We sent off to [coughs] Pittsburgh Plate Glass, and had six by six pieces of Herculite glass made. Now, we got it just like that. Top senior- top priority. Anything with a, with that type of priority arrangement, I was due to get it now. I got, oh, I think it was about four dozen of those things. Our job was this, if you hit that glass with a hard piece, how do you hold it on the bench? We don't want that glass going all over, because it might be contaminated. Okay? So, what is the glue, or the substance of there of that will hold [claps hands] that glass down on that bench, and will not fly apart? We had to know the energy. We had to know the energy of that glass in order to do it. So, [laughing] we tried various substance, oh, for three or four days, and my job was to sit the dog gone thing out in the center of the floor, take a ballpeen hammer, and hit it. And, then, we would measure how far out the glass went. See if we can get it closer and closer where it will stay. Well, we worked on that thing, and worked on it. One morning, Dick comes in, he says, "I think I know the substance that we need, Howard. You know where you can get some tar?" Roofing tar. Black roofing tar. "I think I know." And, [clears throat] "Yeah, we can get some. I'll get a priority slip, and go get some." [laughs] And, with a priority slip, you got everything. And, I got a gallon of that stuff in, and we smeared it over the wooden block and put the son of a gun, and I hit that thing, and not a piece went out. Not one piece. That's what we did, and every department over there worked on things to go down to The Mound. So, every one of those tables down at The Mound had tar over the thing, put down, and then the glass. This is the things that had to be thought about as we worked with this material. And, each little, shall we say, each little "i" had to have its dot. We had to be very carefully put that dot down on what we were going to be doing.

Even with "Gertrude." Now, who in the Sam Hill is "Gertrude?" "Gertrude" was five fingers that you put into a apparatus, and you could move your fingers, and it went out through tubing up high, and, then, down, and, then, back of a lead glass with a oil inside of it, which made it about six inches, four to six inches thick, somewhere in there. So that the operator would coming out here, and opening them with his fingers, and so forth, would not become radiated. He only had a few hours, anyway, and he'd have to be changed with someone else. Safety. Safety. Safety. And, this operated fingers, of your fingers, in here, and they called it "Gertrude." Why? Who? How? When? I don't know. But, it could pick-up an egg, you could pick-up an egg without squashing it.

But, what was happening back in there was a exchange of chemicals with plutonium in it for reaction purposes, and it was done there to enhance, more or less, the quality of the plutonium more than anything else. "Gertrude" broke her pin, and I had to go back there where all that

[13] Developed in 1938, "Herculite glass is thermally tempered to make it stronger and more resistant to stress than annealed glass, offering high load-carrying capability, and resistance to impact and thermal shock." PPG Aircraft Product, "Materials," http://www.ppg.com/gls_ppgglass/aircraft/material.htm (accessed June 20, 2006).

radiation was to measure that pin, and what it was for. And, I only had forty-five seconds to do it. It took me all day. It took me - [pause] it took me about three, maybe four hours to get suited up, and, then I go in through security. Checkpoint. Checkpoint. Checkpoint. To get in there, and, then I'm in there for forty-five sec- and then coming out. Then it was, checkpoint, checkpoint, checkpoint, afterwards. Then, I had to go down and take a shower, and the security, the, ah, physics people would come in, and take a wiping. Wipe me with a little lard, and put it on a instrument to find if there was anything on me. I had a few places that was on, in my glove hands in here. So, then I had to scrub, and scrub, and scrub that, and I scrubbed it with type of a, like a lye soap, it was, oh, my gosh, it was rough on your hands, and made your - My wife goes, "What's happened to your hands?" Oh, I said, "I just had to scrub myself for them." Let it go at that. But, then, I had to have my finger pricked every day for ten days. Make sure that I – any that we had went down. Each one of us, most of us, I shouldn't say each one, most of us had what they call a bank account. The bank account consisted of your days, and the hours that you worked, all right? That was money in the bank, and if you had an exposure of such and such, they would subtract those days. So that we had a knowledge of how much you could work more. So, where as you had ten days, and you got exposed, and they subtracted for five days, well, the next five days you couldn't work in there, or work any place. There's again, there's security. I could go on in quite details on this securities business.

