

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

**Interview with**  
**Robert Campbell**

**March 9, 2004**  
**Los Alamos, New Mexico**

Interview Conducted By  
Mary Palevsky

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Produced by:

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

**Mary Palevsky:** *What I was thinking about when framing this question was, here I'm sitting with you in your house in 2004 and people say, Oh yes, you have to speak to Bob Campbell because he has all this great knowledge. And so back sometime long ago, I guess, starting at the end of the Second World War, whenever you arrived here, you were a person with a certain amount of experience who got involved in this whole nuclear testing area. And even to go back a little farther, it would be helpful to know where you were from and where you were during the war and then how you ended up here.*

**Robert Campbell:** Well, if I can do it quickly.

*Yes, just an overview, yes.*

I was born and raised in a small town in Ohio. Born in 1920. And ended up at Purdue University. Not a distinguished student. But in 1942 the draft board was after students and—one of those things and I ended up taking a job in August of 1942 at the Naval Ordnance Laboratory. And I was there for, I don't know, it must've been two or three days before they sent me down to a little field station in Solomons, Maryland. And I worked pretty much out of Solomons for quite a while after that. The game there was, well, mine detection. The Navy wasn't very well equipped. In fact they weren't equipped at all. At that time there was this big to-do to get mine detection work. The Germans were putting magnetic mines all over the damned East Coast, in our shipping lanes and that sort of crap, tankers coming up around Florida. And I got in pretty much on the tail end of that. That's where I met your father [Harry Palevsky]. He was an electrical

engineer doing electronics, the amplifiers. Don Hughes was in charge of that group but he worked out of Washington. We didn't see him too often. There weren't very many people, half-dozen or so. I know where two of them are today but the rest of them I don't know.

Anyway, there came a time that the law of the land was everybody under twenty-five puts on a suit [uniform], no matter what. No more occupational deferments for single men. So I put on a suit. By that time I had left Solomons and worked a couple of years in Nova Scotia. You evidence some surprise. Early on all the mines were laid from ships, surface vessels. And that wasn't going to catch it, you know, you can't mine Tokyo's harbor with surface vessels during the war. So

there's a big to-do about getting aircraft capable, things that were capable of launching from airplanes. And I'd have done the damned field work forever and ever, I guess ever since I got out of school. But the tail end of that program, somebody designs a mechanism and somebody builds it and somebody, you know, [asks], Here's the damned thing, does it work? The way you find out is you take it and drop it in the water and see what happens to it.

OK, for a while people tried to drop it in the water, if you will, and used divers to recover things. And that's pretty damned poor. You can't really—well, it's hard to tell from what a diver saw or didn't see, felt. You know it happens, sometimes you can't even find the case. But Nova Scotia, the upper end of the Bay of Fundy, they had tides like fifty feet. And so you could drop something at high water and drive out to it in low water. It was a wonderful thing. We could do more in a day up there than you could do in a week in Florida in a lake or Bermuda. [00:05:14]

*So no need for a diver then at all?*

No divers, no.

*Amazing.*

So I went up there and worked. That was before I put the suit on. Worked as a civilian there for, oh, year-and-a-half I guess, last half of the summer of 1943 and then 1944 in the summer. We didn't work during the wintertime. There were chunks of ice that were floating around that it made a messy thing. But then I ended up after that, when they said, put on a suit, they sent me back there as officer in charge of the damned place.

*Interesting.*

Yes, I got a full set of shots, a copy of Navy regs [regulations], and best wishes. I didn't finish that job—I wasn't released from active duty until the summer of 1946. The last job I had was to go back to Nova Scotia and close out that station and disband it. We turned it over to the Canadians.

*So were you up there at the end of the war?*

Yes.

*When the bombs were dropped?*

Yes. People disappeared from NOL [Naval Ordnance Laboratory].

*Right.*

I never knew where the hell they went. But after the bombs were dropped, if you will, then I started learning where some of these people were, you know, where had they gone? And actually they took the better people from NOL. Some very good people. And I went to work for NOL again when I was released from the military. And peacetime Navy, well it's kind of frustrating.

*Why?*

Well, the war is over and so now we have to play by the book. And the Navy had some books that are wonderful, just kind of frustrating. Having been accustomed to doing something and not being thwarted by a bunch of paper.

*Right. Going through all the procedures?*

Yes. So I made a mistake. After a year of that, as a permanent civil service employee and all those wonderful things, I decided that this AEC [U.S. Atomic Energy Commission] bunch, Los Alamos, was new and never in my lifetime could they get as hidebound and as bureaucratic as the Navy.

*Interesting.*

And I was talking to some of my friends who had come here and they said, Well, come on out. At that time the lab was in a pretty low point for getting people to come here, so they weren't too fussy.

*Oh, so you're being humble about—*

No, no, it's a matter of they needed bodies.

*OK. And this was—?*

I arrived here on the third day of July in 1947.

*In 1947. OK.*

And I've been mad about that ever since too.

*Why?*

Well, it was one of those things that—we came by train of course and the train was late and the bus that was supposed to meet the train had already left and so on and so forth—the taxi had left, and I got a bus from Lamy to Santa Fe. And there I was, a young kid with a sport coat, you know, and a tie and all this sort of stuff, a fishing rod, a briefcase, a couple bags, plunked down in July in the sun in Lamy. And you know, you get off an air conditioned train and you wonder, What the hell have I gotten into? This isn't helping you, is it?

*But it's interesting because you said—it's helping me, I like all these— human details that you don't get when you read a book a lot of times.*

You get on the damned bus and come up out of that little gulch that the tracks are in, towards, Lamy, look around. And this is my first trip west of the Mississippi. I didn't know what to expect. And all these tufts of bushes here and there, I thought, My God, this country has the mangle. And I got to 109 East Palace, Dorothy McKibbin, bless her. And she arranged for me to get on some sort of a local bus and get up the hill. And that thing—this is before the road from Pojoaque was paved. And it went through all sorts of little back places and put off a package here, pick up a package there, you know, and it was getting warmer and warmer and warmer. Finally got to Los Alamos and then—this is the part I've been mad about—it was about three o'clock in the afternoon, the third of July, tomorrow's a holiday, everybody's *pfft!* Out of here. And they gave me a key to a dorm room and says, *Come back Monday*. This was on a Thursday. I didn't get paid for the Fourth of July holiday. I've been mad ever since.

*They owe you that.*

Yes, they owe me a holiday. [00:11:36]

*They do. But now when you said a few minutes back—I sort of—I missed this beat. You said you made the mistake so you were saying the mistake was—*

The mistake was, what I found since was if there was something in the Navy regs that I didn't understand or didn't like or thought didn't make sense, you know, if you go back far enough in the Navy history there was a reason for it. But here you are in a completely new program, with no prior history, nothing to guide them, so they made up rules. And sometimes these didn't make sense. But it was wonderful because if you find that you can work your way through the

bureaucracy of the Navy Department and had that for a background, these people were pretty naïve. It was very easy to get along in this system.

*Yes, I know what you're saying.*

So the Navy was good training for me.

*So you were hired to come here sort of remotely. You sent—?*

I had never been here and never had an interview with these people.

*You just said, This is my background, and they said, Come?*

I sent to them an application. Today they'd be called a resume but it wasn't that formal. And they said, Fine, come. And I had no idea what I was getting into. Nor did they. But they needed bodies and some of my friends here recommended me and that was it.

