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by [signature]
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Interview with Claude Sill, 8-18-94

Burt Baldwin (B) and Bryce Rich (R) are interviewing Claude Sill on 8-18-94.

(Sill's narrative is in bold print.)

(B) Claude, do you give us your permission to use this tape recorder?

Sure.

(B) There are some formalities here, some specific information that I need to ask and then we'll get into more general things. I've got you down as your date of hire is 1951 when you came here to the site.

Yeah.

(B) July 1, 1951, okay? And you went to work for AEC then, didn't you?

Right.

(B) And you were...

I was Chief of the Analytical Chemistry Branch, if it's relevant to anything you'd be interested in.

(B) Okay, and you remained there until you retired from AEC and then came to work for EG&G, here.

That's right. I retired, yes, I think it was January 2, 1980, and my retirement lasted for 30 days, when I was going bananas, so I came back to work for EG&G on February 2, I guess it was, 1980.

(B) Okay, All right.

(R) Just for my recall you were Chief of the Analytical Branch the whole time you were with the AEC.

All but the last two years, I guess, when Marcy Williamson came in as the new director of the, I guess it was Radiological and Environmental Sciences Laboratory at that time. Uh, he took, I don't know whether he felt that the old chemistry branch needed some new blood or what, but in any case he moved me as his principal scientific advisor, and a guy by the name of Lou Bodner came in as Chief of the Analytical Chemistry Branch, so I was Chief of the Analytical Chemistry Branch for all but the last two years of my tenure there, til 1980.

(R) Did the Analytical Chemistry Branch have responsibility for whole body counting and that area of responsibility?

You bet.

(R) That was part of the Analytical Chemistry Branch, right.

Right.

(R) So one of the areas that we'll be wanting to explore with you a little bit is some of the experimental work that went on as part of the whole body counter development work that was done here.

I'm not right sure how detailed and explicit I can get, in that particular area. I was Chief of the Analytical Chemistry Branch and as such, everything that went on there was within the purview of my responsibilities, but I didn't do it personally. But I had some other people, and maybe you want to put some of these names down: Dale G. Olson was chief of the radiochemistry section in my branch and another guy that you might want to talk to, I'm not sure where he is. He might not even be alive yet because I haven't talked to him in a lot of years. This is a guy by the name of Jesse I. Anderson. Now Jesse was one of the guys most directly involved in the whole body counting at the Calibrations, the original rotoscanner, whole body counter and stuff...

(R) Did he work for Dale?

For Dale, yeah. Jesse would be a good guy to talk to, if he's still around.

(B) Sure, sure.

(R) Purcell, did he...

(B) Purcell?

Yeah, Rex. Rex Purcell was in the instrument group under Mack Wilhelmson and he was, Rex was strictly an instrumentation type. He was the guy that maintained our counting equipment.

(R) Did he get involved in the whole body counting?

Yeah, in that, as I say, he was the one that did a lot of the calibrations and so on like that.

(R) Would it be worthwhile talking to Wilhelmson or Purcell?

Who?

(R) Wilhelmson or Purcell.

Well, Wilhelmson is dead.

(R) Darn, I'd forgotten. Yeah, he died.

(R) How about some others, how about Rex Purcell?

Yeah, again, I haven't seen or heard of Rex for many years so, I don't know where he is now. Certainly he would have some knowledge on the instrumenta-

tion and maintenance and the calibration and things like this of the whole body counters?

Another guy that was involved with the rotoscanner would be DeRay Parker and he is dead, too, now, so you can't talk to him. That's why I say, Jesse Anderson is one guy that might be most knowledgeable about...

(R) He lived in Riverside, down in Blackfoot area, didn't he?

I don't even remember that. The last I remember, when he was in Idaho Falls, I thought.

(R) Uh, maybe I was mistaken.

(B) Did we ever count people in a gun barrel?

In a gun barrel?

(B) It sounds funny, I know.

Not in a gun barrel, per se, unless you've got a gun barrel that's five feet in diameter. Our original whole body counter was a circular, cylindrical piece of pre-atomic bomb vintage armor-plate steel, battleship steel, and if I remember correctly, it was an ammunition chute or something, big and round, a circular thing, and if I remember, it was about five feet in inside diameter, so we just cut out one of these big cylindrical things, uh, oh, I guess it was about four feet high and put a back on one side and a hinged door on the front side and that was where our original whole body counting was done, inside that circular thing and, incidentally, that thing, and this might be valuable in terms of timing, that whole body counter was installed on the outside of CF-646 and a cinder block enclosure built around it, and then when we left CF-646 and went down and built CF-690, as far as I know, that shielded counter stayed where it was. It was inside; we couldn't get it out without tearing the whole building down, but by that time, and anyway, we had gotten ahold of some flat pre-atomic bomb vintage armor plate battleship, the old background steel, that we built the present whole body counters in CF-690, but that one was a circular thing. You go into it and you had to duck to keep from cracking holes in your head, and the sides were rounded, and so on.

