

**History**  
of the  
**U.S. Food and Drug Administration**

**Interviewee: Fred Rueter**

**Interviewer: Donald R. Hamilton**

**Date: January 14, 1997**

**Place: Rockville, MD**



National Institutes of Health  
National Library of Medicine  
Bethesda, Maryland 20894

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Fred Rueter

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Last position held: Engineering Director

Date: \_\_\_\_\_

Interviewer: \_\_\_\_\_

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CASSETTE NUMBERS

GENERAL TOPIC OF INTERVIEW: History of the Food and Drug Administration

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NAME: Fred Rueter

NAME: Donald Hamilton

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DH: This is another in a series of interviews in the FDA's Oral History Program. Today the interview is with Fred Rueter, former official in the Bureau of Radiological Health in the Food and Drug Administration. The interview is being held at the residence of Mr. Rueter. The date is January 14, 1997. Present in addition to Mr. Rueter is Don Hamilton, the interviewer. The transcript of this interview will be placed in the National Library of Medicine and will become part of FDA's Oral History Program.

Fred, to start the interviews, we like to begin with a brief autobiography. Would you start with some of your early years, where you were born, raised, educated, and include any work experiences you had prior to coming to FDA?

FR: OK. Well, I was born in western Kansas, actually out in the country. I keep telling people I probably ought to go into politics, because I was born in what you might call a dugout. It was underground, just a . . .

DH: A sod house type?

FR: Well, my father then built out of adobe--basically the same as a sod--built an adobe house over that, and that's where I grew up. My first eight years of schooling was in a one-room schoolhouse out on the prairie in western Kansas in Scott County.

From there I went to Colorado College, primarily because it was the closest four-year college to home, because I had a part-time job as a pumper in the oil field. I chose a major of geological engineering by going through the course curriculum of many different professions. I knew I wanted it in the sciences, but I didn't know which science. So I went through the curriculum and tabulated them, and geological engineering had the most of all of them. So I said, "Well, that's for me." So I started out there. It wasn't a good fit for me at that school. I wasn't too happy. So I transferred to the University of Kansas, and then got my bachelor's there in geological engineering.

Went on to the California Institute of Technology in Pasadena, California, for a master's in geology, with some thought of going on for a doctorate. But my father passed away, and that was back in the days of the draft, so I knew I would have to fulfill my military obligation one way or the other. So I heard about the Public Health Service, and I thought, well, if I can use my education for our country, I think it would be better than digging a foxhole for our country.

So I applied for a direct commission to the U.S. Public Health Service. As you know, in most of these you have to have an interview, so they arranged for me to have an interview with a physician down at the outpatient clinic--I think it was down at Long Beach. Maybe it was in L.A., I don't know.

Well, he didn't know anything about engineering, and, of course, I didn't know anything about the medical end of it. So most of the interview was sitting there talking about how a john flushes, what makes it work. So it was kind of interesting.

DH: This was in the middle fifties?

FR: This was . . .

DH: You got your degrees when?

FR: I got my bachelor's in '58, and then in 1960 I got my master's from Cal Tech. So this was actually early--well, in '60, 1960.

Bureaucracy moves slowly, so I finished my degree and accepted a job with Shell Oil Company, and in the meantime was in the process of joining a reserve unit to just put in six months and then so I'd have, you know, minimum time in the service. While I was there, why, I got the direct commission. Of course, there was a rummaging around, well, how do I get out of the reserve obligation to accept this? But it seems like there was a law on the book, and I would assume it's still on the book, that anyone who is a non-com or an enlisted personnel, if offered a commission, the previous service has to release them to accept a commission. So then I came in, and that was a direct commission.

My thoughts were to use my experience in geology for siting of nuclear reactors, studying of the transmission of radioactive materials, you know, pollution-type environments or waste disposal and that sort of thing.

DH: What was your category when you . . . ? You were . . . ?

FR: Engineer.

DH: You were an engineer.

FR: I came in as an engineer.

DH: Weren't most engineers . . . Most engineers at that time were involved in environmental studies?

FR: Pretty much so, yes. Well, we had the water supply . . . The bureau . . . Let's see. What did they call that? The Bureau . . . I'm not quite sure, but they had the Taft Center there in Cincinnati which was primarily water supply, sanitation, and that sort of thing. So they had a fair number of engineers and sanitarians there.

I was first reported to Cincinnati and went through a ten-week course in radiation protection, and it had . . . Basically was all of those Rad Health programs that we had and the training, old training group, just end to end. You stay there and finish one, and you start right in to the other, and then it included two weeks down at Oak Ridge, actual hands-on and decontamination of things and monitoring, a type of environmental monitoring you would do around the reactor.

DH: So your . . . Then that was your first duty station then, was Cincinnati for training?

FR: Well, for training, but that was sort of in transit. My first duty station was here in Rockville. As a matter of fact, I was probably the first, but I would say three or four of us were the first ones to open up the Chapman Avenue Building. It had just been completed. Another geologist by the name of Bruce Maxwell--he was a civil servant and geologist--he came from the Bureau of Fisheries, I think. I don't know just where he came from. Then Paul Echrich, who had just come through the same training program as I. We were the first ones into the Chapman Avenue Building.

DH: Echrich?

FR: Yes. And, of course, that was back in the days when the rad program was growing rapidly. So we soon had quite a group. Of course, at that time, it was only the two floors.

My task: I was assigned to a Technical Operations Branch, I think was the term at that time, and Julius J. Sabel was the branch chief. In there was Morton Goldman, who was an MIT graduate, and they had . . . I don't know all the details so I won't speculate, but he left the service and started up a small company called NUS, Nuclear Utilities Services, which now is a big . . . I'm sure he got bought out and moved on, but he was an originator of that company.

The particular group I was in was involved with the environmental phases, and we conducted what was called the SEERS Project, S-E-E-R-S. That's Savannah Estuary Environmental Research Services. What we tried to do was we actually went down and had Coast Guard people utilize their boats, and we took samples of sediment from the bottom of the river and into the tidal flats; we collected clams and fish and seaweed, as well as water and all of that, and then had it analyzed. The purpose was to see how much of what was coming out of the Savannah Plant was getting down there. Of course, this was right at the saltwater/fresh water interchange, and that's where the chemistry gets to be kind of murky. It's a different ball game. So that's what we were trying to find out. Fortunately, there wasn't much getting out of Savannah Plant, so we really didn't (Inaudible).

DH: What was the Savannah Plant producing at the time that they would have the radioactive effluent?

FR: I'm not so sure, but it was I think a plutonium plant for producing plutonium for the weapons.