*Now at that point when you're coming in that era, are dealing with having to get clearance before you show up here?*

Oh yes. But that wasn't all that big a deal. It didn't take that long. You had to have a clearance before you could come, but they initiated the clearance sight unseen, and I think it was only a couple of months or something like that from the time I said, Well, if you can clear me, I'll come.

*And then did you have a position or a title or what were you?*

Oh no, no, no, no, no.

*You just were a body coming to work?*

You were just a body coming to work. And I found out later the question was, OK, who gets the body? Which group? And there were two groups that were interested in me. And I don't know whether they flipped a coin or what the hell they did. That's their problem. I ended up working briefly for a man named Koski, Walt Koski. He was one of the legendary types around here too, as a group leader.

*OK.*

But within a month or two or three or whatever it was, he pulled out and went back to some university, and I ended up working for a chap named Willig, Frank Willig. And it was out at one of the test sites, one of the firing sites, our site.

*Where, down at Trinity or—?*

No, here.

*Oh, here. [00:15:18]*

Trinity was long over. Trinity was in 1945.

*Oh, I know. I'm just saying the site itself.*

No, no, no, it was on one of the—there are still a number of locations out in the southern and I guess the southwestern part of the lab's property where you can fire explosives or do whatever.

And this was one of those. The game at the place where I was at, our site, one of the games, the thing I was interested in doing, was trying to take two jets made by—putting an explosive cylinder around a pipe and it squeezes and makes a jet. And the question was what's the ionization in that jet? And so I was trying to make a jet go through a spectrometer.

*OK, and measure that way.*

And measure that. Didn't work, or I couldn't make it work. But we fiddled around with things like that at that site. It was Group M-6. It was changed to GMX-6 in a reorganization but didn't change the thing. But then there came another time. But there came a day that I was kind of fed up, bored, I don't know, with our site and playing with the explosives, and just before Greenhouse dear Edward [Teller], he always had some damned thing, some idea he threw away, you know, or threw out. People would go along behind him and pick these up, look at them, and see, Oh, this is what we want. Yes, we'll try this one. Well, one of the

ones that got tried, he asked the question: What is the inside of a fireball like? And so on the spur of the moment we, for Greenhouse, put together a small group, I think four or five people, young engineers, field types, and so on, to look at that. And we ended up making a gadget that would hold a piece of pipe and close the ends of it, wheel it in the fireball area, and try to just take a sample, a snatch, and see what was there.

*How do you do that? I mean that's a technical question and other things but how would you even be able to measure it when it just—?*

Well no, what you hope is that you can get a sample of whatever was there and hand it to the radiochemist and let them play with it.

*OK. All right. So somehow you have to get a piece of it out.*

That's right.

*OK.*

So we built some things, and it was fun. And basically it was a piece of pipe and we had to have a valve for each end of it to close it. And you don't get that by turning off like a water tap. So we went into the interior of ballistics and made some guns which fire a projectile across that thing. And you don't do it with round projectiles; you do it with flat ones. And you don't want them to bounce, you throw in a taper, you know, there are all sorts of things. So we developed little guns [00:20:18] to close the damned thing. And then came the business of, OK, we've got that. How do you hold it? How do you get it back? And it turns out that Baldwin Locomotives had works, you know, they made steam engines. They had quite a foundry and they could cast the machine things for us. So we designed just a brute strength cast steel housing that we put this bottle in, little old intake, if you will, a little funnel-like on one end and an open back, so the fireball is supposed to fill that bloody thing and we're were going to close it.

*Oh wow!*

Well, we built them, put them in place, they were fifty feet out from the bottom of the Greenhouse Easy tower. So they were well in the fireball. And after the damned shot we went up and took those castings apart, got the bottles out, took them to a lab down in the other end of the atoll. They had a copper liner in, took the liner out, gave them to the chemist to dissolve. They were clean. Didn't work.

*Amazing.*

Did not work at all. So we went through all that damned rigmarole, money, time, energy, whatnot, got the damned copper sunk, and I think what happened—

*That was my question.*

I think what happened is that there was no flow through there at all. The damned thing in that nozzle or intake just stagnated.

*Yes. Interesting. But you see it raises one of the questions that I sort of had generally about testing, or what you did, and you can tell me if this is a good question or not. Edward Teller says—I'm curious I guess from a scientific point of view and the way his mind was, I guess he would be curious about lots of stuff—so then the decision is made, This is a worthwhile thing for us to do. I guess it would be just a purely scientific point of view having nothing to do with—*

Nothing to do with bomb design, nothing to do with anything else.

*Thank you. Yes. So you're saying, how can we look at what?*

What's in the fireball. Actually some good came of this, but it was many, many, many years later. Many years later. The question floating around in the system somewhere came to the lab, where people were developing silos for missiles and they wanted doors that would open and

what not and so on and so forth. They asked the question, Have you ever had anything in a fireball that you recovered? So we could go back and show the drawings, photographs, what not, of these castings. They were bolted together. And we were able, because of the way the bolts were positioned—the nuts were down in the shadow—we were able to unscrew those damned things—they were big bolts—and get this apart. Well, this gave those people some idea of the amount of melting you got and what would survive in a fireball—well, in a fireball, period. So that experiment was some use. It was used again for people who were designing missile silos.

*Yes, for a completely different reason.*

Yes. But there's a wealth of information in it if you know where to look, you know about it. And a lot of field experiments in this laboratory—and Livermore too—had been very poor, even damned bad, about documenting failures or why things failed. [00:25:06]

*Interesting.*

You know, you're trying to do something and if it doesn't work you drop it and try something else, but you don't record what you did. And I've been in many, many meetings over the years and somebody would bring up, why don't we do so-and-so? and the voice in the back of the room says, Well, do you remember so-and-so? Been done. But no record of it. But that body of information is gone.

*Was it ever documented?*

No.

*Never.*

No, no. What I was saying is if it worked you used it. If it didn't work to hell with it. You'd drop it. We never stopped to document what we'd done.

*Right. See, that's another—*

That's a part of this laboratory, and part of Livermore, and they went the same path, they had the same pressures on them, that it's lost. It's just gone. A lot of that walked out the door—

*In people's heads.*

In people's heads, and if you're not sitting in the room to ask the question, Hey, how about old Tennis Shoe? Nobody ever knew there was an old Tennis Shoe or whatever the name was.

*Right, right. Now this raises a couple of interesting points. One is the whole notion of talking to people in the classified arena about those kinds of things, so at least you get it out of their brains and onto a piece of paper. That's one way that these things could be done.*

This generation that's in there today is several generations from what I was talking about, and they don't know who to ask. They don't know what to ask, and the people sitting back in my generation don't know what the problems are over there. It's a disconnect. There's been an effort for people to go back into things that there's some data for and try to put that data into a format that somebody can use but that is a tremendously uphill—

*Sure. Sure. But the institutional pressures—I'm guess, now, you tell me if I'm right—what were they that would cause that to be the case? You don't want to look at mistakes because they—*

No, no, no, no, no, not at all. The problem that was set for the laboratory when it was designed—to design a thing that would do so-and-so. And that's what you were focused on. You put all your energy into doing that and if you went down a path that didn't help you, get back on the track. And the pressure was to have something in the stockpile by such-and-such a date that would do so-and-so. And there was no pressure on you to document how you did it. Just do it.