(B) This may be where we have this reference to this gun barrel, and I know that we've had some gun barrel sections around but none of the ones I've ever seen were large enough to fit a person.

No, this was not a gun barrel, in the sense of a projectile going down it.

(R) They just called it that.

(B) They called it that because they didn't know what else to call it and it reminded them of a gun barrel.

If I recall correctly, it was an ammunition chute.

(B) Okay.

It was a heavily shielded, circular tube in which the ammunition was funneled down into the guns, or something like that.

(B) Sure, sure. Do you have any sense about when this was installed? This ammunition chute?

Oh, gosh, let's see. I first came up here on July 1, 1951, before there was even a road out to the site, except through Blackfoot, and I remember that I spent darn near the first year, maybe 9 months of that first year, in town because there wasn't anything to do out here. I remember Mack Wilhelmson and I used to drive down to Blackfoot and come out here once in a while to sort of supervise construction, remodeling renovations of the old concrete bunker, the bombproof powder storage from the Navy gun testing program, and so I know that there was a year at least after July 1, 1951, when there was nothing out here and then, shortly after that, was when we got the remodeling done on CF-646 which I understand, talking to Tom, is also a point that needs to be clarified because 646 was the original number, the original building in which we built our laboratory and it set right next to a separate building, a smaller building with the number, 633, and then when we moved in there, Foster Cipperly brought his Personnel Metering Group in there and so on. They tied CFA-633 and 646 together and put the Personnel Metering people right back in there and then for a while, the 646 sign on the front door was left there and 633 on the other end of the building was left there, and then eventually the CFA-646 was withdrawn and the whole composite was now called 633.

(B) Okay, okay.

So that's where 646 was. It is part of the existing 633 building. So I don't remember how long after we got that building remodeled that the part where the whole body counting thing was installed. It was installed up alongside the outside of the building, and remember, this was the old Navy powder storage building, they were all steel reinforced concrete. That north wall was ten solid feet thick, that was the percussion wall, and they'd test fire their remodeled, the rebored guns, out north of there and so it was a cat hauling job to do any... I remember it took a crew of four men with jackhammers, I think a week, to punch two holes through the roof, which is 2 feet of steel reinforced concrete, to get a hole there for our exhaust stack to come out of. So, in any case, this whole body counter was moved up against the outside wall and then a little cinder block addition put around it, and so, I'm just trying to speculate that it might have been a year or maybe two years before we got that in, after we got the building remodeled, that the Navy had, maybe that's a little bit long because we started working on it, if I remember correctly, shortly after we moved in there, so I would guess it would be '51, '52, maybe in the '53 or '54 range.

(B) That meant that you had whole body counting facility there by the time we started dealing with processing stuff out of the Chem Plant, TRA, and...

Pretty close.

(B) You didn't have much slop, did you.

(R) Let me, uh, just kind of a general question. You could probably outline for us, Claude, I'm sure you've given some thought to it. Can you check off the human effects, that's what this is all about, the human effects studies that were done at the site of which you're aware of, or would you just list them?

Now what do you mean by "human effects"? You mean the deliberate stuff, or...

(R) Experimental, anything experimental in relationship to humans that was done here.

Well, yeah, uh, the first one that comes to mind, of course, is the work involving, the tests involving RaLa operations. Uh, there was a program called RaLa, which is capital R, small a, capital L, small a, standing for radioactive lanthanum, which was the separation of Lanthanum 140 from short cooled fuel elements. This was the trigger for some of your early bombs. And so to get the radioactive lanthanum out, they had to process fuel elements from the Chem Plant, and you guys both know probably better than I do, after very short cooling and after that short cooling, of course, you inventory the iodine 131 with its eight-day half-life, uh, was pretty maximal and so that iodine would come out of the stack and settle out on the surrounding areas, and so they put some cattle in there and let them pick up the iodine and then we had some volunteers who drank some of the milk, uh, containing iodine 131 and they were then monitored with the thyroid counter and, of course, we were (we meaning my whole Analytical Chemistry group) kept track of the iodine activity in the milk and the activity in their urine, excreta, feces, and directly in the thyroid.

(R) And so you did all the analytical work associated with it?