So that was my first major project. Another one I got involved in was trying to design the sampling procedure for a monitoring station at McMurdo Sound in the Antarctica. PHS got a contract from the navy to do I guess you call it off-site monitoring. Of course, no one ventured very far off-site there though. But they were going to put in a reactor for power supply because of the high cost of getting fuel in there. So we did the pro-operational sampling, and then after I moved on to other things, people did stay for some of the operational. That was interesting, because being a scientist, accepting some of the things that had been done and just accepted, I always questioned. One was the air sampling. We tried to figure out how many millicuries of whatever element per cubic meter of air. Everyone, as you know, in a nuclear laboratory, you worry about counting down to the gnat's eyebrow the picocuries or millicuries or whatever unit (Inaudible).

(Interruption)

FR: OK. Try to backtrack. So everyone's put a great deal of effort in getting the accuracy of the numerator, and I asked, "Well, what about the accuracy of the denominator?" "Oh, you use this instrument." I say, "Well, how careful is that instrument?" They said, "Oh, well, we just accept this." So I tested it, and it could be 200, 300, 400 percent off. So I designed a method of calibrating the air flow so that we could get some more accuracy on the denominator in the equation. So it's kind of interesting to do little things like that to improve the program.

DH: Now, you physically went down to McMurdo?

FR: I did not. We collected the equipment, got it tested, developed the protocol and the procedures, and . . . I could have gone down if I wanted to, but spending six months over the Antarctic winter didn't appeal to me.

So let's see. Who did go down? Charlie Cox went down; he spent a winter over there. George Shultz, he was from Cincinnati. And then Larry Grossman, I think, spent some time down there.

DH: Really? I didn't know Larry was down . . . I didn't realize Larry had been around that long, I guess.

FR: Part of that also is I don't consider myself to be a mathematician, but there's enough natural radioactivity in the air, radon and thorium, that we wanted to sort of nail that down, too, so we could find out if any of the radiation you see is due to the influx or having a reactor there, or is it natural, because there was a volcano not far from there.

So there are some equations that you collect, a filter(?), and then you go down through the whole radioactive chain, you know, and then subtract things out. It's a lengthy mathematical process, and in those days when we didn't have the computers, it was pain to figure it out.

DH: The government, then, basically they had built the reactor, and you were testing to see what . . . In other words, were there pre-operational tests done as well?

FR: Well, we were there what you call pre-op. My part of it was to develop the protocol on the sampling technique before the reactor was in place. I think it was to, the reactor itself was probably assembled at Idaho, and perfected, and then just brought down almost in mass and put into place.

DH: Hate to try to build something down there then in those kinds of conditions.

FR: Yes, conditions. I can remember Charlie Cox mentioning that in his laboratory he always had the trouble of the ink freezing. Whenever he wanted to go to write something, the ink, you know, had frozen. Some of the instruments required, you know, putting ink in.

DH: So they basically, though, found that there was no real, there was no problem with . . . ?

FR: To my (Inaudible), yes, that's what I . . . I was not associated with that later on when they actually went critical with the reactor. But I do know that they have removed the reactor and no longer use that, and that's because of treaties. They say we will not have anything that has any radiation in it down there. I don't think it was because there was some escape or anything. It was just, we will not have it there. So . . .

DH: Nuclear-free zone. Maybe the original nuclear-free zone then, you know.

FR: Right.

DH: When this project was complete, what was your . . . ? What did you move onto from that point on?

FR: OK. It's rather interesting. When they started this project, they wanted someone to go down to the Antarctic. I said, "No, I'll stay here." So I did that part of it. That's when the Nuclear Weapons Test Ban was broken by the Russians. So we had all sorts of gearing up for more fallout. They wanted to set up this radiation surveillance network, each state capital and other state health people having an air sampler and daily--or hour--well, maybe twice a day samples of air and what not. The headquarters would be downtown, and they wanted me to go down and do that. I said, "I don't want to work downtown. I want to stay out here." So they hired a young lieutenant who had just come over from the Air Force by the name of John Villforth. (Laughter) He went downtown and started the surveillance.

DH: Well, you . . . You know, if you would've decided to go downtown, you could have been the bureau director then, huh?

FR: Well, I don't think so. John's an exceptional person, and he would have risen to the top no matter where they put him.

DH: Cream does that.

FR: After that, because of the weapons test, they were gearing up to get ready for the U.S. to resume its weapons test, and in the previous weapons test, we all hear about the horrible stories at Pakini(?) and what not. So it's my impression that DOD, in an effort to try to legitimize their efforts, contracted with the Public Health Service to do the off-site monitoring, thinking that it would be more of a disinterested and maybe not quite as biased group, and that the public would accept their statements as more credible.

DH: I was going to say, I think there was also, from what I've read and heard others talk, you know, I think at that time, PHS had a much more acceptable scientific platform, if you will. So whatever, you know . . . They didn't appear to have a particular agenda in mind so that their results were not somewhat questioned by a skeptical public as what they had been.

FR: That's true, and our whole goal was entirely different, you know, protection of the public. So it would just give a little different slant to it.

So I say that . . . Well, then I was assigned to the Pacific, and I say I went through the Pacific with my suitcase, wearing civilian clothes when I spoke to civilian governments, and my uniform when I spoke to the military. I actually had an audience with the Prime Minister, the Kingdom of Fiji. Most of it was just to try to explain to

people what was going on, what was the possibility of radiation in their particular government, and what not.

A rather humorous incident . . . Well, this is after another story I'll be telling you. I was in Honolulu when I got a message from the headquarters to go to the French Consulate and get permission for a U.S. destroyer, and they gave me the name, and Captain Henry Rechen to go to Bora Bora and set up one of these monitoring stations.

DH: Rechen being a bureau employee?

FR: A bureau employee and one of our PHS group. But they needed to set up a station down there, and the only way to get there in speedy time was just to dispatch a destroyer with him on it.

Well, the French are kind of laid back, and so I got to there about 11:00, noon on a Friday, and all of them had gone home, you know, wouldn't be back till Monday. I said, "But I've got to get this." "Well, sorry. They can't be disturbed. They're off. That's it."

Well, I'd heard in the meantime that the destroyer showed up and started into the harbor, and they immediately were signaled, "Get that warship out of our water! You do not have proper clearance." So they cruised offshore until Monday when I could get in there and say, "Hey, this is what's happening." They say, "Oh, OK." So they wired them and let them come on in to set up the rad health station.

DH: But they had to stay out of the harbor area.

FR: They had to stay out there, right. The French are a little bit touchy about their sovereignty and followed the procedures.

DH: Did you ever talk with Henry about, you know, his extended time on the ship?

FR: Not aboard the ship. He enjoyed being in Bora Bora, because afterwards it was, you know, they're friendly enough, it was just that it was the protocol.

One of my tasks was to set up a station on Washington Island. This was a small island, part of the Hawaiian Islands, Christmas, Fanning, and Washington, and then there's a small, almost just a reef, a penrine(?) reef to the north.

