

**Nevada Test Site Oral History Project**  
**University of Nevada, Las Vegas**

**Interview with**  
**Troy Wade**

**July 7, 2004**  
**Las Vegas, Nevada**

Interview Conducted By  
Mary Palevsky

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Produced by:

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## Interview with Troy Wade

July 7, 2004 in Las Vegas, NV

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[00:00:00] Begin Track 2, Disk 1.

**Troy Wade:** Well, my name is Troy Ernest Wade II, and I was born in Cripple Creek, Colorado—a little mining town up on the side of Pike’s Peak—on July 18, 1934. So I’m coming up on a major step here in my life [70<sup>th</sup> birthday]. I was named Troy E. Wade II because my mother didn’t want anybody to call me Junior. My dad’s name was Troy Wade, and so I was named Troy Wade II so I wouldn’t be called Junior. However, I did have an uncle who thought Troy Ernest Wade II was kind of a heavy name for a little kid to be blessed with, and so he called me Tim—Tiny Tim—and that name stuck with me. And so I can readily identify a phone call whose genesis was pre-1958 because they will call me Tim. If it’s after 1958, they call me Troy. So I have that way to identify phone messages and letters.

Anyway, I was born in this little mining town, very famous gold mining town. I have a younger sister and a younger brother, both alive and well. My sister lives in Denver and has for many, many years. And my brother lives in Pittsburgh, and flits around as a very successful investment banker.

My father was a man of many, many talents. When I was first born, he had everything from insurance agencies to mining investment interests in Cripple Creek. He later bought hardware stores in both Cripple Creek and Victor, which is a little town very close to it. And a well-educated man. I think very early on I learned from him the importance of knowledge and of managing it right.

My father's family all came from Missouri. My mother's family, also in the mining business, came from Virginia, to Texas, to Cripple Creek. And it was interesting that here's my mother, in this little mining town, who was a graduate of the University of Texas and also a graduate of the Juilliard School of Music. And so I grew up in a house full of music.

**Mary Palevsky:** *What kind of music?*

Piano. She played the piano. And my father worked his way through college, playing the C-melody saxophone in a little orchestra that he had.

*Where did he go to college?*

Colorado College in Colorado Springs.

*And what was your mother's maiden name?*

Hill. My mother was Grace Patricia Hill. And her father, Ben Hill, my granddad, was a very well-known mining engineer in Colorado, and elsewhere, for all that matter.

So I grew up at ten thousand feet altitude. Cripple Creek, like all mining camps, goes through cycles. And when I was born in 1934, things were good because gold mining is a depression business, and so Cripple Creek was doing well. Things begin to decline in the late thirties. And then when World War II started, the government in its wisdom passed a law. It was [00:05:00] War Production Board Order Number L-208, which declared precious metal mining as a nonessential industry. And it essentially shut down my town, shut down all of the mines and the mill. And that happened in many places in the United States. The justification was that the government wanted highly skilled miners mining things that were needed for the war, like copper and lead. So L-208 shut down Cripple Creek, and it never recovered from that. Never recovered.

My wife was also born in Cripple Creek. Childhood, high school sweetheart. Her father—an interesting sort of side bar—when this order came along and the mines were shut down in Cripple Creek, the government recruited a lot of men, including my father-in-law, to go to the island of Hawaii, where they spent two or three years mining out the inside of Red Hill—which is the big mountain that's right adjacent to Pearl Harbor—so that they could put all the petroleum stores needed to maintain the U.S. fleet underground, so that there would never be another Pearl Harbor kind of disaster. So that's the kind of things they wanted good hard rock miners to do, and that's what my father-in-law did.

*And his name was, or is?*

His name was Aaron Beltz.

*And so that's your wife's maiden name.*

That's my wife's maiden name, is Beltz.

*OK. And her name is Mary, isn't it?*

Mary, yes. My father and my father-in-law both died in the same year, 1979. My mother passed away in 1993. And Mary's mother just celebrated her ninety-ninth birthday in a nursing home in Arizona, but doing remarkably well.

So I grew up in a very depressed business environment. The mines were shut down. When mines are shut down, people don't buy things from hardware stores. And a lot of people were leaving. Flash forward to this time and you'll find some mining resuming in Cripple Creek. The ironic thing is that Cripple Creek is one of the three little Colorado mining towns where gambling is allowed. The Colorado legislature, many years ago, passed a bill that allowed what they call limited gaming in Cripple Creek, Black Hawk, and Central City. And so it did great

things for my home town but it didn't do much for me because I live in a gambling town and I hate to go back and visit a gambling town, so things have changed. Things have changed.