I was Chief of the Analytical Chemistry Branch and, incidentally, we ought to put in Dr. G. Victor Beard, who was the original director of the Health and Safety Laboratory of the U.S. Atomic Energy Commission at that time. Uh, the reason why I was hired was under the philosophy of having a single "bioassay group" that would handle all bioassay work and all environmental work for the entire site, all the contractors on the site, instead of having to set up a different laboratory, a different organization for each contractor on the site and this was one of the things that crossed contractor boundaries, so that was my original charter, was to set up procedures for urinalysis, particularly, when I first went up there, just urinalysis to check up on internal contamination by all the contractor people working on the site, all over the place. Then of course, later on, that got extended to whole body counting as fast as we got smart enough to do it and then, certainly, a little bit later, the

whole picture of the environmental concept came in. We did lots of sodium measurements, trying to use the sodium chloride from regenerating the ion exchange columns at the Chem Plant and, so on, as a tracer going down the well and things like this.

(R) Did you do, you had the thyroid counter, was that one of the early developments was a thyroid counter?

Yeah. I can't even remember very much about the thyroid counter, uh, it was not a very sophisticated thing, by today's standards, it seems to me like all we did was strap a raw thallium activated sodium iodide detector on the guy's adams apple and wait for the count to show up on the counter.

(R) You know how you calibrated that?

No, but it would have been something like that, we would have taken a bottle with, uh, approximating the thyroid size and shape and so on, and put in an amount of iodine 131 in it and, as I say, it was not a very sophisticated.

(R) Did this RaLa experiment, uh, you said involved human volunteers to drink contaminated milk, was that a DOE experiment, or was it one of the contractors or who suggested and ran the experiment?

Well, we're getting into an area now that I'm not going to be very familiar with. I was chief of the Analytical Chemistry Branch and it was my responsibility to provide the analyses, which I did without poking my nose into other people's business.

(R) Well, you didn't... Or maybe I shouldn't put words in your mouth. Did you participate in the design of the experiment?

I did not. I didn't. Only the analytical. Now at that time, when Vic Beard set this Health and Safety Laboratory which had several names as we went down through time, originally it was Health and Safety which included the Fire Department, the safety engineers, and the doctors and the dispensary and the whole works, and then part of them get put out into a division of their own and so then the title came back to Health Services Laboratory and so on. Now I forgot what we were talking about.

(R) Who designed the experiment?

Oh, okay, one of the, uh, when Vic Beard first set up this division, he had four branches, an Instrumentation Branch, a Health Physics Branch, A Personnel Metering Branch, and the Analytical Chemistry Branch. Now the chief of the, uh, I'm sorry, Site Survey, we had a site survey branch which was headed up by a guy name of Percy Griffiths and Percy had a guy by the name of Clyde (Gus) Hawley who worked for him and Bill, uh, oh, hell, he'd kill me (Gammill). In any case, as far as I know, most of the plans for this originated in the Site Survey Branch.

(B) This would have been early; this was long before the CERT project came along.

I would think so.

(R) Let's see, early, the front end of the RaLa process...

Well, again, I don't know if it was the front end or not. It seems like I heard RaLa all my life. I know it was a dirty damn thing. Every time you guys would dissolve one of those fuel elements... Within a week after it was removed from the reactor, we'd get iodine all over the place and this was very interesting because...

(B) All over the place at Central?

The site, I mean, the farther out you go, the less bad it was. But I remember that this was all very interesting to me, because this was at the time when I developed what I think was the first carbon cartridge used in monitoring air for radioactive iodine. Now, I remember I had a little carbon cartridge, about a half-inch in diameter, about two and a half inches long, and we'd go out and hook that onto a pump and draw air through it and stick it down in a thallium activated sodium iodide well crystal, where at that time, the only ones available were about a half-inch in diameter and two inches deep and, here again, I think this is correct, I am taking credit for having been the guiding force behind getting the first large well crystal made because I remember talking to this guy from Oak Ridge and I told him, I want you to take a 3 by 3 crystal and dig a hole in the middle of it, two and a half inches in diameter within a half inch of the bottom. I remember he said, oh, yeah, I can do that, I got a crystal in there's got some bubble in the middle and we'll try it, and if we wreck it, it's no problem, so in any case, that's where the iodine cartridge started out, monitoring for iodine in the air. Okay. Let's see. What were we talking about?

(R) This is still the design and the conduct of the experiment.

I was an analytical chemist and I was doing whatever I needed to do to provide the analyses that other people thought they wanted, or that I suggested that they ought to want and so on, but it was somebody else, now again, remember Vic Beard, he was the director of this laboratory and as far as I'm concerned, my good friend John Horan notwithstanding, he was the best director we've ever had, he was a scientist and he appreciated good science and good scientists, and in fact, he <u>demanded</u> good science, so Beard really was the guiding light behind the whole damn thing. He would tell Percy Griffiths what he wanted, and give it to Perce to go ahead and do, so really, Vic Beard is the guy you ought to talk to.