So they actually dispatched . . . Holmes and Narver was the construction company that . . .

DH: Holmes and Harbor?

FR: Holmes and Narver? How did they spell . . . ? Narver. I guess it was N-A-R-V-E-R, yes. I'm not exactly sure about that spelling. But they were on the LSD (or LST?) to set up a camp for us.

Washington Island was a rather interesting island. It's two miles wide and four miles long. What lagoon it has is enclosed completely, so it's sort of fresh. They have a high rainfall, so a lot of the salt water . . . It's still salty. You wouldn't want to drink it, but it's fresh.

Another third of the island is a peat bog, and the other third is above sea level. It was a copra plantation, copra being the dried meat from coconut, and there was no real way to get through there. It was a German colony up till World War I, and they had blasted like a hole in the reef so you could come in and land on the beach. But it was . . . I contend I was perhaps one of the few PHS officers who have actually waded ashore from a landing craft wearing a PHS uniform.

Now, as you know, we had a lot of people come in from other services that had done that in a marine or army or what not, but I was . . .

DH: Not too many PHS people had ever done it.

FR: Right.

DH: Right.

FR: So we set up there. It was a radio communicator and myself, and the island was inhabited by a (Inaudible) Australian by the name of Bill Frew, and three hundred some Gilbertese laborers.

Now they pitched us a tent, and we set it up as our workshop and living quarters and all of that, because . . . Well, the idea was the ship would leave, and we'd be there for four to six weeks without anyone else. So they left a lot of provisions. When the ship pulled away, I took count of what they left us, and we had a freezer full of steaks--that was good--not too many loaves of bread, six cases of dehydrated cabbage, and sixty cases of beer. (Laughter)

But fortunately, we were able to barter and use some of that, and the plantation manager took us under his wing, so we had an arrangement . . . As a matter of fact, we had three maids and two houseboys for our GI tent. Of course, they were the same ones that he had, so they would clean our tent, and we would have dinner at his place, our place, wherever.

DH: But basically, in general, you know, there was no problem with acceptance of your presence there at the island?

FR: None whatsoever. None whatsoever. They accepted us very kindly. The Australian, Bill Frew, was just a fantastic, a great person. If it weren't for him, it would have been a rough time.

DH: Was that generally the case on all the Pacific areas that you visited?

FR: Yes. However, there was one island . . . Flora. Was it Don Flora? I'm trying to think of his . . . He was a regional rep up in Seattle for a while. Dave Flora. Dave Flora was on the adjoining island, Fanning Island. The plantation manager there was a South African, and he had an entirely different philosophy. On Washington Island where I was, there was a very close relationship, friendship, acceptance between Bill Frew and the natives, and he did not have a weapon.

I'm trying to think of the South African's name. What was his name? Anyway, he was very gruff, not well liked by the natives, and he had an arsenal in his house, always in fear that they were going to rise up against him, and I thought he was . . . And they're all Gilbertese which are very friendly.

As a matter of fact, while I was on Washington Island there was a riot. For some reason or another they got down on one person. In the Gilbertese Society, there are two bad things you can do: insult a guy's wife or burn his canoe. Well, they burnt his canoe, and so there was all sorts of . . . I didn't see any real physical violence. But once I saw

the woman of this family bringing all of her possessions in a blanket and the kids come across, and here came this mob, and she . . . The terror in her face, you know, very visible, and she ran to the little compound that was the constable. They had set up sort of a British-style government there. It wasn't a barricade, it was just a little stone fence, you know, a foot high. Well, they stayed out of it.

DH: It demarked that this is . . .

FR: This is British crown property, and you don't come without permission. So the mob stopped right there. It was rather interesting.

Bill Frew finally arranged to get the guy off the island, because there was a freighter there taking the copra. The next day, why, the entire mob took up a collection to repay the guy. (Laughter)

DH: Go figure. Well, so you were on Washington Island then you said for four to six weeks you spent there?

FR: Yes, I think I spent four weeks there. We kept having radio problems, so the ships came a little more often. We finally got that solved.

Another humorous incident on the island: In talking with Bill Frew, the plantation manager, he said, "Well, there were, you know, the three hundred natives, him, and his dog." And that was it for animals, other than birds, you know, on the island. So OK. Well, we put all of our equipment along one wall of the tent, our radiation monitors, the radio, you know, all the laboratory equipment we had. On the other side of the tent, we had our bunks with mosquito netting and so forth, and then on the end we had our food supply and cooking and so forth.

Well, one night something woke me. So I sleepily got out of my mosquito net, walked to the center thing, and looked in the entrance door, and there was the biggest darn hog I'd ever seen. I looked at him and he looked at me, and finally, you know, tsshhh tsshhh (makes sound of hog dashing off), and I could have just seen him having come on in. Then I got out of my bunk and this mosquito netting, scaring him, and him going through the wall wiping out all our instrumentation. I could just see a radio message back to headquarters, this RADSAFE Station destroyed by one hog.

DH: The tent would have all come down around everything, and you would have been in bad shape.

FR: Yes, it would have been interesting. But it didn't.

So we managed that, and then I went back to basically the headquarters on Christmas Island and helped with sundry other tasks there.

DH: The . . . Were you on the islands . . . ? Were they doing active testing? I mean, what you were doing there from, you know, basically is you were trying to find out what kinds of fallout--was it fallout?--from tests that were being done in the Pacific, or was this tests that were being done Soviet?

FR: The primary purpose was to determine if there was and what kind and how much fallout came from the U.S. weapons test.

DH: From the U.S. weapons testing.

FR: Right. And all of the tests--well, I won't say all of them--but vast majority were off of Christmas Island, and they were all air bursts so that the fireball never touched the surface, which would have been the ocean, and depending on the size they expected was how far offshore they put it. So that they could set up their equipment on Christmas Island, and, yes, it would get a little bang, but it wouldn't destroy it, and they could monitor the . . .

(Interruption)

DH: OK. We were talking about the (Inaudible) being on Christmas Island.

FR: Yes. So all of the surface detonations were offshore at Christmas Island, dropped by B-52s, and detonated so the fireball never touched the surface.

Our task was then to measure and see if there was any fallout, and we saw no fallout in the islands around there. There was more fallout back here in the states from those weapons tests than there was there. The reason being by not touching the surface, it was all the fission products and activation products with the bomb itself which went up with the plume and got in the upper atmosphere and went all the way or halfway around the world. None fell out right there.

The only local radiation we had was they would send rockets up into the fireball--well, not the fireball, but after it, the cloud afterwards--and collect samples, and then they'd try to retrieve those rockets. Of course, they became contaminated, but that was just like working with radioactive materials. It wasn't really fallout.