Kohler: Were there any problems with The Mound facility upon first moving in there? Were there things needed to, that were changed from the initial move in period?

DuFour: Yes, there were changes. There was many, there were changes made, but it was change for security purposes only for the person. More than anything else. And, there was security checks made for people - you don't go in there. You're not allowed to go in there. So, those changes came about from the operations itself, more than anything else. It was just that we have big swim, the swimming pool down there with the hot stuff in it for being cooled off of water. There were very, very few people allowed in that area. Very few people. It's not so much for the security of the material, as it is your own security, and that was changed out at a- you don't need to go in there.

Kohler: How were things like access established, you know, who had rights to go into certain places?

DuFour: That was established by, shall we say, the people who had, and were in charge of the lab itself. These were security people, and you had to have like a written permission to go to this foreman, or this supervisor, or this one, to go, "Yeah, we want him to go there," and the purpose would be written.

Kohler: What type of access did you have? Were there a lot of areas that were restricted to you, or?

DuFour: I'm either unlucky, or lucky, okay. I think I was fortunate, and the reason I say that, I think I was trusted. I could be trusted. I kept my mouth shut. To go at various labs to do certain work that they needed to have done. That would be all mechanical. That was it. So, but, there

was a lot of places that was off limits to me, too. But, I had a badge, and I had a badge with various colors on it where you could go into certain labs.

Kohler: And, kind of overall, what was the morale like in the different facilities, and the working environments?

DuFour: I never saw morale so high in any place in my life than it was there. The morale was high. The people were up. There was no force put on you to accomplish anything, or to do this, or that. It was known to be. In other words, you knew that job had to be done. That's what we were here for, and there's a reason for that. I didn't realize it, until I was out of the lab itself. Back into, shall we say, normal situations, all right? Every person in there had to have Q Clearance,[14] right? So, what are you getting in there is above normal people of life. They've never been into trouble. Had never caused any trouble. They were a trusting people, they had to be. So, you're getting a higher, I don't like to use the word, but it's true, you're getting a higher class of people. And, these people, their life is pretty stable, because they're not doing things that they don't need to be doing, or have been doing, or whatever you want to call it. These people are wonderful people. They're friendly people, because they have to be friendly in order to live the type of life that they were living. So, we had a marvelous camaraderie of everyone. Everyone. I never heard an argument. I never heard anybody cussing. I never heard, "Oh, he's [sounds]." Or, "This one's [sounds]." Oh, there was a little friction goes on a little bit. You can't help but have that, but it was never drawn out. It was never really done. And, I loved it. I loved to go into work. As I told you before, I think that my wife used to call me up and says, "When you gonna come home for supper?" Because I was so interested in what I was doing. It was fascinating. You're right on the edge of discovery all the time. And, it was just great.

Kohler: Was there an overall eagerness there for everyone to get into work? Where people, did they want to be there?

DuFour: I would say, yes. Yes. Yes. You see, you had these responsible, you responsible people to begin with, so they're there. There were very few that were late, very, very few. I don't know of anyone in our group was ever late. I don't know of anyone that was ever late. Never had a reason to be late. No. I knew that they'd take off for dentist appointments, or something like this, or there was sickness in the family, but as far as their work is concerned, no. I know that.

Kohler: Was there a certain amount of patriotism?

DuFour: It was all patriotism. It was all, we knew it. We knew we were working on something that would help us out for world purposes. We knew that. That was an inner feeling. There was no question about that. It was the same thing in making the fifty caliber machine guns when I did that. In that particular area, we knew, we knew we had to get those guns out, and we

[14] Q Clearance is Top Secret clearance that can only be granted by the Department of Energy, and is "based on an individual's need for access to the information and favorable adjudication" of a clearance request. U.S. Department of Commerce, "Manual of Security Policies and Procedures, Chapter 15: Special Access," http://www.wasc.noaa.gov/wrso/securitymanual/Section%20II%20-%20Chapter%2015.pdf (accessed June 20, 2006).

worked, and we worked hard to get those guns out. I remember working around the clock sometimes. Completely around the clock to help get those daggone guns out. I knew that. The patriotism in there was high; it was exceedingly high. And, the girls that stood there for hours and hours just putting the firing pin in there and turning it, and looking at how- twenty times its size to make sure it was rounded, so it would fired right. Just inspection.

