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

Interview with Herbert F. York

July 22, 2004
La Jolla, California

Interview Conducted By
Mary Palevsky

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[Recording begins mid-conversation.]

Herbert F. York: —but *one* of the reasons is the history of the past, so that past reasons are relevant but, of course, it has to be relevant now.

Mary Palevsky: *Right. So he was saying—one of the main messages I got from [Sidney D.] Drell was that one of the main reasons for being behind the comprehensive test ban* now *is the Non-Proliferation Treaty [NPT], which you talked to me about.*

Yes. That's what everybody says, yes.

But *the NPT has been in effect for a long time.*

Yes, for, what is it, since 1970, is it? It had its twenty-fifth review quite some time ago.

Yes. So the question is, then, the two couldn't have always been so closely linked, because we haven't had *a Comprehensive Test Ban Treaty [CTBT]. Now the concern seems to be—*

Oh, no, but we've always been in *favor* of one. No, the Comprehensive Test Ban Treaty idea goes back to the Eisenhower administration. It's twenty years *older* than the NPT.

Right. But it's never been ratified, and now it seems—

No, the argument for why you should *have* it, which is what you were discussing, predates the NPT. So the NPT has *always* been a reason. When I asked the Russians why were they negotiating a comprehensive test ban, when we all knew that the Russian military didn't think it was a good idea, the answer really was that [Andrei] Gromyko thinks it is a good idea because of the NPT, because of non-proliferation. I mean, don't say the treaty, just the general idea. So it's

always been that, since there's been a non-proliferation regime. The main reason for the NPT is that. The main reason for a test ban now is the non-proliferation regime.

And so the other question that sort of arose from it going back that far is—and you and I have talked about it, but I guess really Eisenhower's importance in understanding this and his—would it be fair to say that your work in that administration, it really informed your thoughts on arms control?

Oh, yes. Sure. Yes. Forever since. Oh, yes.

Yes. Because I know you've written about this, but it's this idea of being in the weapons world and then being in the arms control world.

Yes, broadening my point of view.

Yes. Because [Richard L.] Garwin talks about that, too, in a different way that I know you know about.

Oh, does he?

Which is, let's see, how does it work? And I can't quote it exactly, but something happens in IBM [International Business Machines] where he's asked to be on some sort of commission, and he becomes involved with the Cambridge crowd. Having been a weapons designer and builder, then he becomes involved with people who are trying to influence policy—

Oh, yes, [Paul] Doty and [George] Kistiakowsky and those, yes.

And [Jerome] Wiesner and that that sort of makes him *aware of that whole other world.*

Yes, it would. I can see that. I've never heard him—you know, that's *news* to me but it's 100 percent plausible.

Right. Because I think one can see how someone like Garwin could be so technically focused.

Yes, he is.

And when he told the story of—because I asked him, remember? A few years ago when that Bill Broad piece came out, [William J. Broad, Teller's War: The Top-Secret Story Behind the Star Wars Deception*, Simon and Schuster, 1992] Garwin was the real inventor of the H-bomb, and they had a piece in the—*

That isn't true, but go ahead.

Right, so I asked him about that, and he told me the story of going that summer to Los Alamos and [Edward] Teller giving him the problem, and then him building this, I guess, model of how you do it. So it isn't true, you would say.

No, no, it's true that Teller did bring him in, but there already was—I mean he didn't invent the H-bomb. That was Teller and [Stanislaw] Ulam period. What Dick did was sketch up something practical, based entirely on those ideas, and I don't think he would say anything different.

He doesn't.

And then it's *also* complicated by things that he may not be fully aware of. There *was* already a group at Los Alamos whose job was to build an H-bomb. You know, *they* were going ahead. I think Garwin's work fed into that in some important way. But the story that *Teller* tells, **[00:05:00]** and that's my main point, the credit that Teller gives to Garwin, he gives in *part* because he doesn't want the *other* people to have *any* credit.

Ahhh. The other people he's been fighting with all this time?

Yes, the ones who actually were responsible for doing the engineering, getting the thing built and tested, and then getting practical versions of it. There's actually a progression of things. One is the test that they put together for Enewetak in 1952, Mike, and then there are the practical devices for building an emergency capability for delivery by B-36s. There's a sequence of

things. And Teller does turn to Garwin because he doesn't like the *other* people. But that doesn't mean they're not *working* on it.

Got it. No, Garwin seems very strong on not wanting it to be anybody's personalities, that people were working, and he talked to me about what his piece *of that work was.*

Yes.