DH: How does that then . . . ? What about the Marshall Islands? Was that a different kind of testing then?

FR: Yes. Well, one, that was much earlier, and we didn't know near as much about what was going on. You know, I sort of get a little perturbed at these people with 20/20 hindsight, when they say, "Oh, well, all these people were exposed and the government knew it." Well, we were experimenting. We didn't know what was going to happen half the time. We'd take what seemed reasonable precautions then. Looking back at them now, well, we would do it differently. And the weapons tests series in '62, I think it was conducted in an excellent . . . We had none of those problems that they had in the earlier ones.

Another humorous incident, on Christmas Island, a lot of the guys got to where they could tell the yield of the weapon by . . . There was an old water tank there. It had . . . On stilts, and had some metal strapping, I guess, to give it strength. The intensity that that strapping would hit the tank would be some indication of the size of the weapon. So they could tell it went five megatons or ten megatons or a half a megaton by how much noise . . . And, of course, it took those weapon designers weeks to figure out the true yield of a device. So it was kind of interesting.

It was interesting whenever there was the blast, because there was a blinding flash. Then, of course, we were so far away from it, that the blast wave would take, oh, a minute or two, three, depending on the distance, to get to you. Usually, the detonations were at dawn or near sun up, and you'd hear all the birds, you know how it is in a sea, squawking and everything, here that flash, and then complete silence. It was just amazing, because

I guess it scared them, and they didn't know what was going on, and there was just complete silence until the . . . Then you heard the . . . The shock wave would hit.

DH: The . . . When you were saying before about going into Fiji and places like this, now that took place before this series of tests, and there your purpose was basically to let the people know that the tests were going to happen? Or were you talking about results that it had happened from previous tests as well?

FR: Primarily to tell them what was going to happen and reassure that it was going to be different than what happened before because of some of the bad press. Basically what we did was a pre-event environmental surveillance. So we visited all these islands, broke up into teams. I went to such places as a Canton, Tongatapu, Rarotonga, Fiji, and others went to other islands, and we set up the . . . Well, what we did was collect some surface samples and some samples from vegetation and then left radiation monitoring equipment with the most reliable people we could find there. Some of them had cable stations, radio people, somewhat technical oriented, or they had weather station personnel. We would leave them with a Geiger counter and a high volume air sampler so they could collect air and then scan it and then save it, and we could pick them up later.

So we did that prior to the test. So we had our pre-shot baseline, and we set up a mechanism for them to then collect information during the period of time so if something untoward happened, why, then we could pinpoint where it was and how it happened.

Then once or twice during the weapons test--because I think they shot, I don't know, twenty, thirty-some devices--we'd go around again and collect these, and see how things were going, maintain the equipment and what not. Then at the end, why, we'd do the final one, getting soil samples and all that to see if there was anything deposited. So we had a before, during, and after of samples.

The only islands that really had some radioactivity on it was Johnston Island itself, and that's another story. On Johnston Island, they were launching the rockets for the high altitude tests, and I don't know what all rockets they used, but one that I know of was the Thor, which was a kerosene for fuel, liquid oxygen for oxidant, and not too reliable. It was . . . Did not lift off, started burning. Of course, there the man in charge had the choice. I'm sitting on this little island, with a nuclear device sitting on top of this thing, a liquid oxygen fueled kerosene fire. What do I do?

Well, he pushed a button to destruct the bomb, which blew all the fissionable material away so it would not go nuclear. Of course, in the process, this put plutonium all over the darn island.

DH: Contaminated the entire area.

FR: And with that huge fire, just vaporized it and burned it down into the, you know. So it was a mess to clean up. Took them three, four months to really just basically remove the top three or four inches of the island and repour the concrete.

Colonel Jacks, who was head of our rad safety, was upset at that. He said, "They've tested these things. They've cooked them in fires. It would have never gone nuclear and all this and that." Well, you know, I empathized with the guy.

DH: Right. The guy who was sitting there with his finger on the button . . .

FR: Yes. But on the island, if that thing had gone nuclear.

DH: Right. He's saying, you know, "Hey, do I vaporize myself here? Or do I blow the stack on this thing?"

FR: Yes, yes. Because they usually evacuated the island, they had skeleton crew, I don't know how many, a hundred or so--I'm guessing--stayed on the island during the blast, and manned, you know, the countdown and rocket ignition stuff, and all of the equipment they needed to launch the . . .

The only casualty I've heard of from the weapons test was that one of the high altitude shots . . . When a nuclear device goes off, you have all sorts of particle radiation

going wild. When it's upper atmosphere, there's no shielding, and it goes off. What happens is the upper atmosphere becomes like the inside of a fluorescent light tube. So for a thousand or so miles around the sky glows.

Well, some of them . . . I think it was a girl in Fiji thought this was the end of the world or something and jumped out a window and killed in the fall. That's the only death that I know of that came from the weapons test. Now, you know, you don't hear it all; I'm not saying it *is* the only one.

DH: OK. So that then being complete, you came back to Rockville?

FR: Right. I stayed there for a little while, and we had set up a laboratory in Honolulu to analyze all these samples as they came in, and as that was winding down, why, I came back to Rockville. My true love was geology. So I had a break in service and went back with Shell Oil Company and worked as an exploration geologist for them for three years.

While I was going to school, Shell hired me to climb mountains, and that turned me on. I said, "What better job can you have than this to get paid to go out and climb mountains?" When I went to work with them permanently, they stuck me behind a desk in west Texas, and that's when I said, "That's . . ."

DH: It's called the bait and switch, isn't it?

FR: Right. "Let's rethink this whole thing." So after three years, why, I had the opportunity to reactivate my commission. I came back in and joined the regular corps and spent the rest of my career in Public Health Service.

When I came back, I started with the computer group.

DH: What year did you come back in?

FR: Sixty-six.

DH: Sixty-six.

FR: That was the first opening, and I knew that once I was in then I could transfer, you know, wherever. But I enjoyed working in the computers, and I guess I did a tolerable job. Nancy Pacquin was there, and let's see . . . Who . . . ? Leroy Cook, I think, was the head of the computer group at that time.

But I had my eyes on the nuclear facilities group, Dave Harwood's group. Actually, the task that I had was to develop a computer database for environmental sampling around nuclear facilities. So that was my task then.

I was trying to develop my long-term plan, so I had a . . . Getting read to apply for long-term training, and figured that the environmental aspect was where I wanted to be,

but I should get, you know, more experience. So I went with Gitlin in the x-ray program, and got involved there. Nothing really exciting . . . Well, even there I was working with computers in Gitlin's effort to try to computerize the hospitals around the country, make them more efficient, and what not.