[Pause] And it was a sort of a family-type business over there. You had all sorts of people who

did all sorts of things and his contribution was going to be—and he was responsible for that, somebody else did so-and-so and so-and-so, and you worked together and then met your stockpile commitments.

*Say that again.*

And met your stockpile commitments. And it was done, a lot of it, in a handshake business. You'd have a meeting for the various divisions, people from the various divisions, maybe once a week or something and I'd just say, Hey, I'm at this point, or I had this problem, but where are we? But those were not documented. To my knowledge. Oh, there were some minutes of the meetings in later years. But either a thing helped you and you used it, or you forgot it.

*Right. Moved on.*

Yes. And there was a fair amount of pressure to meet your commitments.

*Right. I mean it raises a question for me, and again correct me if I'm not getting this right. Go ahead, you were going to say something.*

No, I'm just going to caution you, this is my view of it.

*That is a given.*

Not necessarily of all.

*No, but that's a given in this kind of work. Absolutely.*

Yes.

*But I'm just wondering if—I guess in sort of the ideal purely scientific and experimental world you'd have the luxury of saying, this didn't work. What knowledge can we gather from why it didn't work? But here you're actually going toward applying this to actual product or—*

Yes, you're solving a problem.

*Right, and that's what you're doing.*

Yes.

*So you don't have the luxury of thinking about why your first guess or first attempt didn't work.*

No, if it didn't work you can't use it. You still have the problem.

*But interesting that this piece did somehow end up being useful all those years later.*

Oh, that was just— **[00:31:08]**

*By chance.*

Yes, it was strictly by chance. When they asked did anybody have anything, it just happened that I was around. In fact I'm the only guy left in the lab at the time. That was fairly recently. I'm the only guy left around town that would remember. And I could go to the photo lab and it works strange things. We had, forever I guess, a group around here who were responsible for the document photography. If you had such-and-such an experiment and you needed a picture of it, you called Norris Gardner [sp] and he'd send a guy out and take a picture. And these photographers kept notebooks and their notebook would say on such-and-such a date he did a job for Joe Schnook. They didn't always say what the job was. They did some sort of caption sheet that said something like "Joe's experiment". So if you want to go back into those records, you'd almost have to know who the photographer was that did that. I wanted a picture of one of the experiments and I had to know that—well, of course it was on Greenhouse and it was about, oh it must have been about January/February of 1951, and Roy Stone was the photographer. Roy Stone. So I can go to the photo lab thirty, forty years later and say, Hey, you got Stone's notebooks from—?

*Amazing.*

There were a number of attempts made by those photographers to go back to those notebooks and actually catalog, if you will, that stuff. But I don't believe there was ever anything near like a

successful—they would get a few of those photographers together and they'd start through from day one and the whole thing would grind to a halt and be out of funding or, you know. And then maybe ten years later somebody would try it again and there were fewer of them and I don't know that they could ever untangle that stuff. But there is, if you could untangle it, there is a wonderful collection of negatives over there.

*Yes, it sounds amazing.*

But they were all done in this wonderful family—it's like you have—I'll bet you, somewhere in your family you have a box of pictures that need captions and don't have them.

*That's it. Everybody's got that.*

Yes. Well, the laboratory has a big box of pictures.

*Yes, it's a big institutional family with their box of pictures. That's a great analogy. I mean it's not even an analogy, it's the same thing.*

Yes, that's it. That's it.

*That sounds incredible.*

Well, it's believable.

*Yes. It's totally believable, and you can see how it would happen.*

I don't know this, I don't know what they're doing now, but in today's world where you can dump things into a computer and sort it and so on and so forth, you don't have to live that way. But these were individuals with notebooks and pens, and it wasn't a quill pen or a stand-up desk but—

*No, but you know I know something of that world from my dad's work because I have these little notebooks, you know, those little academic spiral—not spiral but with the little marbly outsides of [00:35:14] his experiments in the 1950s, and they're handwritten and everybody's watching*

*the run in the different handwriting and printouts of the little graphs are pasted in and, you know—I'm from the era, having been born in 1949, that I remember when things weren't computerized for a whole long time until my adult life. But it's an artifact now, for God's sake, because you don't see it anymore.*

Well, it's awfully hard to sort.

*It's impossible to sort. You have to read it, right. Yes. Well, that's somebody's big project if they ever had enough money and time to do it.*

It's too late. Too many of those photographers are not living. It's just like so many other things. It's information that people carried around in their heads and they were walking encyclopedias, if you will. But they're not walking any longer.

*So that just becomes "stuff" that no one understands.*

Well, it's stuff that's no longer useful. If you don't know what it was, don't know that it ever existed, how the hell can you ask for it? How can you ever do it? You can't just say, dump all those negatives that you might have in my lap. It's a hell of a limbo.

*So the notebooks actually then contain the negatives?*

No, no, no.

*They refer to the negatives.*

If you use a picture in one of your reports—and we didn't write very many reports—it'll have a negative number on that picture. Which is still a long ways from Nevada.

*The road leads there. But so you were able to go over to the lab, what, photographic records, and find that photo.*

Yes. Oh yes. Because I knew the photographer, I knew the time, so on and so forth. But there is—well, the stations, there were two types. There was—we called it Station 123 and the 124.

Just arbitrary numbers. And I couldn't go to the lab over there today and say, Will you give me a copy of the pictures of Station 123 on Greenhouse? They'd just say, Ehh. But you have to say, Roy took the pictures about this time, and then they go find Roy's notebook somewhere and then we can go through them and say, Yes, let's look at this, and I'd get a number. OK?

*Yes. Yes, but see, this is useful because people don't, especially as time goes on and technology changes—*

Well, this is not the information you'd get from the more illustrious people who are out here.

*Right. But it's the way things—*

How did it work?

*That's what I'm saying: How did it really work?*

For me it worked that way.

*Yes. Yes. That's interesting. So that was Greenhouse.*

That was Greenhouse. At the end of Greenhouse we'd been put—that handful of engineering types—my background was optics and spectroscopy, not engineering. It's probably the only thing I've never worked in. But at the end of Greenhouse—or at Greenhouse, just for administrative purposes, we were assigned to a group. And it happened to be a group [where] the guy in charge—group leader—was a colonel, Bob Jarman. And he was in the Task Force One. He was the only military guy here in Los Alamos that was in charge of all the damned military experiments. And he kept books on the whole bloody military effort. And Greenhouse was a very large thing for effects measurements. Old Bob Jarman, he was supposed to keep track of that.

*Right, OK. Bob Jarman, OK.*

Well, this small group of people was put in under Bob Jarman's wing just because it was a place to put it. We didn't fit, had no business there, it was just administratively a time sheet to sign.

*Is he Army then or—?*

Yes. [00:41:53] Yes, Army colonel. And that was during Greenhouse, and we got paid that way. It was convenient. At the end of Greenhouse they decided that they'd keep that group of people together. They were a bunch of mechanical engineers. And I guess I should back up and say there was, in 1948, a division formed here, J-Division.