Then this is really a technical question I need to ask you, related to the test site. I really don't understand this. You've got testing going on at the test site, but you can't be testing thermonuclear weapons. Are they too big to test at the test site?

Oh, yes. Well, at the beginning, absolutely, yes. We did them at Enewetak.

You did them there, but then as the years go by, don't the fission weapons become less important as weapons themselves?

No, no, they'll still remain important. They remain important twice over. One is as weapons *per se*. I mean a large part of the stockpile is still fission weapons. I don't know what the fractions are. But in addition to that, *all* thermonuclear weapons have a primary, which is a fission weapon. Then the *primaries*, whether you use them as weapons *themselves* or whether you use them as primaries for thermonuclear weapons, can be tested in Nevada. So Nevada still has a *major* role to play, no matter what the relative importance for the nuclear is. And furthermore, it's just so much easier to do things in Nevada than it is to do them at Enewetak, for all kinds of reasons, including politics; because as bad as the politics of Nevada might be, it's *worse* out at the Marshall Islands, ever since Bravo. But even before Bravo, because we were just cavalierly moving people around. Not many. That was what made it all seem so plausible. Yes, it's somehow wrong, but there's so few of them. And the cause is so great.

Yes. Actually, Mrs. [Dorothy] Grier mentioned to me, I guess at one point, Herb Grier in the late eighties goes out to the islands to see what the state of those people that were moved from the early test were—

Yes. Yes. Gerry Johnson did, too.

Maybe they did it together.

Maybe. I don't remember that.

And she said she had some letters somewhere about his concerns about—I guess it had become like a welfare state out there.

Oh, yes, it's terrible. But it's somewhat similar to everywhere in the world. I mean the western civilization destroyed some of the more primitive civilizations they found there and didn't replace it with anything that really worked. But in the case of the Marshalls, it just turned them into a welfare state, as you say. But in terms of the American Indians, it brought them the Baby Jesus but it destroyed everything else, family relationships, *et cetera*. Religion, as well as politics and so on, the Christian religion is one of the main factors that destroyed the American Indians. Because with all primitive peoples, religion is connected to family relations, it's connected to agriculture, it's all connected together. You destroy the religion. The missionaries come in and say, `Your parents are stupid. We're here to tell you young folks the truth. Don't pay any attention to your parents.` So they destroyed everything. The American Indian, it's a welfare state. They didn't replace it with anything useful. They replaced it with something artificial and partial. You know, you can build a **[00:10:00]** civilization on Christianity. I mean the Europeans *did*. But when you destroy everything they've got and replace it just with a piece of something different, it doesn't work. Now, in the

case of the Marshalls, there's also religion there, you know. The missionaries were all through that place.

Yes. I really don't know about what was done for the testing except for that this population of people was moved off their—

Yes, both the Bikini people and the Enewetak people. And then when the big fallout accident happened, there were some more. I don't remember what they did. They took everybody off of the islands where there was a lot of fallout. So you had, I don't know, three or four or five atolls. You just moved all the people into an entirely different circumstance. Then recovering from that takes hundreds of years, if ever, and it takes local leadership, which doesn't arise.

Well, it won't arise in a welfare state in that situation.

No, it doesn't arise. The French have done it differently. In Tahiti, they've essentially bought the loyalty of the Tahitians. Well, the French put *large* amounts of money into Tahiti. Practically *everybody* is on what you would call "the dole" *somehow*, either being *employed* by the government to *run* the welfare system for the other people or hire the school to use everything. All through Tahiti, when the French test—and this relates to tests—when the French test in the nearby atolls, the *Tahitians* don't object. It's the *New Zealanders*. And the Tahitians don't object because they *have it so good*. The French have completely bought them off. Slight exaggeration. But I wanted to hear about Garwin. I didn't want another interview of me.

OK, so the other thing we talked about a lot, and it's sort of still vague in my mind, so don't hold me to it, was this question, I guess his latest book, Megawatts and Megatons [Garwin and Georges Charpak, University of Chicago Press, 2001]—*have you seen this book?*

Yes.

It has some discussion of damage from fallout, illness and deaths from fallout. So we talked—I sort of picked his brain how I *can begin to sort of try to sort out various claims of the various constituencies in Nevada about, you know, low-level radiation harms and all those other kinds of things, because one of the striking things on the studies, the talks I've had with people so far, is these narratives are* so *very, very different about the effects of the testing, illnesses from testing.*

Well, there's enough uncertainty about the effects of radiation at *very* low levels. It is untestable, you know, you *cannot* test, you can't do experiments about one in a million effects. You have to use *theory*. And so once you start using theory on something like that, instead of experiment, you can pick and choose because there are different theories. So we're not going to resolve that. I mean the people at Three Mile Island, the people in Nevada, who *want* to believe the worst have *some* scientific basis for believing the worst.