My family was always very knowledge-prone, education-prone. My mother was a schoolteacher, history teacher, and I look back and think of all the remarkable things that I learned and sort of things and ideas that stayed with me because of the environment that I grew up in.

*Like what would be something like that?*

Well, interest in history, for example, not just [as] something that you were required to take, but to understand history. And, for example, when we, many years later, moved to Washington, I knew a little bit more about history and the role that Washington, D.C. had played than most because of [00:10:00] my mother's insistence that we needed to understand the history of this country. Played well with me. Helped me a lot. And interesting, you know, I've been to Europe several times where history is centuries. In the United States, history is a few hundred years. And in Las Vegas it's ten years. If you don't like a hotel here, you just blow it down and build another one. That's the history of Las Vegas.

So let's see, I went to high school. I worked in the mines. I worked in my father's hardware store, and then when I got to age sixteen I worked in the mines, underground in the mines, which was legal in those days. It's not now. My dad didn't like it, but I didn't want to work in the hardware store just because kids don't like to work for their dads. So I worked in the mines in the summer, and he supported that. He, I think, was never terribly happy about it, but he supported it.

He got involved in uranium mining when uranium was discovered in what's called the Colorado Plateau. He got very involved in that, and he also was the genesis of my love for

railroads. When I was born in Cripple Creek, there was a railroad still operating. Long gone now, but I grew up in the era of steam engines. And my father, one time, when he was off in the western slope of Colorado looking at his uranium mining interests, came home and advised us that he'd bought a caboose. And sure enough, a few weeks later a narrow gauge caboose arrived and was set up in the back yard of our house in Cripple Creek. My dad turned it into kind of a little summer house, bar. And the thing that made it so unique was that this narrow gauge caboose had been used in the movie *Ticket to Tomahawk*. And so instead of being a Denver and Rio Grande Western caboose, which it was, it still had the movie paint on it and it said Tomahawk and Western, the Route of the Bloody Basin Cannonball. And that sat in our back yard, and it's now at the Colorado Railroad Museum in Golden. My dad gave it to the museum.

*So he invested in uranium mines, is that what you're saying?*

Yes.

*OK. How big of a community was Cripple Creek at that time, would you guess? This is something we can look up, but are we talking about a small city or really more of a town or—?*

Well, we're talking about probably maybe twenty-five thousand people when I was born. And when I graduated from high school, it was probably twenty-five hundred.

*So your high school class was small by this time, I would imagine.*

Yes, my high school class was thirteen. My wife's class the following year was very large; it was seventeen.

*Amazing. That small. And what about religious background? Was it a religious family or just churchgoing, as families were in those days, or—?*

I think churchgoing. We were Episcopalians, and my mother played the organ at the Episcopal church, as you would expect. Her mother, by the way, and my aunt played the piano in silent movies in Texas and in Colorado. So music kind of was what came in that side of the family.

Yes, we were Episcopalians. My father was a converted Southern Baptist. His mother, my grandmother, was a very devout Southern Baptist, true Southern Baptist. So yes, we were Episcopalians. My wife grew up going regularly to the Methodist church, so we've always been [00:15:00] not religious zealots, but we understand who controls destiny and that it isn't us.

Let's see, I then went on to the University of Colorado School of Mechanical Engineering. I ended up in Utah. Let's see, this would've been about 1957, in Utah, down in the Four Corners region, where Utah, Colorado, Arizona, and what is it, New Mexico, I guess, all come together. That's big uranium country, and I was down there in the Four Corners area in a uranium mine.

*This is after you finished school?*

Yes. And I got a call over the radio network that came into the mining company's radio network. Well, you know, there were no such things as—there certainly weren't cell phones. There weren't even phones in that part of the world. This message came in that asked me to call a particular man at a particular number in Las Vegas, Nevada as soon as I could get to a phone. So it was a few days before I got out to Blanding, Utah, where they actually did have phones. And I called this number in Las Vegas, Nevada, and it was a fellow who worked for Reynolds Electric[al and Engineering Company], who worked for REECo. He had been given my name by a friend of his who grew up in Cripple Creek, and they were recruiting people because nuclear testing was moving underground and they wanted mining people who were knowledgeable to come out and help them, and so I was offered a job in Las Vegas. I later met this fellow. His

name was John Elmgren and he was a senior official for REECo. I met him in Denver and we shook hands, and in April of 1958 I arrived in Las Vegas, Nevada and went to the Nevada Test Site for the very first time.