*Right. I read about that.*

And before that, Crossroads, Sandstone, when the lab had a part to play in a testing operation they'd pull a bunch of people in from that into a group and they'd do the job and then at the end of the operation they'd go back to their own departments. But this seesaw in and out got to the place that it was kind of obvious that this was going to go on for a while, we're going to do a lot of testing, it's going to be a continuous thing. And so in 1948 they formed a division to do this. OK? Probably one of the most influential people in starting that was Darol Froman. And he may have been the first division leader, I'm not sure. I asked Norris [Bradbury] about that and he wasn't sure. But Al Graves was the first guy that really put some character and put his imprint on that group of people, made a division out of it. So we end up—out of Bob Jarman's group—ended up as a group of engineers to do odd jobs, mechanical engineering jobs in J-Division. And I stayed with that group for about two months. And then one of the tasks that had to be done was—the way J-Division related to the rest of the testing world, AEC of course was in charge. Very much. And if some experimental type needed a blockhouse to record some damned thing on some damned shot, he had to have somebody he could wave his arms to—hands—who could

go then to the AEC, and with their authorization of course, talk to their construction contractor or their architect engineer, get the appropriate drawings made, come back with their

[00:45:26] knowledge, get them approved or something, get it built and all that sort of crap.

They're called facilities business. And I ended up untangling that thing in the fall of 1951.

*And so in what sense you do mean "untangling"? That the procedure was just too convoluted or—?*

Well no, we had to learn how to use the procedure.

*OK. This would be—?*

Had to learn—it was a business of inventing a way of getting the damned thing done, using the lab, AEC, and most of the time Holmes and Narver.

*Yes.*

While we were overseas with Greenhouse—that was over in Enewetak—the big deal came up; they needed to test a primary. There was no sense in taking it out to Greenhouse and using it if it wouldn't work. So they threw together Ranger just real quick. And the guy that did that was mostly Jack Clark. He didn't do the experiments but he got the experimental people and the engineering people and the this-and-that. So we're played like a—you don't have to do any acts in this circus but you need a ringmaster knowing when this comes on, when that—and how the show goes. And that's called a test director.

*OK. The ringmaster is the test director.*

Yes. He doesn't have to do anything, nothing at all.

*Just make sure that everyone else does what they are supposed to do.*

Everyone else knows what's expected of them. He didn't have to do it.

*OK, but without him would it have gotten done?*

I don't think it would've happened.

*OK, just checking.*

But I'm prejudiced. Jack Clark was the ringmaster for Ranger and all the rest of them. He had started in the facilities business for Greenhouse. He got pulled out and put in as a ringmaster for Ranger. OK?

*OK. So "facilities business," he's with Los Alamos but he's doing that kind of work and—*  
Yes, in J-Division.

*OK. All right.*

But when they pulled him out of that they put another person in the facilities business who didn't fit very well. Didn't fit very well. And so in the fall of 1951—this is a few months after Greenhouse and a few months after the group was formed—I got pulled out of that group to do the facilities thing. And I did that until 1957, I think it was. Five years, 1957, 1958. And then they needed somebody, an apprentice test director, and they pulled me out of the facilities business and I became an apprentice to Bill Ogle. And that messed around for a year, year-and-a-half—about a year. And then there was a test moratorium. What do you know? Well, just before I went to work for Bill, in the facilities business we were doing a test area over at Jackass Flats for the Rover program. So I did the early construction crap for that. Went to work for Bill. Came the moratorium, I get sent back over the mountain. Now I'm the test director for Rover and the first Kiwi-A. Kiwi-A was the first reactor. [00:50:37] This is supposed to be the story of the test site, not of my life.

*Well no, but you're doing perfectly right what I want you [to do]. You're telling me just the kinds of things I want to know. And I'll ask you some questions about the test site in a minute.*

The Kiwi-A, first—I don't know whether you're familiar with that or not.

*Yes, the Rover, the reactor that's going to go in the—*

Yes, space propulsion thing.

*Correct. Yes.*

That reactor was actually operated a year later. I guess it was 1959?

*I don't know the year.*

Something like July, right?

*We can verify that.*

Well, the moratorium started in October of 1958 and I think Rover was the next July. At the end of that we had some local testing problems and eventually the bell rang and we were all sent back to the test site after the moratorium. The moratorium was over. We were told—well, I left here on Labor Day. That would be what? 1961? The moratorium lasted two or three years.

*I think it was—was it 1961 when the Soviets tested again?*

Yes, I think so. We were turned loose the last week or so of August. We knew this might happen. But I spent Labor Day that year driving from here to the test site. And the game was to get back in business. We were ready to fire on the fourteenth of September. Two weeks. We were not allowed to do it. For some reason—I never knew why—the honor of the first shot after the moratorium was awarded to Livermore. And there we sat ready and had to wait for them to get there.

*Interesting. And so what was the name of that shot or that series, do you remember? We can look.*

Well, you have it there in "209." Well, to be honest with you—

[Looking through publication: DOE/NV—209-Rev 15 December 2000]

*I'm just curious to see what the Livermore—*

Oh, I don't know what Livermore's look like.

*This is Labor Day. Yes, I see Operation Nougat.*

Nougat, yes.

*Nine-fifteen-nineteen sixty-one is Livermore and then you guys have something called Shrew.*

That's right. We had Shrew ready to go before they had—

*Right. But they got to shoot Antler.*

They got the honors, so—

*Right, and it's the same—OK, so can I go back for a second and ask you a couple of things?*

Sure. Sure.

*Basically what you've done with that time line is we've gone from your being in the Pacific and then really what was I guess the real creation and buildup of Nevada Test Site itself. Right?*

*When you start after Ranger, then September—*

No, it was Ranger and there was Buster-Jangle and I think there was—Buster-Jangle, I came into that group, you know, the facilities group during Buster-Jangle, that was already in the field. It [00:55:00] was too late to effect the—the stations were either built or they weren't. The cables were in or they weren't, on Buster-Jangle. So I think it was—I'm not sure, I think it may have been Teapot that's the next operation in Nevada.

*OK. Now would you be—these are such basic questions—*

Then of course before that we were back in the Pacific for Ivy, the Mike shot.

*But when you start working in Nevada—I mean when you go to the Pacific you're there for long periods of time and your wife and your family, they stay here, is that right?*

Yes. Same thing in Nevada.

*That was my question. The same—*

Grace will tell you that.

*Yes. So you would take off for—*

**Grace Campbell:** Timbuktu.

*Timbuktu.*

**Robert Campbell:** No, you'd go to the test site and—well, going to the test site was a hell of a lot better than going to Enewetak, as far as family was concerned. Because at Enewetak you did not have telephones and you were a pretty serious airplane ride on military air transport to get back in case you had to. If you had to come back for some reason, God forbid, it took you days to get here. In Nevada we had telephones. You could solve some problems that way. Or you could always get in a car and within about twelve hours or so, if you were heavy-footed, you know if there's a crisis you can get home.

*Right. Now were you involved at all peripherally or directly with this whole question of the establishment of the continental test site?*

No. That was Jack Clark did that one.

*And so you all are just doing your work here, not—*

That was done before I came. I was in Enewetak when that happened.

*OK. So you're just feeling the effects of it because you get not to go to the Pacific anymore. You get to go do your work in Nevada.*

Well, what actually happened, it's about that time—well, I did Ivy in the Pacific and it was a long go. And it took then about a year, year-and-a-half to get something in facilities designed and built and so on and so forth. And I was out for quite a while with Ivy and then they got some help. It was something like a—Ivy was a two-man group really. Well, it was only one shot. But then they got a guy by the name of Newman, Bob Newman, to help. And we had a division of labors really. I kept doing the Pacific thing and he took most of the Nevada load. In fact he took

all of it for that group. And it went on that way until after Redwing. And I got pulled out of the group. Newman took it over. And I started an apprenticeship to Bill Ogle.