And he said that the whole question of low-level radiation, just what you're saying, I asked him about the studies of this fellow Gofman, John Gofman.

Oh, yes, they're greatly exaggerated.

What Garwin said is that there's actually some good science in there. I guess he quotes a lot in his book. But again, I have to—

Well, Gofman *was* a good scientist, but he became a fanatic about it.

And he was at Livermore. Did you know him?

Yes, I knew him very well. He did cholesterol measurements on me *long*, long before they were fashionable. That was one of his studies, the relationship between cholesterol and heart disease. He was doing that in the fifties. He had this nice captive group, or cooperative captive group, which I was part of. So my cholesterol measurements are fifty years old.

But he was a medical doctor at *Livermore.*

Yes.

On this whole question of health effects, is that right?

Yes. Right. Like everybody at Livermore, he had certain things he was supposed to do and other things he did on his own. I think a lot of his work about the damage from radiation was self-inspired. And then he got crosswise with some of the people there, so that it became a highly personal thing. I think he and Mike May had a major **[00:15:00]** falling-out. But yes, there *is* Gofman, he *has* done good work, but he *is* a fanatic also.

Right. So that was helpful to me with Garwin, just to start to sort out how I *might be able to start thinking and at least asking good questions, because one of things that happening in Nevada is you'll have, say, DOE people saying, `There are certain cancers that we know are caused by this, and if you come to us without one of those cancers, forget it.` Because there's this whole compensation program, right? Then I was talking to someone else—*

You see, that supersedes the scientific facts. Once you're in court, it doesn't matter what the science—I mean it may matter, but not very much.

Right. But then I was talking to a labor guy who's working for the Department of Labor helping to find people who may have claims, and he's telling me, `Well, no, we've got doctors here right now from`–I think it's Boston University or something—`trying to determine what those cancers are.` So apparently those cancers haven't *been identified. So, you know, you get different stories.*

Yes, and both stories have a lot of truth in them. I mean there *are* people who think they've done it, and there are other people who think you haven't done it *right*. That's just the way it is. It is so emotional, and litigation is such a poor way of deciding science, that it's absolutely and permanently screwed up. I mean you're not going to straighten it out.

No. And then I had a DOE guy basically say, if people could make claims to private industry the way they're making claims to the government on this, we'd have no free enterprise anymore because it's so arbitrary, in his opinion.

Well, yes, you're right. It's just not *entirely* arbitrary, but the claims are just so grossly exaggerated, and in the Pacific, and at Three Mile Island.

Yes. Well, I asked Dick Garwin about this because one of the arguments is you do apparently see clusters of leukemias in Utah, members of families, a whole bunch of young children in schools. You know, someone like me, who is not an expert in any way, wants to be persuaded by some of this kind of thing.

But there are just, all over, strange clusters of diseases. Now, one *knows* there is a connection between leukemia and radiation. By the way, you also know that if it doesn't happen within ten years, it probably isn't radiation connected. That I know from my *own* case. But, of course, some of the radiation, they might have picked up something late. So it's something you never can be sure about, but clusters happen anyhow. You know, even the clusters involve very rare events. It isn't as if everybody in some town had leukemia. It's a teeny little group. And then newspapers, you can just write down the interview. They'll go in and they'll interview and they'll say, `Oh, yes, there's three on the next block and there's four on the`— you know, they're just making it up, *almost*.

[00:18:51] End Track 2, Disc 1.

[00:00:00] Begin Track 3, Disc 1.

You know, this is one of the big emotional issues that we're looking at.

And there's a *huge* amount of amateurism. Everybody *knows* a cousin who, on the next block, there's a cluster of eight. It's just mostly bad information, and sorting it out would be just

extremely difficult. But it's in the courts, and the courts are not a good way. They have an *entirely* different set of rules for deciding what's right and wrong.

Yes. Another thing that Garwin talked to me a little bit about, and I really don't know enough about it, was the test ban and this problem of decoupling?

Oh, yes.

I sort of understand it. This was a controversy about whether you could have a test that would—you explain it to me, too.