*Now, have you moved here or are you just seeing what the situation is, or you had agreed to come work here?*

I came to work here.

*Now, were your children born at this time?*

I had two small kids, and I left my wife and the two kids back in Cripple Creek, and I came out to Nevada to see what this was all like and what this job was going to be like. In April of 1958, and it's now July of 2004, and I'm still here.

*Amazing. So we hear lots of stories about how Las Vegas was so different then, but just what were your impressions? Did you fly in? Did you drive in?*

Drove.

*You drove. Of course, you drove in. So what did you see when—had you seen it before? Had you been to Las Vegas before?*

Never been to Las Vegas before. I'd read about it, seen about it in the movies and in the newsreels we used to have in the movies in those days, which was the best way to find out what was going on in the world. And so I had no idea what I was getting into, and I had no real vision of what Las Vegas was going to be like or what the Nevada Test Site was going to be like. When you come here for the first time, the centerpiece of Las Vegas in 1958 was Fremont Street. There were hotels on the Strip, but the place where everybody focused and all the glitz was on [00:20:00] Fremont Street. And so I went down there, like all newcomers do. Fortunately I learned very early that gambling—that you don't keep building hotels and casinos by paying

very many winners. And so even though I've lived here now forty-plus years, I have never—I gamble a little bit, but mostly when you have company and go to casinos—I never have gambled much because I learned quickly that that was not a way to make a living. Some of my friends, by the way, who came to the test site about the same time I did, did *not* learn that lesson, and paid dearly for it over the years. Las Vegas was about, I think, fifty thousand people when I moved here.

The end of June of 1958, I went back to Colorado and got Mary—took a bus back to Colorado—and got Mary and the two kids and everything we owned in a U-Haul trailer and headed for Las Vegas. End of June, first of July is kind of a shocker to someone who is coming from the mountains in Colorado, because it was very hot. Very hot. And we had rented a duplex in North Las Vegas that had the swamp cooler. And that's how we began life as citizens of Las Vegas.

*What was it like when you first went out to the test site? What did they have you doing and what was the situation out there?*

Well, I've learned since I went out there that the nuclear nations of the world, which at that time were the United States and Britain and the Soviet Union, were sort of mutually, without any agreement, moving towards another way of testing other than atmospheric testing, because worldwide fallout was becoming a big problem. I didn't know that at the time. I only knew that nuclear tests were going to be conducted in "underground caverns," quote unquote, and I was brought here, along with a whole bunch of other people, to begin to do that, to set up the procedures and the *modus operandi* for major mining operations on the test site. I'd looked at maps, of course, but the test site was a long way from Las Vegas. It's long today. It seemed like *days* when I went out there for the first time. And I spent, as I recall, a week or so going through

medical examinations and then a lot of training in what is radiation and the basics of what is a nuclear weapon—or atomic bombs, we called them all in those days—what are atomic bombs and why do we test them. And then I went to work. One of the tunnels in Area 12, called E Tunnel. Started E Tunnel. Portaled in E Tunnel.

*Interesting. So you're a REECo employee, and is there a job title in those days that you have, or what is—?*

I was mining superintendent of E Tunnel. And E Tunnel is in Area 12, where all the tunnels are—most of the tunnels. Most of the tunnels. And in those days, it was—well, I later learned, of course, that in 1958 President Eisenhower and General Secretary Khrushchev had agreed to a [00:25:00] moratorium on nuclear testing, to begin October 1, 1958. And so, quite unexpectedly and quite unplanned for, the United States—who in 1958 were testing in the Pacific—moved the test series back to the Nevada Test Site so they could complete a bunch of things before they went into this moratorium. It was called Hard Tack, Phase II. And so here I am up in the tunnels, and they would tell us, Get everybody out of the tunnel at five o'clock in the morning, or eleven o'clock in the morning, and face away from Yucca Flat. And so here we were just, you know, a few miles from nuclear tests. And then I later was down in Yucca Flat, close to a nuclear test. Those were all unplanned by anybody when I took the job to go to the test site. Suddenly, all of these mushroom clouds were showing up in Yucca Flat, and that too left a lasting impression on me.