*Yes. So when you're in Nevada you stay out there at Mercury and do that whole thing and—*

Yes. I had a hard time—I still don't understand, thousands of people did it but I don't understand how they did it. To spend a couple hours getting to the test site, putting it out, full day, a little more, and a couple hours getting home at night. That commuting, that permanent business in Vegas, that was awfully difficult, and people did it year after year after year after year.

*I was talking to someone a couple of weeks ago about that, getting the bus in Henderson and—*

Yes. Well yes, Henderson. But before there was a bus people were carpooling, and that's before that road out there was anything more than a two-lane track. That was a real widow-maker. How they did that I don't know.

*Yes, because we just drove on this nice highway just to see the place and spent the whole day. I mean the scale is just—and the distances are just not—*

Once you get to Mercury you're still not there. We had people putting in an eight-hour work day up on Pahute Mesa, and living in Las Vegas.

*Wow. Amazing.*

The other thing I think I don't understand is physically how the construction people in the summertime out there can work in that—and there was always a couple weeks in the summertime that the temperature would be over a hundred-fifteen every day. But they'd get out there and physically put in a day laboring. How you do that I don't know.

*Yes, I don't either.*

But there were a lot of people that could do it. Did it. Made it possible for us to do other things.

Let's go way back in this story.

*OK.*

When I first came here I think the situation then was AEC had been formed in 1946. They weren't very old and there was a guy in charge in the Santa Fe operations office, which was the whole schmear here, Carroll Tyler. And apparently his idea, or his instructions, were that he was to support the laboratory. Not *manage* it but to *support* it. And Carroll was replaced a few years later—let's see, he was still around for Ivy, I think—by a chap named Leehey, Donald J. Leehey. **[01:01:54]** His instructions were to get the control of this operation. We enjoyed the initial relationship, being supported and so on and so forth. And it's never been the same since. But Leahy's instructions were quite different from Carroll Tyler's.

But all sorts of things were happening about that time. One of the big things, far as I can tell, until then AEC had a weapons program and they did biology and medicine, sort of made that possible to major military applications or classification or whatever, made that weapons program possible. There was no competing for their services. There would not have been any of these things if there hadn't been a weapons program.

*All right. These things are made to support it, is what you're saying.*

Or derive their funding. Well, the weapon program justified the whole damned effort, and you wouldn't have needed the biology and medicine people if you didn't have some program to do it.

*So use of the biology and medicine people because of radiation effects?*

Yes.

*OK.*

But where this changed was about 1954, I think it was. You can check it. They formed their reactor division, AEC. Division of Reactor Development. Now there are two pots of money. Two reasons for being. They can be played against each other. And I think that's where the

whole business, the way you did business, from my point of view at least in a way worth staking you out from where—from here things change, they're different, there's another technical division.

*So you're competing with them for funds.*

Funds or for—well no, there really wasn't a competition for funds because anything Norris [Bradbury] asked for he got. That's the reason. He was a person of some honor and they trusted him. But then you have to learn what the commission [AEC] was then. The commissioners in that early part were people with some technical background and some background in the weapons problem. That changed. [Pause] OK, where were we?

*OK, so just let's finish that thought. So that changed and they become what, bureaucrats and lawmakers and—not technical people anymore in later years.*

Well, there was a drift in that—they became managers. Ringmasters. This is reflected today at the foundation in Nevada, your little museum.

*Not my little museum.*

Their little museum. The thing I'm getting back on that is that that's a wonderful monument to the DOE.

*It is.*

But the laboratories have no real part in it.

*That's a very interesting perspective when I think about it. Well, and you know we can talk about that later. It's not really on this, but when you look at how that thing is set up then that makes perfect sense.*

Yes. We get requests, if you have any little artifacts you would like to put out for display, and so on and so forth. But it really doesn't fit what I think the mission of that place is.

*Just say a little more. It doesn't fit because?* [01:06:31]

Well, what they're doing is documenting and AEC, , ERDA, now DOE, what they see as their role in the program, and they have very little acknowledgement that the reason there was a damned program was because these other people down here had a problem they were solving.

*I'm interested in that because when I go and look at it and think about points of view—*

I haven't seen it.

*I have some questions from sort of other points of view. It's interesting for me just to put on that lens for a second and say yes, I think that that's correct.*

What's interesting to me is some of the people who initially were [saying]. Hey, let's do this, let's help, laboratory-type people, by and large have lost interest except for a few people who are politically correct.

*I don't know. That was something I sort of walked into and when I walked into it—it's not relevant for you, we can talk about another time—I looked at it and saw what I saw as “point-of-view” issues.*

*Let's do this because there's ten minutes left on this. I'm going to just stop this one [CD].*

[01:08:14] End Track 2, Disk 1.

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

My wife has an Alzheimer's problem.

OK.

So I need to take care of some things with her about 1:00.

*OK, we'll end before then. And then maybe if I have any follow-up or anything I can call you or whatever.*

All right. Whatever. I would try to be cooperative.

Well, we got up to the point that I apprenticed to Bill [Ogle] and then he got involved in Dominic or I don't know. I ended up being the ringmaster for twenty-five years.

*Yes, that's what I understood. And so just to understand what that actually meant on the ground—*

What it means is learning what it is the lab is trying to do, you know, when they would like to do it, and then making sure that everybody gets on stage at the right time, gets off at the right time, or gets the papers signed at the right time. But the DOE thinks they're running the damned show and, you know, it's just a support thing. It's just pure support.

*Are you still inputting technical pieces at this point?*

Well, you surely have to be aware of it.

*Yes I know but as far as designing or—*

No, no, you don't do that. No. But you know who the damned designer is and what his responsibilities are, or who's going to be responsible for RADSAFE or for the alpha measurement or for this or that. You don't have to do any of the *acts*. But you have to know how the show gets together to come out a shot at such-and-such a time.

*OK, so moving from being in such a hands-on place to this kind of position, did you find that—and I know that it was a gradual thing—did you find it gratifying? Did you miss doing the other stuff? Did it—?*

Not at all.

*You didn't.*

The best job I ever had was the first job in J-Division, first real job, and that was the facilities job for Ivy. I was new, had a lot to learn, one shot, very simple operation. I really enjoyed that one. You focus on one thing. And as you go down the path later after that and you have several shots going on at the same operation or—it's a juggling act. To juggle the effort that you have, the construction effort or experimental effort or whatever. It's just a juggling act to keep all the balls in the air.

*So I have two general questions that spring from that. One is that—a question I was reading about yesterday. John Hopkins gave me an allowable version of the first chapter of his book.*

Oh, that would be interesting.

*Yes, I think it's very interesting.*

I'd be more interested in seeing the last chapter of it. I don't think he's ever going to get there.

*OK. One of the points he makes is about Norris Bradbury and this idea of the lab, Los Alamos, really needing to be involved in the design of the weapons and the way the weapons work. And the military's purview really being things like OK, let's call it a device when you guys are working on it, the weapons kinds of things, the effects, et cetera, really belong under the military purview. I haven't gotten far enough along in the story yet. Did that sort of model continue as you were going along?*

Oh yes.

*It did. OK.*

I believe it did.

*All right. So the military's out there at the test site—*

Effects tests.

*—doing the effects tests.*

We sometimes called them “colonels versus distance.”