Well, it goes all the way back to the Eisenhower administration, the *very* first negotiations with the Russians by us, with [Hans] Bethe involved, and others. Teller comes in with some work that has been done by the Latter brothers at the RAND Corporation. There's a book by Teller and Latter. I don't remember its title. But it dates from the late fifties or early sixties, and the central theme to it is this idea about decoupling. Now, it *does* work, up to a point. It *is* a major feature. However, it's not as *easy* as they make it sound.

And decoupling is? Because I want to sort of—

Well, you explode an atomic bomb in the center of a large, spherical cavity under the ground. And when you *do* that, before the shock hits the walls, it's expanded and a lot of the energy becomes somewhat diffuse. The energy doesn't disappear, but it behaves *differently* from what happens when you explode a bomb in a tunnel with all this rock right around it.

OK.

[Telephone rings.]

[00:02:15] End Track 3, Disc 1.

[00:00:00] Begin Track 4, Disc 1.

Now, before you go any further, this is a theoretical sphere, right? Do we know how we would build this sphere?

Yes, there are lots of ideas. One of them is a previous nuclear explosion, especially in a salt mine. The Russians actually have *done* those things. They've exploded nuclear weapons in salt mines with the idea of making big cavities for storing gas, they say, but it could be used for this purpose. So it's one of these things where there *is* something to it. I mean you *can* make a complete scenario, and when you do, you come up with the fact that a nuclear explosion of *fifty*-x will make the same kind of long distance seismic signals as an explosion of merely x, closely coupled with the rocks. But, you know, you can't be sure. You don't know whether the thing is going to collapse. I mean, in other words, that makes a big signal of a different kind, the collapse of a cavity. So that it's one of these things which *does* point in the direction of being able to cheat, but leaves doubts in both directions. But when it was first raised, I remember somebody, I think it was Bethe, expressed his great annoyance. Bethe expressed some kind of *public* annoyance about Teller going around trying to undermine everything. But they had a lot of ideas about how to evade. Teller kept inventing all kinds of ways to evade the test ban, like going behind the moon, things like that, which still come up occasionally. You can still find somebody that talks about it.

Yes. I think it makes sense now. There is a piece in the Bethe collection [The Road From Los Alamos, AIP 1991] *about how you would actually* do *it in this salt environment.*

Well, there are a whole bunch of ideas, including just digging a big hole with mining machinery. There are various ways to make cavities under the ground, but the bigger they are, the more difficult, not just because there's more work, but because they may collapse. You can't just put a big cavity anywhere and expect it to stay there. I mean it's an iffy proposition.

Yes. But this is something that kept a test ban—

It was a major factor in slowing things down at *all* times. It keeps coming up all the time. It's an idea that goes back to the fifties which people will bring up today. If you have a debate over a test ban, if the treaty ever reached the Congress, the opponents to the treaty would come in and say, `Look, we can make these cavities.` They can't make them, actually. It's theoretical physicists performing a somewhat complicated mining engineering job with the uncertainties that *go* with that.

Right. So at this point, because this is from the Cold War, at this point, obviously, similar arguments are being made against the test ban, but how does that work? It's still the Russians? This is what I don't understand.

Oh, well, what's happened is that both the arguments against the test ban and arguments *for* the test ban have greatly diminished with the Cold War over. Even though it is mainly connected with proliferation, nevertheless, the end of the Cold War just brought down interest on all sides of those questions. So the argument *against* the test ban, people will raise the issue of whether it can be monitored, which is what you're talking about when you talk about decoupling. But that's not the *main* reason for wanting the test ban to go away. It's because they feel that it's inhibiting.

Right. And I think that when I spoke to Teller, that was one of his main concerns about any *treaty, was that it would inhibit the United States from doing what they wanted.*

Yes. The people who are against it—this monitoring issue is *much* argued but it *wasn't* what motivated people. What *motivated* people was that they either *did* or *didn't* want the limitation itself. **[00:05:00]** Then monitoring is a juicy issue to argue about because it can be endless, you see, because that has to do with seismic detection. That relates to how *many* seismic detectors

you need, how *close* you have to be, how *reliable* the results are. It goes on and on. You start studying how many parts of the Soviet Union have salt beds which are big enough to put *cavities* in them. You know, it just never ends. The *details* on something like that never end. That was a new wrinkle. But they *never* are what motivates. What motivates, on the one side, is that they don't want those inhibitions.