*Yes, talk a little bit about that. You'd been told, in theory basically, what atomic weapons are and you'd been told—of course, you know about the bombing of Hiroshima and Nagasaki. So what's that like when you actually start seeing them in number out at the test site?*

Well—and let me add one more component to that—I had also grown up in the mining business, and so I knew a lot about explosives and I knew what explosives could do. And I knew enough about World War II to know about the numbers of millions of bombs that were dropped by both sides with explosives in it, and you saw all the pictures of the damage. But when you saw this new thing called an atomic bomb go off for the first time, and you felt the heat from it, and you saw the light from it, and then later you felt the shock wave from it, and you saw the destruction, whether it was a big depression in the ground or whether it was one in one of the little cities that was built, it was just remarkable to see. I think, like everybody else, I was impressed and awestruck about this thing. I didn't understand for several years exactly what I had watched and how it could be used, but I could look back now and say I think I was a better United States government executive and arms control negotiator because I had actually witnessed atmospheric nuclear tests and felt the effects and been in the radiation fields and understood what a dreadful weapon of war a nuclear weapon really is. So the fact that I was here in the very early days helped me a lot. You can assemble a room of notables these days and ask for a show of hands of people who have witnessed an atmospheric nuclear test, and there aren't very many. I was at a big meeting at SAC, Strategic Air Command—STRATCOM as it's now called—in Omaha last August, in a meeting whose details were classified. But here was a room full of, oh, probably a hundred experts in nuclear weapons matters from both the military [00:30:00] side and the government side, and some retired consultants such as myself, and when the question was asked of these ninety-plus people, when that question was asked, How many in this room have witnessed an atmospheric test?, there were three of us. So it left a lasting impression on me, one that has stayed with me all of this time.

*Let me just ask this question here. Obviously, people who have witnessed that have different views on how that is or different stories of how that's affected them. Some people have said, You can't really understand it unless you see the destruction around it. But you're saying that even the explosion itself, from what you understood of what explosions can do, was sufficient to give you a sense, in a very concrete way, of the kind of the destruction that it could cause.*

It sure did. It sure did. It's the visual and sensory effects of the thing itself. Made a lasting impression on me, and then I saw destructions of things like the towns that were built, and I really was able to see firsthand what kind of destruction they would cause. And another thing that's interesting is that later on in my life, as I began to really understand what deterrence is, I could really relate back to my early days at the test site. And you know we all worked in the nuclear weapons program because we believed that we had to arm ourselves in a way that we could defeat the Soviet Union, and that at some point in our lives there would come a point in time when we would be in a nuclear war. I certainly believed that in my early days at the test site. And I could look back, now that I understand deterrence a little better, and say I'm glad people changed from being advocates of the use of nuclear weapons as an instrument of war that you would use. And so you went from that to having the fact that you have them as a deterrent that you would never use, but the other side knew you had them. Quite a change in your view of the world, to make that transition from—

*No, I think it's a really important point you're making, and important for our understanding, because sometimes when you talk to people, they'll tell you from the outset, It was always deterrence. We had to have those weapons so that they wouldn't be used. Because the problem, of course, is that the weapons are so horrible, why would a person work on them? That's an outsider's sort of question that they have. But you're saying that you're*

*going there at the beginning and there is this sense, we have to be able to win that nuclear war, and then that shifts to a sense of the concept of deterrence. For you personally, that is.*

Well, for me personally, I watched from a distance the era of mutually assured destruction, which I look back now and say, That was nuts. That was a *crazy* point of view for both sides to have, you know. Mine's bigger than yours. I've got more than you've got. And I took some comfort in the fact that I didn't believe the United States of America would ever launch first, but I *did* believe that the Soviets probably *would*. If the Soviets thought they had an edge on us, they wouldn't hesitate, I believed, to begin a nuclear war. And so I kind of grew up in the early days of my time on the test site believing that we were preparing ourselves for that war. And then other people decided that this doctrine of mutually assured destruction was probably not the right thing to do. And thank God they did, because another thing that is remarkable when you look back and you know that in that era, both the United States and the Soviet Union had tens of thousands of nuclear weapons. That one never [00:35:00] went off for any reason, accidentally or on purpose or because of sabotage or because of—it's just remarkable to me that that never happened. And as Tom Reed [author of *At the Abyss: And Insider's History of the Cold War*, (New York: Ballantine, 2004)] pointed out when he was here, it is *absolutely* remarkable, looking back, that you had all of these thousands of nuclear weapons in the hands of a few people who were smart enough to recognize what would happen if a nuclear war started, and cooler heads always prevailed. And history has shown us that things like the Cuban crisis and things like Korea and some others, even the famous stories about NORAD in Colorado Springs thinking because they were looking at the Aurora Borealis and they thought it was a major launch, it's just absolutely remarkable. Thank God that none of them were ever used.