(R) It's just a matter of trying to resurrect the information related to if any of these experiments might have been done and so, is it fair to say that in your capacity as analytical branch chief, you would know who they were, the ones that participated in the experiment? Do you know if they had any kind of

informed consent, formalized, or were they volunteers in the DOE system or who were the individuals?

When are you going to ask me questions I can answer?

(B) I, we'll take turns. Maybe I can find one easy enough.

I can almost certify, by today's standards, that there was no such thing as informed consent at that time, and the reason I can say that is that this business of informed consent, in fact the whole philosophy of human studies really started with me at this area, and I wrote this paper, an IDO document which was published as an IDO document. I don't mean to say that I was the only guy in the world who was worrying about human studies. I remember once talking to Dr. Gene Saenger from the University of Cincinnati at a meeting one time, and he came over and shook my hand and he said, I been wanting to meet you; I want to compliment you on having enough guts to write that article that you wrote about the logic of using human volunteers for calibration purposes and things like this that are going to be of benefit to everybody who comes through it.

(R) Was this an early paper, Claude, that the Health Physics Society...

Yeah, uh, no, no, this was never published anywhere except it was an internal document. There was an ID number on it and...

(R) Can we get that? Have we got it?

You certainly should.

(B) Turned the tape over and we are saying we're continuing the interview on the second side of the first tape with Claude Sill. Apparently the tape ran out on a few minutes of discussion that was not recorded, but the principal thrust of the unrecorded conversation was that the quantities of radioactive materials that may have been ingested or inhaled by personnel as volunteers were only slightly greater than that detectable. Do you agree?

Certainly not much larger, if any, than the numbers that we have been seeing for years in occupationally exposed workers which had not caused any particular alarm in the eyes of the cognizant Health Physics on the job.

(R) Good, good. The volunteers, the human subjects, were they mostly people in your laboratory?

Again, I'm going to have to think for a minute. My off-hand comment would have to be, yeah, they were entirely people within our laboratory and I remember the scientists actually participating in their own work, and I remember having said this at some meeting or on a public occasion or some place to show that we were not using people outside of our own labs simply because, in the first place, the number of times we had to do this was so small that we didn't need a large reservoir of subjects and, secondly, where

better to get peoples' support of this philosophy than the very people who are doing the work?

(R) Did you participate as a subject?

I did not. I did not ever do it and the reason that I didn't is because I was never needed or I was never asked. It was not because, either that I had anything against it or that as chief of the analysis branch I had to maintain my sobriety, or I'm driving so I can't do this, nothing like that. It's simply that I was never needed. The question never came up about having ne participate. I would have done so, very easily, very quickly, but I was writing a paper, I was pushing this concept philosophically.

(B) Was it typical, you mentioned, that these calibrations that were completed using human volunteers, were they published in some journals, or were they in a IDO document, or did any of them remain unpublished?

I would hazard a guess that none of them were ever published, simply because they were never the end product of some very deliberate, organized program to do this. In other words, you go ahead and you calibrate something and you say, well, we're getting a counting efficiency of about 27%, so the next time you see that in a human, you say, okay, that counting rate of about 27% means so many dpm, but that's just one item in a calculation. You almost never see counting efficiencies, counting times, and things like that mentioned unless it is itself the end product of the investigation. No, I would bet that you could not show a single one of these things had ever been published.

(B) Excuse me, I kind of interrupted you, I guess.

(R) Any other? You got two major categories, you're all familiar with the RaLa experiment in which your participation was primarily as an analytical resource to those who were responsible for the experiment, and then you had a series of calibration experiments in which you are an analytical scientist, participated directly both as responsible experimenters and subjects, is that a fair statement?

Right.

(R) Do you remember any other human experiments?

Before I get to that, you might also, if you can, find [redacted]. If I remember correctly, I suspect [redacted] probably took more of these internal things than anybody else because he was the guy was doing most of the work.

(R) So [redacted] and [redacted] would probably be good ones.

Yeah, [redacted] and particularly [redacted] because he's the guy that was most directly involved in the rotoscanner and the subsequent development of the whole body counter as it was presently constituted over there.

(B) Did you or [redacted] or some other people in your staff typically travel to other national laboratories or sites to see how they were going about developing whole body counters?

I don't think we did that, uh, we were all going to meetings and so in the course of attendance at the meetings, obviously, we'd get to chewing the fat with somebody, oh, you guys building a whole body counter, well we are, too, what are you doing, and we're doing such and such, so there was an interchange and it seems to me that, I think it was Dale, made a trip down to Los Alamos one time specifically for the purpose of looking into their whole body counting program, so that's one I know where he did, but I don't think of any where else.