*OK, so tell me what that is.*

Very early on, very early, the effects business was as simple as putting a bunch of Jeeps out at various distances and seeing how far they would roll. Or a bunch of pigs with uniforms on, the effects of skin burn in pigs and so on. But everything that these people did was as a function of distance, some flux there or there, or—Well, how far did the Jeep roll if it was parked here? How far did it roll if parked there? Colonels versus distance.

*OK, so I still don't get it. So colonels refers—*

**[00:05:48]**

Military.

*—refers to the military versus distance. OK, how far the thing rolls. OK. But you—*

But to us it wasn't a very important thing.

*OK, so you're saying that was sort of what was being done there.*

But that was their interest. I mean we weren't interested in how far the damned Jeep rolled. But the military sure as hell was! And it was very serious to them but we were not properly respectful.

*OK. So this sort of brings up the other—*

But that division—division of interest, division of responsibility, exists today. As a laboratory we're interested in how the damned bomb works—device works. And that's it. Not what it does, not what the effects are or someplace. But did our design, the thing we're responsible for, did it work? Not what effect would it produce over air a mile away or—that's not useful to our designing the damned device.

*OK. So someone is saying to you—but I'm assuming—well I don't know, I have to understand this better. Someone is giving a directive to the lab that says, We need a weapon that does—we need something with this output. And that will fit into some sort of—a deliverable package.*

Actually the design of the deliverable package, the packaging of the damned thing, is a Sandia problem. But the device itself is a Los Alamos problem. But that's what the laboratory does for a living, or did for a living. God knows what they do now. But they had that device. And it's packaged ultimately by Sandia and given to the military. We don't do things like, oh, well we don't do any of the airdrops, we don't do any of the ballistics stuff. We have to have a package the right size, weight, whatnot, for those folks to do what they want with it.

*OK, so you're out at the test site making sure that the test goes off as you designed it to go off, and then you're looking at your results and you're saying—*

No, what you do is you record a bunch of data out there, all sorts of crap, and you bring that back to the lab and go over it with the—well, to do a test you have to know what sort of information the designer needs. What does he need to plug into his computers? We try to measure that information in the field and bring it back to the designer and they input it and correct things and take the next step. It's just business of recording data out there and bringing it back here in a form that—putting it in a form that the designer can use. That's pretty simple.

*Well yes, it sounds simple but in theory—*

But that's it. That is it.

*So you're talking then to the weapons designers—*

And let's say—it doesn't exist any longer but let's say—let me continue to use the J-Division, which was an organization that knew field tests. And the designer wants to know about something and we have people working design and experiment—experimental physicist-type—

to measure that and bring that information back to the designer who can plug it in and go in and get it. I may be missing the point here.

*No, no, you've got the point. I thought of another question. You've explained it perfectly. So I guess one of the questions that's raised sort of goes back to questions that came up even about the atomic bomb, which is you've got the scientists and you're doing this work and you're doing this job, and how are you thinking yourself personally about what the political situation, the Cold War, how this fits, does that come into your mind at all when you're doing this work?*

**[00:11:13]**

I think a lot of people might claim that they have that sort of a vision ahead. I don't believe it.

*Why?*

I think you are so wrapped up in getting your piece of this puzzle in that you don't give a damn really, you don't spend much time thinking of all the other pieces in that puzzle. You try to fit yours, try to discharge your responsibility. I think that's where your effort is, not some big picture thing.

*OK. That makes sense.*

I think a lot of people who claim they were looking at that big picture are deluding themselves.

But I don't know.

*Yes. You can just say for yourself that that was—*

I should say that I had enough on my plate to take care of the things I was responsible for.

*Right. Right. And then—*

You have to trust everybody else that discharges their responsibility, and do yours.

*Right. And then part of your job was making sure that they did do theirs right and you had management stuff to do.*

Yes. You have a commitment to put something into a stockpile. That was the end point for the lab, to have a design that would meet some military requirement.

*And the other sort of question that's out there that I'd like to hear what your thoughts are or were was the safety issue. I think you alluded to it a little while back.*

Could have but the safety thing, as far as I am concerned or was concerned, was a very basic rule. Well, it says you can delegate authority; you cannot delegate responsibility. And as far as I'm concerned that's the whole safety program. You are responsible for the people below you. There's no way you can duck that. And you are responsible *to* the person you're working for, for the safety of your people. I'm afraid that in today's world there's a tendency to want to delegate responsibility. I'm sorry, that's not acceptable. You can delegate authority but not responsibility. The lab had, I think, a pretty damned good safety program and it was based that way and there were some people, notably the guy that was the safety director, Roy Ryder, who were pretty damned wise people and if you had a problem you could go to Roy and say, *Hey, I want to do so-and-so*, and he would help you find the safest way to do it. But you always felt responsible for the people you were working with and were working for you. I'm afraid there's a—we didn't have protocol, we didn't have procedures, didn't have so on. I don't think you can write safety things. We got along very well for a very long time with a thing called the *Ordnance Safety Manual*. That's a manual that the military put together over many, many years of, oh, safety rules for things barricaded this way, if they're barricaded that way, the function of distance, and so on and so forth. A lot of that was fed in here, into the lab, through the military and it was a pretty good guide. But there were no written papers. Got along fine without them.

**[00:16:30]**

*Well it sounds like you're saying it almost a—*

It's a personal thing.

*It's a personal thing and it's a value thing that you had.*

That's right.

*If you hold those values you'll behave in a certain way toward the people that are working for you.*

Or you will expect them to behave in a certain fashion.

*Right. Right.*

You know, if Ron doesn't want to wear a hard hat, Ron can get the hell out of here. And that's oversimplifying. But I don't find people taking that personal responsibility today. And that was the heart of the safety in the lab. And it was very good. The results were good. We did that. We were in a very strange business where there were a lot of strange chemicals and explosives and this and that and some other bloody thing. We didn't really damage too many people. Nothing like the construction industry does or—we paid attention. Well, I don't know what else to say.

*OK, I thought you were going to say something else.*

No.

*OK, and then the other question—and then I can wrap it up. I know you've got things to do. The other broad question that people have when they think about the test site and the testing is the safety of having had a continental test site, you know, to the people in the surrounding areas and the whole downwind phenomenon and then the atomic veterans as well. So I wonder what your views on that are.*

Well, I believe—and I really sincerely believe—that the people who are doing the testing, people in charge of it, were very sincere and did everything that they could possibly think of for the safety of their folks *and* the safety of the people off-site. A lot of things they didn't know and

some of those things bit them, but as individuals I think they were very sincerely trying to prevent any damage to anybody. There used to be a thing, oh a long time ago, before each operation, some of the senior people in Nevada, the lab people and AEC people and the Public Health Service—there were other bureaus and whatnot—would do a dog-and-pony show and they would go around to community after community after community, all around the test site and try to explain to those people what we were doing and, well, try to educate them a bit. Some of the folks were pretty hostile. Some of them were damned hostile. And it's interesting that some of the most hostile ones were eventually won over and really became supporters. There was a guy—I don't know whether you know Chuck Costa or not.

*I've heard of him. I haven't met him yet.*

Chuck was a Public Health Service officer and he came to this business kind of late, but he did more as an individual in educating the ranchers and getting their acceptance. Of course he was single at the time and everybody had a daughter. But Chuck, he's a very skilled person. In that Prince William Sound thing and the Exxon Valdez accident. Who was EPA? Chuck Costa, in quieting that down. He's very skilled. I think he may be working at the lab now, I'm not sure.