*At the time, when you first get there in '58, again, you're expressing a point of view about the weapons, and I'm imagining that the culture of the test site, pretty much everyone was agreed that we were in danger of being in a situation where the Russians launched a nuclear war. Is that right? I'm asking.*

Well, let me back one step back away from that. I think most of the people that went to the test site, other than the lab scientists, but the construction people that went to the test site, and the support people who went to the test site, went there because it was a job. And it turns out, a very good job. It paid well and you were compensated for the fact that it was so many miles away and all that. But it was just another job. And certainly I made the transition and I saw other people make the transition from saying, This really isn't just a job. We are doing something that is pretty important for this country. And initially it was because I thought we were going to end up in a nuclear war, we had to have more than they had so we could survive. But you've heard a lot of other people say this, and I believe very deeply that the vast majority of the tens of thousands of people who cycled through the Nevada Test Site are among the most patriotic souls that this country had, because you get caught up in this feeling that you are actually making a difference in whether this country's going to survive or not, and that's a pretty important thing.

*So I'm wondering, are you saying that in a sense, if you go just for a job and it becomes something different, in a sense are you saying that the work itself and the importance of the work itself contributes to your patriotism in a certain way, because you're right there in an important task?*

Well, it certainly did for me, but I have to be honest and say, you know, a lot of that is retrospective because—

*Well, let me just say that I think that's one of the nice things about doing this kind of conversation, is that we have the opportunity of your retrospection. We hope that someone who's lived as long as you have will then be retrospective in a meaningful way, so don't worry if it's a reflection. That sort of goes with the territory.*

I certainly didn't understand, for example, the 1963 treaty, the Limited Test Ban Treaty. People were talking and negotiations were going on when I came to work in 1958, which is why this country was beginning to look at how to do underground testing. Because the politicians of the day knew that we were going to get, at some point, to an agreement with the Soviet Union, **[00:40:00]** which we did in 1963. And the Limited Test Ban Treaty banned testing in the atmosphere and space and under water, which of course was a very good thing for the world. I came here because the country was getting ready to do that and there were people that knew we were heading for that treaty. I didn't understand that until much later, and I didn't understand all the ramifications of it. I heard competent nuclear scientists at the time saying that going underground would be a big mistake, that it would limit the *kinds* of measurements that could be made and the *understanding* of the phenomena. And of course just the reverse of that was true. It turned out to be a much more technically productive way to do business. But at the time I knew that we were going to test these things underground. I didn't know how many we had or how many *kinds* we had or how many we *needed* to have, but I clearly sensed from what we were doing that we were in a race with the Soviets. And I also saw a lot of other things going on at the test site, trying to understand the effects of a nuclear war, learning about radiation and learning about what it would do to the skin—the experiments with all of the pigs in Frenchman Flat, and the BREN Tower constructed specifically to look at, to be able to predict doses on Japanese kinds of housing, and the farm, which was established specifically to begin to understand how

radiation from the nuclear exchange would get into the food cycle—so you'd be able to understand that so you could protect your own people. And these were all pieces that, when you're just working in the tunnel in Area 12, you don't understand. But the more you were at the test site and the more—whether you were a miner or a carpenter or in the mess hall, everybody—you had to have a Q-clearance to work at the Nevada Test Site. What you knew was governed by the need-to-know principle, but everybody knew they were involved in something that was pretty important. And the longer you were there, the more you learned. And I think most people discovered that it was an important thing, and it was more than just a very good job. It was something that was good for the country.