(B) Would there have been an occurrence where, let's say it was [redacted], had ingested one of these capsules, got counted here, and went down there and got counted and came back, got counted to do a kind of intercomparison?

No. everything was too short, half-lives were too short, the transit time through the body was too short, and we didn't care to pursue it very far. Long about this time there were some phantoms being generated by or in the commercial sector to do this, and, no, I don't think we ever did any intercomparisons.

(B) Do you remember any other experiments other than those two major categories, either in RESL or anywhere else on the site of which you're familiar?

No, not really. As I say, we did not do a heck of a lot of human studies.

(B) Did you ever use people who had received medical administration and then used them as human subjects, an opportunistic study, if you will, as they were a source. It wasn't experimentation, other than the fact that you could count somebody with a lot of...

My tendency is to say no, but there is something in the back of my head that says, it seems to me like somebody had a brain scan, or something that we checked, but I'm not right sure that I might not be thinking [redacted] who had a tumor or something on his brain and they gave him some radioactive material, and had nothing to do with this, so I don't know, I can't really separate those things in my mind.

(B) That happens to me, too.

The answer is no, I don't believe we ever did that.

(B) Oh, yeah, that happens. If you had, if it had happened, and we're agreeing we don't know who to tell, would that have been included in the regular whole body count logs that you made of the employees that come and go?

You mean to have counted some activity, medically that had been injected or something? Well, I don't know. Again, one of the problems we have is that here is 1994 we have a completely different culture and brain set and frame of reference. These days, man alive, everything you do gets logged down 14 or 15 times someplace! I'm tempted to say it was sure, if it was very important, it would have gotten written down somewhere. I'm not sure that that's true. The other night I got to looking through some of my papers at home. There were several years in which the Health and Safety Division to which I belonged, Vic Beard's group, wrote an annual report and this was then continued on under Don Walker's regime when he replaced Vic Beard, and it was quite interesting. I found a couple of these at home and I went thumbing through them so that if there had been anything of very great importance, it would have been noted in that annual report of the division; however, I think there were only about 3 or 4 years when we ever wrote an annual report. It got so the boys, I know that the one year, it was time for the following year's report before they got the previous year's report out, so we said the hell with that.

(R) It was self defeating.

(B) Yeah, right.

Well, I'm sure the answer to your question is, yeah, I suspect that these things most of the time do not get put down anywhere.

(R) Are you aware of any iodine diffusion studies across human skin that would be obtained, I think some work was done at the reactor complex diffusing across human skin obtained through a cadaver or amputee or something like that.

Somebody mentioned that to me a while ago and I've searched my memory since and I honestly can't remember anything about human skin.

(R) Like I say, you wouldn't have been participating in any experiment here.

No. Well, at least I can't think of the connection between skin measurements or whatever. In my business it is generally either whole body counting, urine analysis, fecal sampling, fecal analysis, excreta analysis in general, environmental samples...

(R) In other words, you've been asked an account of some skin or something like that.

Well, if somebody had said, yeah, we've got some skin here we want to count, without more knowledge of what this experiment might be, I don't know what would be served by counting some skin. You would have to know whether it was supposed to be keeping the stuff out or pushing it in through, or something. It seems to me you'd need something else besides the skin.

(R) I can just suppose they'd start off with a source and measure how much is diffused and maybe collected by the skin itself or something along that, in order...

None of this rings any bells at all, Bryce. Can't think of anything related to human skin.

(R) How about since you left DOE, since you've been with EG&G, is there anything you can think of, analytical, human effects, human studies, sampling, etc?

No, I was hired back by EG&G to build another laboratory, to spike some waste form samples in a program intended to investigate what we call here an "iron enriched synthetic basalt" as a long-term repository for radioactive waste and everything I've done since then has been simply analytical work, particularly for transuranium alpha emitters and so on, in refractory materials, glasses and basalts and soils and things like that.

(B) That are hard to dissolve?

Yeah, but which are very easy to dissolve for us, all you gotta do it change

[redacted]

shooting these damn jackrabbits and, of course, they would then bring these jackrabbits in and skin out their thyroids and send the thyroids over to me and we'd analyze them for iodine 131 as a way of keeping track of the RaLa releases on site, so yeah, that animal program... And then frequently, somebody would come in with a deer that failed to get across the road and so they would come in and they'd skin out a couple of organs and bring it in and have us analyze it to see if the local animals were picking up anything. Uh, I'll never forget one of the most interesting things I think that I ever saw was a rattlesnake that was collected down by the Big Southern Butte and brought in and we found quite a lot of sodium 24 in the rattlesnake and yet, the only source of sodium 24 was, I guess, the reactors, and here the damn snake was clear down at the Big Southern Butte, 20 miles away or some damn thing, and even in the first place, even if he could have made it in that time, snakes don't move that far, and so there's always been a question in my mind of how the hell did that snake get irradiated to produce sodium 24 around a reactor and then wind up way down at the Big Southern Butte?