*Here?*

Here and at the test site. He was an officer in Public Health Service, then he went into EPA.

And at one time he was working for the lab and was back here helping to decommission one of the reactors. He's just a level-headed kid. Not a kid anymore.

*I guess he can always be a kid to you.*

Well yes, and he pulled a hitch as test director out there after the weapons testing. I don't know whether he's still there or not.

*Yes, I know the name and I've heard people refer to him. [00:22:11]*

He's a very skilled and pleasant person. Good with people. He did a wonderful job of educating the people surrounding test site and getting some of them, like the Fallinis, they're just north of the test site, ranch. They did not like us at all. They liked Chuck, and they now come down or did come down to the dinners for the ranchers and that sort of crap, tours of the test site. Completely 180 from where they were. And I don't know how I got to that subject.

*Well, because I asked you about the safety to the public.*

But I do think that the people, the Jim Reeves, the Al Graves, the—oh Lord, who were they? Did those dog-and-pony shows conscientiously. They were people of integrity. They were not out there to snow people. They were trying their best to educate them.

And the thing I run into—and there's no way to combat it—there have been a number of lawsuits brought against the university [University of California] or whatever, and if you look at some of those damned things what almost had to happen was somebody—Joe Schnook—was at some operation—and most of the ones I got involved with were at the Pacific—and then they would come back and tell stories and do something else and eventually die of an ingrown toenail or whatever, or cancer, you know, whatever. But people would start to think about the stories they'd heard and beginning to wonder if by God it wasn't the testing that was responsible for that and actually bring suit. There's no way you can disabuse them of what their father told them. He may not have understood what he was experiencing. He may not have understood what he was trying to—but legally it makes just a field day for lawyers. I don't know how you combat that because the father's gone and they can no longer go back—and I've known some folks, people from J-Division, that would say, Look, they're conducting all these damned experiments, look at the [00:25:30] exposures we got and we're not lit up like a whatever. We're very sympathetic but you know, a couple of those people who actually

ended up with a lymphoma of some sort, in the final days of their life really began to wonder if they, you know, if that really wasn't why they were suffering this way.

*Yes, interesting. Yes.*

So it might be pooh-poohed by scientists one day. And years later think, I wonder if I could be wrong. I wonder if this thing that's happening to me is because of something?

*Yes. Yes.*

Well, and off-site safety, I'm sorry, I'm aware of some things that were surprises. I'd be in a weather meeting and know what was supposed to happen, what was forecast and so on and so forth, and if it didn't come to pass—that forecast. Yes, the downwind people can get bit. I think its surprising that so few of them did get bit. So I think—I was test director in Nevada for something like a hundred and twelve shots. That's a fair percentage of the shots that have been conducted by this country. So I sat through a lot of weather reading, a lot of forecasts, and listened to the best information we could get before decisions were made to do something. And none of it, damn it, was done frivolously. None of it was done by stupid people. None of it was done in a deliberate fashion to harm—you used the best information you had and, I'm sorry, you went with that. You have nothing else. But there's no way you can convey that to the guy who lost his sheep. All he knows is the damned sheep's gone. There's no way to educate people, the general public. You can't bring them up to the level of understanding or knowledge that a few people have. You can't do it. And you can't expect them to trust you. No way. So I think we'll always have this pulling, divisive thing.

I know, going way back, I come out of an area in Ohio, in the upper Ohio Valley, a river and little creeks coming in, and there are people living—were then, this was seventy years ago—people living up in those hollows, they're a very proud person. There were a lot of Scotch, a lot

of German, some English, but they're very proud folk. And they have a very great difficulty fitting into civilization because they're too proud to be told anything, too proud to learn. Sincere, my God, yes. Too proud to learn. And I think some of the ranchers are too independent, too self—well, self-sufficient, to need to learn anything. I don't know how in the hell I got on that.

*No, but it's interesting because I think your—*

It's always going to be that way.

*Right, but you're fleshing out—your perspective is certainly useful to me in trying to understand this phenomenon which is a big part of the Nevada story.*

Yes. Oh yes.

*It's a big part of the Nevada story and it's something that sometimes you look at it and you say, you know, how can this be, this great divide? And so no I think you're bringing a really useful perspective to it.*

Well, again it's a personal view.

*But that's really the point of oral history. We've got the documentary views.*

May not be accurate. And I know that. I'm having a great deal of trouble, as I get older and older and older, things have a tendency to run together. I don't know whether the shot was over there or over there or this time or that time or which operation it was on. It's all back there somewhere.

**[00:30:59]**

*Yes. I think that that's probably—to me you're amazingly lucid and clear so—but compared to what? I know that compared to probably the way things were. But my real philosophy about that is, we can look here to see the date of that test and what it was. That's not the value of sitting*

*down and talking to someone who actually was there and formed certain views from being there, so it's all to the good as far as I'm concerned, greatly to the good.*

There are some people that really put the foundation down under this thing. Not managed it but put the bricks in. They're no longer around and will never be recognized. AEC people, lots of lab people.

*Are you thinking of any particular names that you could tell me or is it just a real general statement?*

Well no. In the facilities business which I dealt with counterparts in the AEC, there were a few giants, I thought. Paul Spain. These are folks that had probably been in the Corps of Engineers or in some other outlandish experience, but really made a contribution to organizing, to a new agency, this AEC, really to discharging the responsibilities of that agency. And they didn't have a lot of time to get up and running. You know, a couple years and they were supposed to be up and supporting the labs. This whole business, I guess every business, but this testing business has a wonderful cross-section of people from all different disciplines or lacks of disciplines. They were a wonderful bunch to know. People actually doing brick-by-brick work at the bottom of it.

*Right, actually doing something that made this thing occur. Right.*

Yes. Made it possible for it to occur.

*Right. See, I think that's the interesting perspective. I tried to articulate that when I first came in.*

*You've got this person named Bob Campbell and he's this thing. But there's all these activities that happened, real-life stuff that happened, and it wasn't a foregone conclusion that it would.*

*When you look back you look at the monolith and you say, It is. It exists. And you're not seeing—*

We did. We did.

*—you know, how you actually made it come into being.*

All I had to do was sit in the damned office and put a schedule on a blackboard and make sure everybody knew what their part was and that they did it. And things would come—I still have a sense of time that is ridiculous.

*What do you mean?*

Well, I intend to do something at a certain time and by God I do it at that time.

*Speaking of which—*

I'm not at a problem yet.

*OK.*

It's your problem.

*OK, my problem. I had one other thing I wanted to ask you, and my problem is I didn't write it down. Well, there was one thing I wanted to ask you. This is disjointed, so I'll start there and see if the other one comes to me. What was the first test you saw? Was that in the Pacific?*

Greenhouse Easy.

*Pardon?*

Greenhouse Easy. It was the first shot in Greenhouse in 1951. **[00:35:16]**

*And what were your impressions on seeing it? Do you look at it sort of from a technical point of view or do you—?*

I wasn't worried about the damned device, didn't know anything about it. All I was concerned about was, Are those damned samplers going to work? And can I get them out?