*OK. Now, what are you actually physically doing on your job when you first get there? You're excavating tunnels? You're thinking about how this is going to be done? What—?*

Just excavating tunnels. Just excavating tunnels. And then along came this moratorium in the fall of 1958, and the agreement between the Soviet Union and the United States was that neither side would conduct a nuclear test. It was a bilateral agreement. It wasn't a treaty and it wasn't ratified in the sense that we ratify treaties, but it was an agreement between the two leaders. And the United States took it very seriously and took it for its word. And I won't remember these numbers correctly, but on September 30 in the tunnel department of the Reynolds Electric Company were like 2,800 people, and by January of 1959, that number was about fifty. So there were major reductions in workers at the test site, major—not reductions in the laboratories, but a lot of changes in the laboratories, shifting people to other research problems and research tasks.

**[00:45:00]** And I was one of the fortunate ones that stayed, because I had a clearance, to begin to do some reentry work in Area 12, to mine back into where a nuclear test had been conducted, to

understand better what happens when you test underground. And so we did that at a tunnel called B Tunnel.

*OK, so I think Rainier is the first underground test, right, in '57, I believe, so there had been other underground testing—*

There were other underground tests conducted in '58, while I was here. I don't remember the number, but there were several.

*All right. We can look that up. So you're going back to sort of see what the story is with those.*

Yes. Yes. And again, in retrospect, pretty scary because we were working in high radiation fields, and we were surrounded by lab people and safety people, but we were doing some risky things, personally risky things, to try and better understand the phenomena of underground testing.

*Such as? Give me some examples, if you can.*

Well, some of these reentries were where you were mining back in or in some cases just removing rubble and trying to get as close to the point where the nuclear device was tested as you could. And so radiation fields were very high and you could only be in there for very short times. And you had to wear all of this gear; it was kind of outer-spacey sort of stuff.

*Right. How are you getting back in there? With other kinds of explosions or machinery or—?*

All of the above. All of the above. Some mining, some just removing debris. Some tests in those days hadn't worked well, and so they hadn't created the famous cavity we all think about and sealed everything all off like they were supposed to. And there were some very positive things. I mean we were working in an environment where the tritium levels were very high, and so everybody—miners, laboratory people—at the end of the shift were given as much beer as they wanted to drink to flush the system, which to a bunch of miners was not a bad deal.

So I did that in '59. Limited number of people. There were like probably twenty or twenty-five of us. Not very many REECo people involved. And then one day, I got a call from my REECo boss in Mercury.

*And who was that, again? Was that the same—?*

At that time, it was a fellow named McGregor, Don McGregor. I believe it was Don McGregor. Called me at home in Las Vegas and said, Monday when you come to work here, go to Area 410. And I said, where's Area 410? I never heard of Area 410. Well, to make a long story short, I came out to the test site Monday and instead of going out to Area 12, I went into Mercury, and I ended up out in an area which is now identified as Area 27 on the Nevada Test Site. I'm walking over to this map. It's this area right here [pointing on map]. Area 12 is out here, and here's Mercury. And I went to work out there for supporting a Lawrence—what did we call it at the time? University of California Radiation Laboratory, UCRL—who [00:50:00] were doing some high explosive experiments and also some experiments of another nature in a very closely controlled, very closely held area. And there were REECo people there. There were miners and electricians and pipe fitters. And one of the *very*, very unique things about it was that the agreement between the laboratory and REECo and the labor unions was that there would only be one boss. And that boss, regardless of which union he came from, was in charge of all of the people. I was that boss, and I didn't know that. There were two shifts and I was one of those two bosses. And I didn't know until I got *out* there and found out that—here I was a miner—and electricians and carpenters and pipe fitters and operating engineers, I would be their boss. And that was kind of interesting because those other guys in the other crafts didn't like that idea. They didn't know me from Adam's off ox anyway. But it was a concept of operation that was entirely

different than had ever been done on the test site before, and I don't think it's ever been done since.

*You have to say that expression again. They didn't know you from Adam's—?*

Adam's off ox.

*Off ox. I've never heard that expression.*

I have no idea the derivation of that expression, but it came from Cripple Creek, Colorado and my mother and father.

*Because I've heard it as "didn't know me from Adam," but I've never heard of Adam's off ox.*

*That's great. OK, new one for me. And you're young. You're what, twenty-six years old, twenty-five, twenty-six years old at this point?*

Yes, about that.