You asked about the "708" Club. In '60--late '60 . . . Actually, it was '61, a group of us, four of us, rented a house. It was myself, Tom Fewell, Paul Larock . . . Who was the other one? Rodger Leupold wasn't there at that time. But, anyway, there was a group of us rented a house and sort of became known as the PHS BOQ. We had a lot of nice parties, and it was always . . . If there was a space, if someone was through town with their TDY and didn't have a place to stay, well, you can sleep over there in the corner. So you never knew who you were going to have there. It was a rather interesting situation.

Another interesting thing in that early phase was Joe Gitlin was doing the Dietary Food Study. Basically, what he did was to get a number, was hire young college--and it was gals--to go out and interview families of what have they eaten in the last week, and try to get a complete list of what people were eating. Then they would go to a grocery store and buy that in proper quantities, take it back to the radiochemical laboratory that Tony Lamonta ran there in the basement of Chapman, and ash it, and actually find out what was the radionuclide content of the typical diet.

Well, having these sweet young things, co-eds, wandering out usually at night, because that's when people were home, didn't seem too smart, even back in those days. So Joe Gitlin encouraged a number of us guys from the "708" Club to be escorts. So we drove them around and went with them. It's interesting that we counted up, and I think we were up to six marriages that resulted from that. Don't hold me on the numbers; there were quite a few.

DH: You and Jan . . .

FR: No, she was not one of the . . . She was not one of those, no.

DH: OK. I thought maybe that she was also one. You were one of . . .

FR: But Sid Heidersdorf was. He and . . . Oh, what's his wife's name? Bill Frizzel was one. So there are a few.

DH: The . . . Now Joe said that there were . . . Well, I interviewed him previously, and he said that that was something of a matchmaking situation there. That they were (Inaudible).

FR: Well, yes. You might say that. Indirectly I met Jan through that. Jan's roommate, Nancy Pacquin, worked at Rad Health and came to these parties and encouraged her to come along. Of course, when she came along, why, then we met, so . . .

DH: How long did you work for Joe then on that area?

FR: Well, let's see. That was probably '67 to '71, and then I got the approval for long-term training, and that's when I went Harvard. At that . . .

DH: Were you part . . . Were you . . . ? Before you were at that point, how much did you have, if anything, were you involved with XES with that study or . . . ?

FR: Not at that time.

DH: OK. What were you doing during that period of time then?

FR: Primarily working with the automation--by automation, I mean, utilizing computers--in radiology departments in hospitals. Joe had worked up a deal with the Massachusetts General Hospital, University of Penn's Hospital . . . What is it down at Atlanta?

DH: Emory?

FR: Yes, Emory Hospital, and then we went to Mayo Clinic and compared the operating procedures and tried to come up with some sort . . . And, of course, he tied in industry. He was trying to get IBM to develop systems and hardware that would help the hospitals.

DH: Well, this was primarily with the idea of making the facilities more efficient?

FR: Making them more efficient, better access to patient records . . . A lot of medical x-rays are repeats. Well, we can't find the old films, so let's take another one. So we figured if we could cut down the number of those retakes, then we would also be resulting in less exposure to the patient.

DH: OK. So then you left in '71?

FR: Seventy-one and went up to Harvard, and that was kind of a trauma for me, too. All along I'd been going, taking these other jobs, but my objective was get back into environment, because with my degree in geology, that's my true love and that's where I wanted.

Well, EPA was formed, and were you with Rad Health when he . . . ?

DH: No.

FR: OK. Well, they just sort of split it, like with an ax. Over here's the environmental side, and over here is the health side. I understand they had knock-down, drag-out fights of who owns that microscope.

Well, I was in the x-ray portion, so obviously was in the medical aspects; but yet, I felt I should be in the environmental aspects. So I don't know who was the power that be, but I went and I asked him, I said, "Look, PHS has approved long-term training for me, but I should be over here. Will you honor that long-term training?" And they said, "No." "OK. I'll stay."

DH: So stayed with PHS side then.

FR: So I quickly switched my topic for dissertation and career plan and did my . . . Well, '71, I came back in '75 and got the degree in '76.

DH: What was your dissertation research?

FR: It was on using time lapse photography in a cardiac catheterization room and a computer model of the radiation in the room so that I could calculate the exposure of any person in the room during the procedure. It took a lot of time. What you had to was identify where that person was and what was the field at that point. But it could be done.

DH: How . . . ? Did the service use that in any way later or did . . . ?

FR: Not really. I think it was one of those dissertations that, yes, that's nice, put it on the shelf, and there it sets.

Although Bart McIntyre felt that maybe it had a real impact on the use of nuclear medicine techniques in cardiology, because I did show some exposure to the operators, the physicians actually manipulating the . . . It wasn't much or bad, but it raised their level of consciousness so that they were trying to find alternate ways. Whether that's true or not, I don't know.

DH: OK. So then coming back in '76 . . . ?

FR: Came back in '76. I worked with Joe Arcarese in what then was the Medical Branch, and got involved with DENT (Dental Exposure Normalization Techniques), got involved with NEXT (Nationwide Evaluation of X-ray Trends), and a few other little

studies, but those were the main ones. Basically, my involvement with NEXT became my life's profession, you might say, from there on.

DH: DENT, you were actually involved with DENT before NEXT? Or was that in . . . ? Or were they going at the same time?

FR: DENT was already going, and actually when I got to work with it, it was more of a maintenance, and the decision had been, "Well, we'll almost sort of let it slide away." So there was no real effort put into maintaining it at that time.

DH: NEXT was coming along and . . .

FR: NEXT was coming along, and one of my tasks was to make it more acceptable and logical, and that's when we really changed it in '84 to a much more rigorous type of program where we actually did sampling, as opposed before you could go out and get fifty, you know. This time we said, "We want these," and we selected those facilities by a random process. So it was statistically dependable.

DH: OK. So the initial NEXT projects were just, it was more voluntary as to who participated in them?

FR: Yes, yes. Right. We asked the states to provide us fifty--twenty-five or fifty surveys of chest, lumbosacral, spine, abdomen, and what have you.

DH: And how did they . . . ? They did that by . . . Did they send their people in or did they just contact the facility and say, you know, "I've got a standard person or I've got a person of such and such a build. What are your parameters for doing an exam?"

FR: They actually had a state surveyor go to the facility and say, "We have a standard-sized person, and here it is, twenty-three centimeter chest, twenty-three centimeter abdomen, nine centimeter head for the skull. An average build person. Set up your technique as if you're going to x-ray this." Then they would make an exposure and measure the machine output using those parameters. Right on, we found the problem. One of the problems was a wide variation. You tell one person what's a standard person, and another person could be entirely different.

But that was sort of taken care of when they went to the photo times. The NEXT program was originally set up to find out the trend in radiation throughout the country, and it was to be voluntary. Each state was to submit--I think they said twenty-five--at least twenty-five surveys, hopefully of each of the projections that they had. I think it was ten medical and two dental projections.