Right. And there must be complicated reasons for that. I mean then you get to the—

Oh, there are general and complicated. The *general* reason, which Teller typically turns to is, You're prohibiting research that will lead *we don't know where.* He didn't argue about the bunker busters or multi-megaton weapons for frying states. He said, You're interfering with the accumulation of *knowledge*, and you *never* know where that's going, and you mustn't limit it. So Teller's main arguments were general. *Lots* of people argue the *details* about bunker busters and on and on. You find a lot on both sides. As soon as somebody says, We need them to break a deeply-buried command headquarters, somebody else says, I got a better idea. You can do that without nuclear weapons, and besides, nuclear weapons have these side effects. So that it's *rich* in detail. *All* of these arguments are *rich* in detail, on both sides.

Yes, because Drell talked to me about that a little bit, that if you're going to look at the bunker buster question, there are other ways to do it, and I think he's written—he gave me some articles.

He's written a lot of stuff. He's one of the most prolific authors of *good* stuff in this area.

Yes. So he handed me several things which I haven't had time to read yet. And I guess that would take us back, and just maybe next time, to historical questions about the reasons that you do tests to begin with. There are a variety of reasons, I suppose, why you would even test. Garwin brings this up in his Drell Lecture, I guess, at CISAC [Center for International Security and Cooperation], and I don't have it with me.

It's far and away the easiest and best way of telling whether your design is right.

There's a design question, but there's also—I'm sure some tests are done to—maybe that's why the Russians went over the moratorium deadline—to freak out the enemy. You know, there's lots of—

Well, that's a rare thing but, yes, I would say not so much political reasons as political considerations that do these things. Like what happened when the moratorium ended. These long series of tests on both sides that had no meaning were done for purely political reasons. But that's part of a different world and set of arguments. The *reason* for doing tests is it is *far* and away *the* best and most reliable and easiest way of telling how you're doing. If you have a teenager and you give him all sorts of lessons in driving but never put him in an automobile, you're really not sure. Testing is a *normal* way of doing everything. You have to have a good reason for *not* testing. Well, like the trouble it makes, you know, it could be even expensive. Nuclear testing causes problems but the *starting* position is that they're useful and why not do them? That's where it starts.

Right. Let me see what else I had on here. Oh, this is just a comment I thought of, and this was related to meeting Mrs. Grier yesterday, which again is something I'm getting my mind around when looking at the test site, is the major role that certain contractors played in the work of the government then *and how that developed, and then how that became problematic. But that was certainly the case of EG&G [Edgerton, Germeshausen, and Grier], I guess, they did—*

Well, they did the firing and time, and doing that right is important. Everybody can do it. It's not as if they had a unique idea. You know, every country in the world that tests weapons has somebody doing what EG&G did. Maybe not quite so good, you know.

[00:10:00] *But at that time, I guess, the reason to contract out was because the expertise wasn't sitting in the labs themselves, or—?*

Well, I think we could've *done* it, but it's easier to do the contracting out. It's sufficiently special. They could've done it themselves. There's no question about that. They could've done it *all* themselves. They contracted out for convenience.

Because one of the things that came up when I went to Livermore on that panel was the question, which remained unanswered among the panelists of these people who had been in the testing world, was maybe Livermore didn't need *something like EG&G because they had good enough engineers that they would do it themselves, and did this sort of reflect on a culture* about *Livermore that was different.*

But it's also historical. When you *start* out, when you're first starting out, like when we first tested in Nevada, suddenly you're adding a *lot* of new things *all* at once. It's natural to contract part of it. You do part and you contract. It's a very natural—otherwise it's slower. In other words, doing it themselves would've taken longer. They're always in a hurry.

Yes, exactly. And then these relationships build up, and then they're long lasting relationships.

I don't think there was a contractor involved at Trinity.

Well, there was some private industry involved.

There were *construction* contractors for buildings and things, and they bought a lot of parts, but I think probably the timing circuits were their own.

Yes, I think you're right.

What EGG did was just done by—you see the same pictures that are published over and over again of half a dozen people up on the tower putting things together. [Norris] Bradbury's always there. There's some other pictures down in the bunker where there are a number of people

whose names are important but I don't think of them. One of them, Donald Hornig, was a guy who later was science advisor for Lyndon Johnson. As a younger person, he was *there* doing this. He was the one who pushed the button, or he was the one who *didn't* stop it. His job is to push the stop button if [J. Robert] Oppenheimer or anybody else says, `Stop`, for *some* reason, whatever it is, then this guy, it's his job. I mean, they talked about it. He's one of the people who was interviewed not long afterwards, and it's a well-known interview of him talking about that's his job, to press the stop button.

[00:12:53] End Track 4, Disc 1.

[End of interview]