(B) Uh huh.

He had a lot of sodium 24 in him. I remember analyzing a few organs from deer and then, of course, we had, and here again, my mind is getting a little bit hazy, we had occasion to analyze some whole mice. But I believe this was after I came back to EG&G, not back in those early days because the mice were burrowing up through the burial ground and bringing radioactive material up to the top, and so we got a bunch of mice and analyzed the pelts and the GI tract and various internal organs to see what was happening, and of course, a lot of these mice were just hotter than a pistol.

(B) Yeah.

I know at the tailings down at Grand Junction, when you go out there, the damn prairie dogs have just little mounds all over that place, where the prairie dogs have dug down through the overburden into the sand tails and brought them up to the surface.

(B) Oak Ridge has got a problem with frogs. They've got some ponds on the site and the males, when it's time to mate, they will select what they think is the best mating place and croak and wait for the females to come find them. Well, as frogs and chickens are wont to do, the pond he thinks looks best is over ont he other side of the road so they cross the road and he probably gets smashed in the process and then the females come over and get smashed and they decide that the male hasn't picked out a very good pond after all, so they come back to the other pond, and they've had hot frogs on the road.

(B) I think about all of the sites, all of them, have had some sort of hot critter problem over the years.

(R) Uh, can you, on my part it's kind of a wrap-up of your long experience in this specific area that we're supposed to be looking at, that is, human experiments, anything else you can think about that might beat your brains, in terms

of something else that we might, uh, you've given us a lot of names. Anything else that you might think of, anything that occurs to you, you might give Tom Baccus a call.

I mentioned when I talked to him the other day that I was looking through a journal the other day for Norm Cohen at NYU and I just happened to stumble on an article. As I turned the page, this one paragraph just jumped out at me, "human studies involving deliberate administration of radioactive materials to human volunteers", and I forgot where the hell it was. I know it was one of these bioassay proceedings that Norm Cohen called me and asked me to send to him, which I did, and so I think it was in one of the ones I sent to him. But I told Tom about it and he said, well, if you can remember where that was, he'd like to know it because we can factor it back to Los Alamos to help them out a little bit. It was a very clear reference to deliberate studies involving human volunteers. No, I can't think, uh, I told you all the things that are floating on the top of this bottle of milk.

(R) Can you remember any other contractor, any other group working out there, or maybe even summer professors who came out to work on the environmental program or whatever, can you remember any one else who might have done some experiments of the like that we ought to know?

Before I forget though, I might mention that you might want to talk to Don Percival. I saw Don yesterday in the store so I know he's still in town, and he's a hell of a lot younger than I am which means he doesn't go back quite as far and his memory is probably better.

(R) And he hasn't been retired for a long time.

I asked him the other day how he was enjoying retirement and he said, oh, it's all right, he's spending all of his time taking care of his mother or mother-in-law or one or the other. They're not too great so he's spending his time taking care of them. Don might be able to conjure up a few other things.

(B) I have a feeling, Claude, that we're getting close to the end of this tape. I had tested this with Lanier tapes before we started and the counter should run past 500. It's 470 now, so... so I'm going to let this run for a little bit and then I'm going to switch and put another piece of tape in there just so we'll get all finished up.

(R) You really represent a wealth of experience, Claude. You've been very helpful.

Well, I'm glad there's some purpose in being 99 years old.

(B) You mentioned putting cattle out on the grass during RaLa which is a new piece of information to me. The cattle that I knew about had been put out there for intake and uptake experiments and were related to CERT, which if I understand rightly was about the same time as RaLa, at the beginning of RaLa.

Now let me inject something here, Burt. When I told you that the cattle was on the RaLa thing, I was biting my tongue at the time because I kept thinking was that RaLa or something else. You have now mentioned the magic word, CERT, Controlled Environmental Radioiodine Tests, so everything I've told you before, when I said RaLa, was probably CERT.

(B) Okay.

I'm sorry about that.

(B) Hey, it's all right, it's all right.

RaLa was very much in evidence but, uh, and it was RaLa that stimulated me to make up these carbon cartridge techniques, as a means of monitoring the air for Iodine 131 but I believe that the cattle was CERT and that's what I kept thinking. Let me add one more thing.

(B) Okay, I'm about out of tape, Claude. I'll get the other tape on and you can add that.