But it was strictly voluntary because it was working with the states, and they chose their own facilities that they surveyed.

DH: Now how many states were involved at that time?

FR: Well, it varied. It went from . . . The pilot test I think was a dozen. I think the maximum we had at any one given year was say thirty-six. Most of us felt very uncomfortable with that, because if you were a surveyor and you were busy, and you were given, "Hey, give me fifty chest examinations," why, you'd go out and get fifty, probably the closest ones you could drive to, and it wouldn't be a fair distribution over the state. So that was . . . The statistics didn't seem right.

The other problem was this idea about you're taking an examination of a standard-sized person, and what does that mean to another individual? So we also photo timing was becoming a major part of radiography. Very few people did the old manual set. Just set the kvp and let the photo timer take care of the time.

So we had to design a method of doing that, and we did by developing phantom, and, of course, that . . . We don't have one phantom that does all, so we tackle a body part at a time.

The first one was the chest phantom, and Burton Conway was very instrumental in developing that. So they set up a protocol where we would then get a list of all

facilities that did chest examinations, and we would randomly select the numbers, give that list back to the states, provide them with the phantom and the equipment--and, of course, we had the protocol worked out, how the survey was to be done--and asked them to do it. We had much better response then. I think we got forty-four, forty-five of the states would do it.

Now, it still was voluntary in that we had no money to give the states, but we did have some carrots. We provided training, and all states cry for training. We had the equipment which they could use for this, but then they could use it for their other. And, as you know, MDH's don't come cheap, and the states have the same budget problems as everybody does.

So it worked out pretty well. By the results being that much better, people could put, you know, more reliability to it if they started seeing some advantages, if they can draw some comparisons from year to year and what not.

We soon realized that we would never be able to hit all the exams. So we chose the more prominent ones and the ones for which we could develop phantoms. Then every third, fourth, or fifth year repeat an exam so we could get that, that "T," the trends part of that.

DH: Initially, the study, basically you went in and you tried to collect information from a facility on a multitude of examinations, and then that evolved into looking at one

particular examination, and tried to get more facilities and more states, and hence more facilities, involved in that.

FR: Right. And those that they got to be a true random sample, rather than go get the ten that's closest to your office and that sort of thing.

Now, you know, we don't have proof that some states did that, but I'm sure it did happen. It's human nature.

DH: Yes. But basically you'd take a facility, a list of facilities in a particular state, and then randomly select from that. Now was it . . . ? How . . . ? Was that done within your particular group or . . . ?

FR: It was done in our group. We requested that the states would send to us a roster of facilities that would be performing that exam. Some states, they had it computerized and could zip it out to us. Other states, they'd just give us, "Well, here's all x-ray tubes in the state."

So we could go down through it, and if it said DDS, well, forget it for chest work. If we could not tell, we would put it on the sample, but we would then over sample, random sample. Say, "OK. Here's the list. You need two. Go down the list. The first one that is not a facility that performs the PA chest, go to the next one; and if it is, fine,

then go to the next one. If it isn't, then, you know . . ." That way we kept some sort of randomness in the process.

DH: Now, you were talking about the phantoms and a rotation of the phantoms over a period of four or five years. What all are the lists of tests that were done? You . . . The chest was a PA lateral chest?

FR: No, just a PA chest.

DH: Just a PA chest?

FR: Yes. And then we had the abdomen, which actually we had . . . Basically a hunk of Lucite with a strip in it that would represent a backbone so that we could get an LS spine as well as an abdomen. It was just that you're looking at different tissue. An abdomen, you're looking at the more soft tissue, and the LS spine you're looking for the bony structure. So we could . . . So one phantom kind of served both of those.

We used the CT phantom, commercially available.

DH: To do what kind of a . . . ?

FR: CT, computerized tomography.

DH: But CT of what area of the body?

FR: It was the head phantom.

DH: CT of the head?

FR: Yes. Let's see.

(Interruption)

DH: OK. CT head?

FR: Yes. We developed a dental phantom so we could do a bitewing-type exposure.

DH: How about mammography?

FR: Well, yes, and mammography, and that is the real success story. We chose the RMI, a company in Wisconsin, chose their phantom, which is the one that the American College of Radiology basically uses.

Bill Thompson and I went through some data and chose the size of test objects that we wanted to see. What we did was use some of RMI's own data, where they showed this particular size, just about every facility could see; and this particular size, very few saw. So we kind of randomly put sizes in between there, and said, "That's what we want." When they say, "Well, just for one or two, we don't want to make a run just for that." We said, "Yes, but we're going to provide one for each state." "Oh, fifty of them. Yes, we can manufacture that."

So they did, and with some minor variations, that has become the standard one that American College of Radiology uses in their Mammography Certification Program. To me the success of NEXT is the mammography program, because in '85 when the data first came out, it was earthshaking, particularly to the radiologist, and it showed that image quality sometimes can suffer when you constantly emphasize (Inaudible) reduction. The idea in medical radiography is to get the maximum information to the physician with the least radiation possible. You can pull the plug and not have any radiation and, you know, save the radiation, but, of course, that wouldn't do.

So we pointed out that it has to be a balance, and by the use of that phantom, we actually increased some exposures. But overall, I think, we reduced it because of other

things that we implemented, like improved equipment, indicated. Another real finding of that was the film processing, how it has to be optimal in mammography or you have all sorts of problems. So part of the mammography survey was the survey of the darkroom and the film processing.

And, of course, that data eventually led to the MQSA, because I remember I was working late one night--early nineties, I can't recall when it was--and got this call from a person who said they were on a congressional staff for Senator So-and-so. I said, "Well, I'm not supposed to talk to you. You're supposed to go through channels." He said, "But we don't have time." "Why?" He said, "Well, we want to introduce a bill tomorrow." This was on Friday, they wanted to do that on Saturday, and "We want to know what kind of quality control test would you put in for a mammography facility?" I said, "You sure this can't wait till tomorrow?" He said, "No." I said, "Thirty minutes is the maximum I can give you." So I said, "Give me your name and number," and I went down and I think it was . . . John McCrohan was still there.

So he and I set out, outlined specific tests, and then we went back and called them in, and sure enough, I think it was the Brock Adams Bill was introduced, and it had pretty much that amount of detail in the bill for quality control. Of course, it has, you know, went through a few iterations and things were changed, so it wasn't verbatim, but . . .

DH: What about some of the other projections that have done? I recognize, and I think it's important, that mammography has, of course, stood out. But I think that, you know, there have been a number of success stories with the other projections as well.

FR: Yes, but the other projections don't have near the amount of exposure. Mammography, the type of organ you're looking at, you have to have extremely low energy x-rays so they're practically all absorbed. Whereas in chest radiography and so forth, they actually go to higher energies to get better penetration and . . .