Kohler: So, there was a feeling you were working on something bigger than yourself?

DuFour: Um-hm, yeah. There's no question about that.

Kohler: Were there times where you felt the pressure of the job?

DuFour: No, I never felt the pressure of the job. For the simple reason, you don't feel the pressure of it, because you don't know what the end is. You following that thinking? What you're looking at is a job. I was given an assignment, and I'll never forget it, number thirty-nine calorimeter. Eddie Jordan taught me all about calorimetry. It took a couple weeks just to teach me. There was no big rush. The details were very, very accurately. Questions were answered very, very accurately. And, I started in making it. Take your time and do a good job, but hurry up. [laughs]

Kohler: Let's stop here.

DuFour: Okay.

Kohler: I've got, maybe, just a few more things to go over.

DuFour: Okay.

Kohler: Just kind of the ways maybe that you relieved the stress, and -

DuFour: Relieving the stress. Well, that particular time there was nothing more for relieving the stress than just going out for dinner, if we could find a place to go to dinner. [laughs] But, actually home. Just go home and relax.

Kohler: Okay, we can talk about that, and I think that'll probably be it. That's the last thing I've got, so.

End Tape 1 (Video)

Begin Tape 2 (Video)

James A. Kohler: Just a few more questions. Were there ways to relieve the stress of the job? Did the workers do something as a group, or?

Howard DuFour: Oh, we had picnics, yeah.

Kohler: There were events sponsored by the company?

DuFour: More, or less, yes. Uh-huh, more, or less, there was things that were, that took place. More, or less, than anything was a families affair. Families would get together, and have things happening to them. And, it [pause] it, ah, the job absorbed your life, more than anything else, and you lived for it, and you done work for it. You knew you were doing something that was in a rush. You knew something was being done patriotically, like you say. But, the thing of it was, it was so new in its make-up that you become fascinated with it. It's like a beautiful woman, you know. And, you get, you want to know all about her. This was [laughing] the same thing with this. With the job itself. It was a challenge. A wonderful, wonderful challenge. I remember times that they had family picnics, and so forth. But, never anything was never mentioned. You didn't even talk about your job. You just, that was it, you never said your job. This is all family affair.

Kohler: You had mentioned earlier, photography being a hobby. Was that something you used to at least get away from work for a little while?

DuFour: Oh, yeah, I did that, too. Had my own dark room, and the camera. Film was kind of hard to get at times, but it was okay. I managed to get enough film to do what I wanted to. And, I had a new boy coming on, and that was very interesting, too. And, so, it [clears throat] the boy came on, well, he was fairly grown when I went to Monsanto, because he was born in ‘45, and I was working at Frigidaire at that time. But, within a couple years, why, I was back, of course, at Monsanto, and I had a good thing to have running around with me, and we did a lot of things together as a family. Those particular times, I think everybody was under the, shall we say, under the spotlight. And, they knew it. But, they went around carrying it very, very well. I think it brought families closer together with what we were doing, and I think it became more of a family affair for everyone, because we didn't know what's going to happen, and there was people knowing that their sons are not coming back, and so forth. So, there was a lot of family things in that nature. There's a difference sense that I would say now. Right now, here we are in 2006, we're looking at disasters, and stuff like this, all over the world. Floods, tornadoes, volcanoes, eruptions here, and earthquakes there, and so forth. If you notice the people, are more or less, are turning back to their families. They're doing the family thing, and they're getting closer and closer together. Even with all the stuff that's going on, but in that War Years, we, it was a closeness of family.