(New tape)

(B) Okay, go ahead. Add one more thing.

This is what you get when you try to go back 30 years and try to remember everything. Sometimes things get a little bit in juxtaposition out of the way it should have been. Yeah, I'm glad you mentioned CERT because that was the trigger that said NO. That's what, and I kept thinking that when they went up, I think they got the cows from Ricks College or someplace up there, and borrowed them for a day or a week or something, and then they had their own source of radioiodine and I suspect, again if I remember correctly and maybe I don't, but I think they just ordered some iodine 131 from the supply house and opened it up and let it loose. I remember that I had a problem with this because in my carbon cartridge work, uh, I remember that during a RaLa operation and it was dirty, I mean, everything I said about the RaLa is right, but not where the cattle came in, but it was a dirty damned operation. Every time you'd dump one of those fuel elements in there, it's short-lived, and that iodine comes boiling out and so on. The first thing that I tried to do, and remember again, I'm branch chief and I gotta worry about monitoring the damned air around that Chem Plant and see what people are getting into. The first thing I did was the usual concept of air sampling; I go out there and take a filter and collect air and, uh, found that, geez, I had all kinds of Iodine 131 on that filter paper, but then I realized that all that means is that's the particulate stuff, what about gas that goes through. So then, the next thing I did, I rigged up a filter with a carbon cartridge backup so that I could separate that which was particulate from that which was gaseous and then some way that I just this minute thought of, first time in 30 years, and I don't know why I was smarter at that time than I am now, but I put two carbon cartridges back of this filter because what I wanted to do is get some kind of a differential argument as to how much went through the filter, which I could

argue with particulate which I now will not do because now I know all about absorption. I mean, you can filter things out on filter papers that are not particles, but then I wanted to know what went through a filter paper or how much would be collected on this thing, uh, let me back up. I had two filter papers, not carbon cartridges, two filter papers and one carbon cartridge, so now I could see what went through the first filter paper, of what went through and what, if anything, would collect on the second filter paper and I did that because I was trying to get an idea of the efficiency the first filter paper had for collecting all the iodine, see, and then, because I, uh, suspected there might be some other kind of iodine there, I put in a carbon cartridge, a carbon cartridge trap on the end to collect whatever went through both of the filters. What I found was that there was always a hell of a lot of activity on the carbon cartridge that had gone through both filters, okay, and yet when I did this with known iodine 131 out of a bottle. I forgot now the specific thing that I did, but the point was that I came up with and maybe there was another test in there where I had two carbon cartridges, there was some way I got some evidence that if you had Iodine 131, Iodine 131, in the iodine elemental form, 100% or 99.99% of that would collect on a single carbon cartridge but if you took the Iodine 131 coming out of RaLa operations, you'd get about 50% of it on this carbon cartridge and 50% of what went through on the next carbon cartridge and so on.

(R) Methane?

Well, I remember, no, I don't know what you mean by methane, but the english used to call it methyl-iodine and clearly, iodine, molecular I-2, has a tremendously high quadropole moment, it's a polar molecule, uh, where methyl-iodide is not quite so polar but besides that it's a hell of a lot more organic and so if you want to collect methyl-iodide, you do it on activated carbon, but particularly the iodine coming out of the RaLa operation is markedly different and, uh, I can't remember now what argument I used but I remember arguing about nitrosyl iodide because if you dump a fuel element into a bunch of nitric acid, the obvious thing that you see coming out of the Chem Plant stack is the red-brown fumes of NO and NO_2. Now both NO and NO_2 have a single unshared electron out here; atomic iodine has 7 electrons out here so they get together and form an NOI compound or an NO_2I compound over that electron pair, see. Well, I don't know what this has got to do with anything, but it's interesting. So my own personal opinion is that out of RaLa there is a nitrosyl iodide complex being produced that is totally unlike I-2 and it's totally unlike methyl iodide, okay, it's something all by itself. And that was the reason why I threw out the filters and went solely to larger activated carbon capsules and the importance of this at the time is that most of the people around the country were using air filters to monitor for radioactive materials, including iodine, but it didn't work.

(B) Did you ever use bubblers for iodine?

That's what I was trying to think of a minute ago. See, you've been very helpful. What I did, and this is the key point and I appreciate your straigh-

tening me out; I knew that I had done something chemically that showed that the iodine was different out of RaLa than either methyl iodide or elemental iodine and, but both of which collect on activated carbon very efficiently, so how did I know this? But that isn't what I did. What I did was what Burt is suggesting. I'm a chemist, so originally what I did, I had this filtering system set up and the gas that went through the filter paper went down through a one-liter absorbing tower containing sodium thiosulfate, and then I would take that liquid which came through and analyze it. Now I find that if I put a carbon trap on the outlet of the liquid scrubber, I now got more activity in the liquid scrubber than went through an alkaline-thiosulfate system. Well, the alkaline-thiosulfate will sure as hell collect all of the iodine very efficiently and methyl-iodide and a whole bunch of other things, so the stuff that went through there had to be something markedly different and some kind of an unassociated nitrosyl iodide which is a covalent compound. Well, I'm glad you straightened me out on that. That's two mistakes I've made.