*OK, so you're working on this project out there and what, you show up on the job and you find out you're running it, or he told you on the phone that you would be running it?*

No, I didn't know till I got out there. And the Livermore guys assembled all of this crew of people, and it was not a big crew. It was, you know, twenty people, maybe. And they said, This is a new thing we're starting out here, and we're going to be doing some laboratory kinds of experiments. Because of the nature of what we're doing, we have to keep the numbers of people involved very small. And so we have an agreement with all of the crafts that there will not be individual craft supervisors. There will be one person in charge, and in this case, it's Troy Wade, which was the first time I learned that.

*That's so interesting.*

Very interesting to me and very interesting to the other people there, too. But we made it work.

We made it work, and I spent the next two years there. And then along came a day in 1961 when

I was out in that area and a Livermore guy named Dale Nielsen grabbed my arm and we walked off and he said, We're back in business. The Soviets just abrogated the treaty. And that was when I first learned that the Soviets had indeed abrogated the treaty. And so then the United States had to reinvent their nuclear testing capability, which took some time. And another thing that history has shown is that the Soviets spent the entire period of that moratorium planning for a huge series of tests. They conducted fifty tests in the first eight months or something like that, which meant they'd spent the entire time—and we of course learned *from* that that sort of technically, they caught us. And [00:55:00] they certainly caught us off guard because we were not prepared to go back and do nuclear testing tomorrow like they were. And it was not *very* long after that that another Livermore guy came to see me. His name was Walt—I'll think of it in a minute. Anyway, another Livermore guy came to me and said, Hey, Troy, this laboratory's going to do some other things in this area. We're going to build a bunch of new high explosive facilities in Area 410, as we called it then, and this is where we will assemble all of the Livermore nuclear devices that we're going to test. How would you like to come to work for us, for the laboratory?

*For the laboratory itself.*

Yes.

*Just to back up a little bit, I'm assuming, then, from the time you go out to Area 410 till this moment, with the end of the moratorium in this moment, you're getting a whole other level of knowledge and things that you "need to know," about what's actually going on out there.*

Yes. A three or four step jump in knowledge and in—what's the word I'm searching for? The sorts of things I learned because of what we were involved in out there. And the other thing that was so different was that this was working side by side with lab guys, so I developed a very close

association with these lab guys, and it was, I think, a result of that association that they offered me a job.

*Right. And so we're talking about now engineers and physicists and all sorts of laboratory technicians of all levels.*

Yes. All levels. And so Livermore offered me a job, and it was actually a cut in pay to go from a craft REECo employee to a laboratory—to a technician. I was going in as a high explosives technician, but in sum, it was a pay cut. I don't remember now, but as a family we were ill-prepared to take a pay cut. Let's see. Two kids, and I think the third one on the way, perhaps. But it was clearly something that I thought I needed to do. And let me shift back to my mother and father's philosophy. You know, my dad was a great believer in loyalty, and he would do many revolutions in his grave to look at, in today's world, how many jobs people have. You go from this company to this company to this company to this company. In his view, you didn't do that. Whoever you worked for, you were just unequivocally loyal to those people in the company, and you didn't change. So here I was, moving from a construction environment into a laboratory environment which looked, over the long haul, to be a much safer environment to be in. And so I did. I went to work for Livermore in 1961.

*Safer career-wise or safety-wise or both?*

Career-wise. Career-wise, yes. Career-wise. And it turned out to be a good decision. A good decision.

*But you're working for Livermore at the test site, I'm assuming. You're not up at the lab.*

No, no, I was a Livermore—as testing resumed, Livermore established a big presence in Mercury, and I was part of that. I was part of that.

*So at this point, now you're involved in actual tests and what goes into at test, or—?*

[01:00:00] Well, I ended up—Livermore began building an enormous number of new facilities in Area 410 as the place where they would assemble all of the nuclear tests, all of the nuclear devices to be tested in Nevada. Now, an interesting side bar here is that, you know, you have the two laboratories. And Livermore, by way of their contract with the United States government, cannot do an experiment that involves high explosive and nuclear materials together in the state of California. They can't do that. So they could do a lot of high explosive testing in California, which they did and still do, but anything with nuclear material had to be done in Nevada. And the devices to be tested in Nevada or in the Pacific had to be assembled in Nevada. This contrasted with Los Alamos, where they didn't have that prohibition. They could do all sorts of the kinds of testing that Livermore did at the test site, Los Alamos did on the hill. And all of the devices that Los Alamos wanted to test, either in Nevada or in the Pacific, were assembled *at* Los Alamos and then transported here. So Livermore had to build these new facilities, and I got involved in the design and construction of the new high explosive facilities, Building 5310 being the star thing.