Kohler: Do you have a lot of close relationships with the people you worked with? Were they friends outside - ?

DuFour: Oh, yeah. Oh, my good gosh, yeah. I still have [pause] there's only two of us left. Only two. He's in bad shape right now. We just got through talking with him there last week. I've watched my people all go. Dr. Hyde, and Kathy. Oh, there's so many of them. I even talked to an old friend that taught me how to make a calorimeter. He's up in Maine, and he's eighty-four. His wife had to tell him how old he was, and here I am at ninety-one, and look at the

memory I've got. [tears up] You're working on me now. It's a, it's hard at times. It's very hard at times. Thinking about all those people that was dear to me have left. Dick Olt. We spent a whole summer together, up together, at the University of Chicago. We had a rough time of it there at first for about three, four weeks. I was cleared, and he wasn't cleared. [laughing] I couldn't talk about my job, but we got by. And, all those people out in Chicago, they're all gone. There are, [clears throat] like anything else, there's plus and minus in any situation. I think that, I think that if you could have interviewed anybody, anybody, I don't care who it was, anybody out of the lab down there, they would tell you it was the best job that they ever had in their life. We've talked about that. Jewett, Larry Jewett and I were buddies. We went, well, the fact of the matter is, we joined, we were working together at Frigidaire, and the strike was coming on, and I said, "Hey, I don't want to get into this." And, he said, "No, I don't either." I said, "Okay, let's go over to Monsanto." Both of us got hired by Monsanto at the same time. We were bench buddies from way back when. So, yeah, [pause] the boss is gone, Pittenger. The very man that hired me the first time. I had his brother working for me at Monsanto on Nicholas Road. He's gone. It's hard, it's hard looking back at times, I guess.

Kohler: What do you miss the most about the job?

DuFour: The excitement. The excitement of discovery. The newness. To know something that nobody else knows. I have patents to my name for that purpose. You have a feeling not of ecstasy, a feeling of knowledge that you cannot, you cannot describe. How you can feel the beauty of it all. Of the knowledge that you have been given. I do not, and I'll make a very hard statement on this thing, I do not believe that you have made anything when you have a patent on something. [clears throat] I believe that you've made a discovery that's already been here. The simple reason, very, very obvious, how did you come about it if it wasn't here in the first place? And, you've been privileged to find that discovery. So, you don't make anything. It's not something that you do. You just discover. And, to anybody that wants to put up a big stuff, they, look what I made, and so forth, when they have a patent. That's when my stomach gets sick, because they don't have that feeling, that wonderful feeling that you've made a discovery of what's already been made here. That's my thing about it.

Kohler: Well, that's all I have for today. Is there anything else you would like to add? Something that we didn't talk about that we should've?

DuFour: I don't think there's much that you can add to this, other than the fact we knew that we knew we were working on something that was important. Something that had to be done. I knew we were taking risk. Everybody knew we were taking risk. My sister-in-law, for instance, she took the responsibility on herself to study the lifespan of plutonium, and every day throughout the year, she took a little ball that had plutonium in it, stuck it into the calorimeter to check the heat. And, for one year, she checked the heat on that little ball, and found out the lifespan of plutonium was five hundred years. Half-life. Five hundred years half-life, five hundred years half-life, five hundred years half-life until it becomes lead. For what's thousands of years. And, she died from it. She died from, what's the- pneumonia. Not pneumonia, but [unintelligible] What's the blood - Can't even remember it now. But, she died a horrible death. But, others have been fortunate enough, myself included, to be hot, and still survive. There is now out a call to any and all who, ah, life has been hurt, or interrupted, or something by working

with this stuff, and there now is a insurance can be taken care of by that. So, it- yeah. This is the only outcome of what there has to be an outcome to anything that's going on. That's about the size of it.

Kohler: All right. Thank you very much.

DuFour: You're entirely welcome. It's been my pleasure.

Kohler: And, we'll see you next week.

DuFour: Okay.

End Tape 2 (Video)

End of Interview