DH: But with a higher penetration they basically a lot of that energy goes on through the body and is not absorbed, so the radiation is lower.

FR: Goes on through, is not . . . Right. So we really haven't found other projections to which we can get as excited about as we have mammography, as far as improving. Yes, we would like to improve the darkroom quality in all of them, but that doesn't require, you know, measuring the exposure. But we do that to keep a trend on it.

The thing that's coming up now and really is . . . Well, I guess it was partially NEXT. We did a fluoroscopy study, and we're finding some of the exposures when they put it in a high-output mode were quite high. Tom Shope has taken that some steps further and looked at a few of those facilities, and has actually started to see actual

radiation skin burns from interventional radiology, where they just try and manipulate a catheter while they're fluoroscoping, and, you know, they just, oh, burning away so to speak.

Although that's not a direct output of the NEXT program, it kind of fed a little bit of fuel to the initial fire to take a look at that.

DH: Was NEXT able to demonstrate reductions in exposure in any of these other projection areas that could be correlated to use of particular kinds of either techniques or new equipment that came on the line?

FR: There was--still is--a reduction in exposures over the time. We can't put our finger on any specific piece of equipment and/or technique. But we feel confident that a lot of it is by going to the faster screens and film, that whenever you can get a decent radiograph for half or a fourth of the radiation, it's worth it. The problem is a lot of these screens out there are real old, and they cost money, and physicians don't want to get rid of them. They'll keep using them till they absolutely can't, and then they'll buy the newer, faster screens.

DH: Do you think that if in the beginning, if the NEXT program had developed as more of the compensatory-type situation rather than being voluntary on the states it would have changed the amount of data that the bureau got?

FR: I don't think so. I think it would have been a tremendous amount of money to make an impact. But it is possible. One of the problems that state programs have is they're under the gun now, too, with cost cutting. And the state legislatures say, "Here, you're doing this for free for the center? You must not have enough to do. So, therefore, we're going to cut your budget, and you can get rid of a few people, because you don't have enough to do on our state programs. So, let the feds take care of themselves."

So with that in mind, I don't know. A lot of the problem is channeling the money. As many states--it's just like the federal government--you give them the money, and it goes into the big general revenue pot, and the unit generating it never sees it.

DH: I . . . You know, it makes me always wonder whether or not, you know, these programs . . . The bureau was always, I thought, relatively well known for the fact that they, while they provided the training and they were very strong in the training area, you know, they were able to accomplish a significant amount of work on very little money. I think this was largely due to the folks who were, you know, running programs, such as

yourself in this program, to be able to work with these people at the state level to try to get them to, again, cooperate without getting a direct compensation.

FR: No, that's true. No way could we have afforded doing NEXT if we had to go out and pay for it. I considered my task was more of a salesperson. Yes, we had to have the technical thing, but we had to convince the states that they wanted to do it. Sometimes I say it with tongue in cheek, but really it shouldn't be. I think it's fairly true. I had hard times sometimes distinguishing whether I was a state person or a fed person, because there are two ways at looking at a problem, and if you're going to get anything done, you have to see where the other person is coming from and reach some sort of reasonable compromise. So many of the people, particularly in the latter years of the bureau--center, whatever we were--said, "Well, we're the feds, and we're going to say this is the way it is, and that's the way it should be done." Well, nothing raises the hair on the back of the state people more than that kind of attitude, and they'll just dig in and won't do it.

DH: The idea, though, right now at . . . We said about the fact that the number of states that participated at any particular point in time with the NEXT program did vary. Were there particular states that were always a part of it versus particular states that were never a part of it?

FR: One or two in each category, but in general it was pretty well shifted. This state would participate for two years, and then drop out for two years, and then they'd participate for two years, and drop out. So it was pretty well evenly distributed. What it amounted to as far as some projections, you know, we had gaps in certain area of the country. But looking at them as a whole, it was fairly even.

But one interesting thing, we looked at it state by state. Now the new NEXT, the sample size is smaller. Our argument was if we controlled the protocol, controlled the sample and indeed got a random sample, we wouldn't need nearly as many surveys to get reliable data. So first on . . . But that would then limit us to making a state-by-state comparison. In other words, we sampled each state according to the population of x-rays. So that little ol' Rhode Island, say, might have two and big ol' Ohio might have a dozen. Now how can you compare the average exposure for PA chest with a sample of two versus a sample of twelve?

Early on, though, in the old NEXT we looked at this, and we found very little state-by-state variation. So we try to group the states and say look at the Northeast versus the Midwest, and however we can come up with reasonable size statistics, and it appears that there's no real "average" difference. You're going to have the extremes in both places.

DH: Right outliers.

FR: Yes.

DH: In talking about outliers, do you know what feedback the states provide to the facilities that they do survey as far as . . . ? Or is that something that the Bureau of Rad Health did to get information back to the facility to say, "Hey, your numbers on this projection were extremely high. Consider taking the following steps," or things like that? Did that happen?

FR: If that happened, it was the state's doing. We, at the federal level, looked at this as a data gathering; the information is confidential; we will only release it to a state in which that survey was done. We will not give Arizona Nebraska's survey results. That sort of thing. And we left it up to the state then, any interaction with their people, with their facilities.

We also encouraged the states not to do a compliance survey while doing a NEXT survey. The idea is, one of the statements was, we wanted to tell the facilities that this is a data gathering, and it will go into a MASA(?) computer, you know, database. Your name and address will be removed, so no one can come back and point any fingers at you. That we meant, and we did follow. Of course, we had to give the results to the states, and then what they did with it was another situation.

I do know one state that signed a facility, and then later on I talked to the state person who did the survey. He said, "Well, that happens to be the facility that my mother goes to, and I'm going to wait a couple months, and I'm going back and resurvey that facility and point out a few things that . . ."

DH: You mentioned about, you know, differentiating at least on a timing basis between a compliance survey versus a NEXT survey. What is . . . ? What comprises the . . . ? We've talked about NEXT, but what's the compliance survey?

FR: The compliance survey depends on the state. Some states have just, "Is HVL in a reasonable range?" and "Is the exposure level less than the 75 percentile of all of them that we've done in the nation up to that point?" This was from the old NEXT, so it was a very high number. The rest of it usually is, "Is the tube registered?" and administrative type of stuff. Some states go much beyond that and do a very detailed survey.

DH: So the states, then, have requirements on x-ray facilities as far as how well they operate, and that is a mandatory-type survey that the state conducts. Your goal, then, was to make sure that the facilities knew that the data you were reflecting for NEXT, you know, was voluntary and extremely separate from that.

FR: Right, right, and it's a research project, and we didn't want to get involved in any of them wanting to withhold data because it might incriminate them. We want to know what's really going on and then back off.