*Oh, back to that. OK.*

Yes. No, I mean that was—

*That was your focus.*

Yes. The fact that there were thousands and thousands of experiments—Greenhouse was a very large effects measurements—I explained this, the things about the military. Hangars and airplanes and, oh boy. That didn't make any sense to me. I knew it was over there—I'm using the next island down—but I didn't know anything about it. I knew Bob Jarman was in charge of it and I was working for Jarman, but I didn't know anything about—. I was concerned about the thing that I was responsible for, whether or not that had worked, can I get it out, you know. So I think Easy shot on Greenhouse may have been, I don't know, something like ten-twenty KT [kilotons], I don't know. I've forgotten. Nominal yield type, I guess maybe twenty, I don't know [45 KT]. But it's on a hundred-foot tower and your experiment's fifty feet out from the base of the tower. You can't help but worry about what's going to happen to that experiment [laughing]. I mean that's what you concentrate on. Somebody else is responsible for other things. You concentrate on that. And I didn't know whether the damned device worked properly. It was the first shot. I'd never seen one before, didn't know—didn't have my eyeballs any ways near calibrated. I didn't think about that. I was thinking about me. There have been other shots that like—well also on Greenhouse, with the George shot, and it was about, I don't know, a couple hundred kilotons [225 KT]. It was a big bomb. At that time it was *the* biggest. And that was impressive. I had seen the Easy and then George. We also had collectors out on George. We never saw those again.

*Yes, I was going to say—*

No, they left. In fact the part of the island left that they were on. But I do remember being impressed, having Easy as a reference, to see this big horrendous, to me, fireball for George. Of course that was eclipsed by Mike a couple years later and so on and so forth. But I don't know, you have A and B and you do get a comparison and that makes an impression.

*Did you think at the time things like, Well, that's a big weapon and what it could do, that kind of thing?*

No. Hell, no.

*Because some people report that. They see those and they—*

No. I know they do and I think they're—I think those people are—well, it's hindsight. My experience for, I don't know, thirty years or whatever the hell it was, was that you really worry, think, concentrate on what *you* are doing, what your responsibilities are, not what somebody else is. A lot of these folks, you know, have all sorts of thoughts later and all sorts of reasoning and all that sort of stuff. At the time it would be very, very rare.

*I remember what my other question was, and it's a little bit—*

Don't apologize, ask it.

*No, I'm prefacing it. It's a sort of a larger question about this whole idea of what you say.*

*People are very careful preparing for the tests. The safety of the people, the safety of the population, the knowledge—*

I'd say they are people of integrity.

*Yes, OK, so they're people of integrity. But then things happen. Mistakes happen. I mean someone said, who was—Bravo I guess was something that was unexpected to be what it was.*

Yes.

*Were you there for that?*

Yes.

*Well, from what someone said, that was a mistake in calculation or something that it was that big or—?*

That was [pause]. I don't know what I can say.

*OK, whatever you can say. Excuse me.*

But it was a new concept. Up until that time, in the thermonuclear business, we'd been thinking of cryogenic devices, liquid hydrogen. And actually on that Operation Castle, had a monstrous damned thing that people *might* have been able to engineer and get into a bomb bay but it would be a booger. But coming up another limb on this tree, there was a concept of a device that was not cryogenic. We hadn't done that before. And the way I've always remembered Bravo is that I was on a ship offshore, I don't know, twenty miles or so, but the damned thing came up and it kept growing and growing and growing and growing. And you watched it first like so [demonstrating], it was back over your head and this stuff started falling, looked like detergent, Tide, on you and it'd start falling all around, and we hadn't expected that. It worked much better than we expected a TR [thermonuclear] to work. Not outside of the range but it really did work better. It was a very pleasant surprise, yield-wise, to people who were going to have to package things to deliver them to—well, to use them—it was a howling success. The weather forecast wasn't so good. It was a very big bomb and got up very much higher than we expected it would go. It got out into an area that we hadn't expected to get in. I was still in the facilities business then. I didn't go to the weather meetings or make any decision about firing or not firing. All I worried about was building some buildings that the people could record and get back in and get data out. Very narrow viewpoint. Very narrow. But it was an expressive thing then. To be looking up and then have to turn around to see the end behind you. And then this white crap falling out of it.

*When you say it was like Tide, was it like Tide in its powder form or was it foamy?*

Yes. No, like powder.

*It was like in its powder form.*

Like powder. Like a granular powder. White granular powder. It was small, yes.

*And what was that?*

What was it?

*The granules or what?*

It was probably coral. Well, it picked up the island and carried it up in the cloud, and then I think those grains of coral or whatever the hell it was, probably they were contaminated, they were crapped up. They saw a particular stuff that started falling out of it. I assume it was coral, I don't know that. It's kind of impressive to think of the number of cubic yards or whatnot of material that got entrained, and it has to come out somewhere. Early on in Nevada, when people were worried about fallout off-site and so on and so forth, there was a program there for a while of trying to blacktop large areas around each shot to keep from entraining dirt, trying to reduce the amount of fallout. Well, that was the reason we went underground really. And Lord, we thought we'd really achieved something by reducing the amount of stuff that came out by a factor of ten, my Lord. You know we were paying attention. Well, we had to because if we didn't, if we kept crapping in the nest, we were going to be shut down. We *had* to pay attention.

*Right. The thing I was going to say when I led up to Bravo, and you're alluding to it, is that I think the larger question for people outside the business is—and this gets into sort of geopolitics and politics and national security—is how much risk is appropriate to be doing these experiments with unknown factors, how much risk is appropriate within those larger contexts?*

Well, let's put it another way. If you have to fire this thing, if you have to test it, you have to demonstrate that it works, then you look for the safest way to do it. And whether that's safe enough or not, you do it as best you can, and by and large the results are pretty good. And for all

the things that were done in Nevada, we did it as best we could with the knowledge available to us at the time. And what more can you ask of us?

*I don't think anyone can ask any more than that.*

But they do.

*Yes. But I think that's why I'm saying—*

These were not deliberate. They were surprises, they were accidental, but how the hell do you rule out accidents in this world?

**[00:47:42]**

*No, that's why I'm saying I think that the deeper fundamental question which I certainly can't answer, I don't know if you can, is it gets down to this very basic decision that's made to make nuclear weapons based on a whole bunch of forces, and once you do that and say they must be tested—*

I don't have to make the decision that you're going to have or you're not going to have nuclear weapons.

*I know you don't.*

But if that decision is made and somebody decides they want one that'll do this, this, this, and that and tells the laboratory, that's what went on up here, That's what we want you to put out. I don't question that decision, but I do it as best we can. More than that I don't think you can ask.

*And the other fundamental problem here with this divide that you articulated a little while go, which I think is really key, is what you said about education and understanding and knowledge. You're dealing at a level of complexity that most people don't comprehend. I don't comprehend it.*

The people that understand a six-pack of beer and a ball game and are satisfied with that level of education are never going to have a grasp of this other business. Of course I don't understand a six-pack of beer and a ball game. We are such a spectrum of people and we can't bring them all up to the—

*No, and it's historical. I mean it's about the history of science, the development of science and technology and the development of our democracy and a whole—it's all in this big, big concept of—*

It's a country. Not *a* country now, it's an international thing now. But let's just say it's been damned interesting—

*I think so. I was just going to say this conversation has been damned interesting to me, so thank you very much. I'll release you. It's getting close.*

No, that's all right. Not to worry. I just have a time line that I follow.

*I understand exactly your time line. But I will—because you've given me plenty of time this morning. It's a long time to talk.*

Yes.

**[00:50:24]** End Track 2, Disk 2.

[End of interview]