And let's see, by about 1963, it turned out I was in charge of all of the devices and the facilities at Livermore. And in the sixties, if you go look at the numbers, that was *really* the heart of the Cold War. This was mutually assured destruction doctrine time, and we were testing—I don't remember the numbers now, Mary—but you know I think one year they did sixty tests in Nevada. Well, you think about that and you think about the fact that it takes three or four years to go from concept to test, and it's just mind-boggling to think we were—so I was a very busy, very busy guy. And the reason I ascended, if that's the right word, to being the head of the place was because we were so busy. And instead of having Livermore people fly down here and be in charge of that facility, it was better to have a guy that lived in the Nevada in whom they had

some confidence, which they apparently had in me. Which meant that there was a period there of a year or so when I went to Livermore every Wednesday. I have a lot of miles between here and Livermore. Because we had a scheduling meeting every Wednesday, and so I'd fly to Oakland Tuesday night, go to a scheduling meeting on Wednesday morning, and fly right back to Nevada.

*Now, who was in charge of Livermore at this point?*

Another one of my heroes, John Foster. So I learned a lot about the internals of nuclear weapons, and I learned a *lot* about physics, some of which I still don't really understand. But I had the opportunity to work with just some remarkable, remarkable people. And again, in retrospect, the decade of the sixties was really great for me because here I was, a youngster, and I was working with some of the prominent people in the nuclear weapons program. And I didn't recognize at the time how prominent they were, but it was a great education for me. And in running the facilities out there, I had to deal with physicists, engineers, and REECo construction people, and it was [01:05:00] kind of fun orchestrating all of that, too.

*Yes. I was going to ask you, you also were still with the AEC [Atomic Energy Commission] at this point, is that right?*

Yes, yes.

*So you're also dealing with that bureaucracy to a certain degree, or was it more hands off in those days, with the lab?*

Well, I was at the level where I wasn't involved with the AEC at the time. Until in the mid-sixties, the AEC decided to—well, two changes were made. Number one, the test site had been a responsibility of the AEC office in Albuquerque, and there was a satellite office in Nevada, but that AEC office reported to Albuquerque and then back to Washington. And in the sixties the government decided that because the test site was going to be around for a long time, to establish

a full blown AEC operations office here in Nevada. It would have responsibility for the test site and other places like Amchitka and some of the things going on in the Pacific. And so as a sort of a mid-level laboratory employee, I was not directly involved with the AEC at all except at the times that AEC guys would *show* up out at our facilities to *inspect*, which we always found objectionable, just because you never liked inspectors, no matter *who* they are.

But as part of this transition from Albuquerque to Nevada, the AEC was rewriting all of its nuclear safety regulations. And this AEC office in Nevada had to establish its *own* complete set of nuclear safety regulations because they were now to stand on their own. And so I had been involved as the Livermore representative to these nuclear safety studies which one did for every nuclear test. There was a very stringent review—composed of people from Livermore in our case, but also there were lab people involved and some military people and some consultants—and you looked at every aspect of every proposed nuclear test to make sure it complied with the nuclear safety rules. And so I was aware of that. I participated in those. And then when the responsibility for the nuclear safety of the test program was transferred from Albuquerque to Nevada, Nevada had to write all of these new regulations. And so the laboratory sort of *loaned* me to the Nevada Operations Office of the Atomic Energy Commission to help write these new Nevada regulations for nuclear safety. And my boss in Livermore at the time was Walt Arnold, who ran the mechanical engineering department, and it was Walt who was the laboratory guy that had the responsibility for this nuclear explosive safety program. And so he loaned me to Nevada to help write their regulations.

And then one day, one of the AEC guys in Nevada said to me, *why don't you come to work for us?* And I thought about that, and I went back to my upbringing and what my dad would've said, and I thought about the fact that I was about to take another pay cut. So if you

looked at career progression, I wasn't doing very well. I was headed straight down. I'd gone [laughter] from REECo to the lab and now I was going to go to the Atomic Energy Commission. But I did. So in 1968, I switched from an employee of what I believe by then was the triple L, the Lawrence Livermore Laboratory. I don't believe it was LLNL; I think it was LLL. I went from LLL to the Atomic Energy Commission, Nevada Operations Office.

*OK. Let's stop there—*

**[01:10:03]** End of Track 2, Disk 1.

[End of interview]