(Interruption)

DH: OK. I wanted to go back and look at some of your experiences as a whole in the rad health area as far as the relationship you had with your colleagues, as well as your supervisors and those you supervised. Anything along those lines you'd like to talk about?

FR: Well, I think that Rad Health--and I think it's fairly general throughout the Public Health Service, but I certainly observed it in the Rad Health--it was pretty much a family. We knew each other; we knew each other's capabilities; we'd call on it; we didn't rely totally on administrative lines, you know, barriers--we approached almost everything in a team effort where we could use everybody's talents. That also, I think, permeated our relationship with the states, which gave us a fair amount of credence with them. I would sort of liken it as we never approached a problem that there was a bad guy and a good guy, but that we had a problem, and that we needed to find a solution that would work and work with them.

Another kind of part of that was the idea that education needed to be a big part of it, that many of the problems were people problems. Not that people wanted to do bad or do a poor job, but they just hadn't been trained or didn't know the right way of doing it, and that's why early on we had such an effective training program, that we brought people in from the states and trained them in radiological health.

Obviously, I'm biased, but I think one of the worst things we did was when the training program was done away with. I can see the logic in bureaucracy saying, "Well, this entity, this industry has grown enough now. It can be self-sufficient and people can pick up and charge for this training." But I don't see it as having happened for the state people. They're usually not paid very well, and they can't pay the tuitions that usually show up only as one-week, two-week courses provided by these entrepreneurs.

But that feeling of family, I think, was a great help, because I've worked with states and had it said to myself, you know, after hours, they go to somebody's room and have a beer or two and discuss going on. They'd always say, "Come on in, Fred. You're not one of those feds," you know, and I was able to interact with them. So they accepted me as one of them.

DH: I was of the opinion that the periodic regional meetings, the way they had set up, and the opportunities that headquarters personnel were able to go to those meetings and

take an active role, both in the daily sessions as well as the evening sessions, was a positive thing.

FR: Yes.

DH: I think a . . . And certainly as part of the NEXT program, you probably had an opportunity to go to a number of those kinds of regional sessions.

FR: Yes, a number of them. Then the NEXT program, when we tried to do a different projection each year, we conducted a training program for the protocol for that projection. We went out and had four or five sessions, and the states would come, you know, a dozen or so to one site, and that provided another one-on-one contact with the people out actually doing the surveys.

You . . . The one problem we had with the CRCPD--that's the Conference of Radiation Control Program Directors--whenever they had a meeting, it was usually all the bosses. It wasn't the guy that was out doing the survey. And people were trying to get us to put on some training programs at the national conferences. I think we did one or two, but our heart wasn't in it, because that was the wrong people to be training.

DH: Yes. You weren't getting at the folks on the firing line.

FR: Right.

DH: The leadership in Rad Health, again, I think was a large reason for that family that you mentioned. But what about funding and otherwise support for these programs? Were there problems, or was it fairly easy?

FR: Well, early on there was not any real problem. We pretty well had a lot of funding and could do what we want. As times went on, it kept getting tighter and tighter. As a matter of fact, NEXT itself was in fear of just being done away with after '85, '86. It would have been a disaster, because it was the '85 data that really started the mammography issue rolling. And in '88, we did it again and pointed out the trends and some improvements just by calling attention.

DH: The reason for that funding was because of what--what, in your opinion? What caused it to fall out of favor, if you will? Was it . . . ?

FR: I was not at the upper levels to really know, but the gut feeling was we were emphasizing medical devices, and let's face it, in radiation, you don't have any bodies laying around. Where a failure of a medical device or something, you can do a body

count. It's a fact of life. If you want to put "X" number of dollars down to protect lives, well, you put them down where you can find the most bodies.

DH: So it wasn't . . . In your opinion, it wasn't necessarily out of favor, it was just the matter of priorities . . . ?

FR: Just the priorities, yes.

DH: OK. And now it's been . . . Is there some change . . . ? Do you feel they're going to change in that area now?

FR: I feel a little bit in my visits back to the group that I'm with. It is still a struggle. The mammography group is going great guns, because that is a politically correct program at this point in time. And the number of people there see it as a building block to rebuild the x-ray program capability; because let's face it, a little later, a couple more years, the mammography program will be a maintenance program--not a gearing up. So then those people will be free to look interventional radiography, fluoroscopy, or what other programs or projections can be defined as a real hazard.

So the feeling is that there may be a light at the end of the tunnel. We're not quite sure, maybe a little foggy yet, but beginning to think that there is.

DH: As you look back over your time in Rad Health, is there any . . . ? What do you think is the major contribution that you were able to make in this area?

FR: Well, you know, it's hard to prove, and I hate to brag, but I feel the NEXT program has been--particularly the mammography part of the NEXT program--has been my reason for existence. Now I'm a Christian person, and I believe that the Lord directs us. It's just that sometimes He doesn't make it too clear to us where we're going at the time. And I went back to that split in EPA, when EPA was formed, and I was in the x-ray side and not in the environmental. That was a real setback to me. I said, "Why?" You know. "This shouldn't be right, you know, a 180 degree turn."

After going through the NEXT program and seeing what MQSA has done, and I had a very integral part in that, and I said, "You know, there are probably thousands of women alive today because of that program." That's why the Lord sent me down this path. Now, that's not saying it wouldn't haven't happened in a year or two or three anyway, but at least I was able to help.

DH: Any particular thoughts, last thoughts about career in general?

FR: Well, it's been a great career. I've enjoyed it. It's had its ups and downs. The thing I really like about it was the camaraderie and respect. I consider myself like an

engineer, and, to me, an engineer who takes the scientific principles and make them work on something. Some people are theorists, and they come up with these beautiful models and so forth, but what happens? You know, it doesn't do anything. And I felt that in the Public Health Service, we were about protecting the public's health, and we did it the best we could with the resources we had.

DH: No regrets about losing geology and . . . ?

FR: No, not really. Oh, I still belong to the Geological Society of America, and I'll read the journals now and then, and, yes, I get an itching to go back, but I don't have any real regrets.

DH: You don't miss climbing mountains anymore?

FR: No. Early on when I was climbing mountains and I was eating my lunch with a guy that I was a field assistant to between years as a graduate student, sitting under a pine tree there in Montana, and over in this valley was a herd of antelope, and over on this other valley there was a herd of elk. You know, a gentle breeze coming through. I mentioned, I said, "You know, I can't believe it, getting paid for a job like this." My field partner said, "Well, Fred, let me tell you something. No job, no matter how interesting,

if you do it long enough and for hire soon gets to be just another job.” And I think there’s a lot to that.

DH: OK. This concludes the interview with Mr. Rueter. Fred, thank you for your time.

FR: You’re certainly welcome.

(Interruption)