(B) They're not mistakes. If you don't think about these things that happened 30 years ago, oh, once in a while, uh, then we can forget about them.

That's what I was just telling Tom. A while ago, after the fact, I think we might very well, you guys might very well have done a good job by me and John Horan together. It's just like you and I are doing now. Something that I say might trigger something in him and everything he says might trigger something in me, and get this synergistic effect between the two of us will be better than what you're gonna get as a linear sum of each of our contributions.

(R) The stack monitors that were designed at the Chem Plant had filters and assorted thiosulfate scrubbers... At the site we were kinda proceeding along concurrent development.

That's funny that an old chemist like me would have forgotten about alkaline sulfate scrubbers.

(B) Well, you haven't used a scrubber in a while.

No, that's true.

(B) Does this term, "NW run", mean anything to you?

Tom mentioned that to me and, uh...

(B) "NW sample"?

(R) Northwestern Universities, we've always had a relationship with them. I'm wondering if that's something associated with them. That stimulates your memory.

Tom mentioned something about Westinghouse. Nothing stimulates anything about NW or NW samples.

(B) NW run or NW sample, uh, we don't know anything about it either. It was one of the people that contacted us and, uh, that's what they called it.

(B) Well, there's another experiment called the "green run". I had never heard of green run except as a characteristic when we were running fresh fuel at the Chem Plant.

(B) Sounds to me like something that hasn't been aged.

(R) But then I find out that there was a specific program at Hanford that was titled "Green Run" and I don't know what that means, at Hanford, but you know that's just one of those things that people come up with titles for projects or programs, or experiments that sound like something that we had done and, oh, I don't know. I just wondered if you had heard.

NW. That doesn't ring any bells.

(B) One that Tom mentioned a while back, Westinghouse was it? We have a report from a fellow who was a sailor on site in training at the time and this would have been '62. His father was having some medical problems and, from what we understand from this guy that reports this, is that his father was given, his father had a blood vessel occlusion problems, apparently, and this sailor and five of his shipmates volunteered to be counted in a whole body counter and they were already here on site because they were in the Navy and so they were counted at Idaho Falls or on site. Well, we understood him to say on site. We don't have direct evidence that they were given radioactive materials but that was kind of inferred. I don't know whether we would have, whether we had a whole body counter in '62 to count them with, and if we would have, would it be in the records and your people would have logged them in just like all the other employees here, or...

Oh, I'm sure that's true. Everybody that went through that whole body counter got logged in. The trouble is, where do you suppose those records are right now?

(B) Well, I don't know. It might be worth a search for them.

They probably have long since been, uh...

(B) We have understood that, uh, an American citizen went over to England and breathed in some tagged plastic micro-spheres at one of the research establishments there and came back to the states and was counted in several different AEC laboratories as a means of cross-correlating the different whole body counting installations. The understanding I have is that he was counted here. Now, would have that have been in the whole body count logs? That is to say, the little sample sheets that you fill out, or that would that have been in somebody's lab book, or would it have been in development papers, or how would that have been logged? Do you recall that happening?

I don't recall the specific instance. I seem to recall having heard vaguely of somebody having done this kind of thing, without any details, but I can assure you that if it had gotten counted in our counter, it would have been logged and described. But my problem is, where are those records now?

(B) Yeah. We've done two things, Claude. Oops, I gotta catch that door. Pull it shut and locked. Uh, we're borrowing this store room and so we keep the door locked, have part of a contingency to borrow it. We've been going through the records receipts, the pieces of paper that says such an item is stored in such and such a box, and we have found several index entries that says there's whole body count records. Uh, there are some records in the Federal Records Repository in Seattle. We have the CD roms here and a new piece of software that we got just this week that we can read those records and if they are recorded as being INEL/NRTS records, they'll either be at the site or at the Federal Repository or else we don't know we got it, and they'll be on one of those set of data files. I can't promise you we'll find them, but we're certainly going to look for them.

(R) Now if they're reports, formal or informal reports, they're probably as valuable as some of those old records. Claude mentioned you got both the informal and formal reports that you've written dealing with your studies. I'm not exactly sure whether we've got...

(B) If they're ID reports, ID numbers, would they have been like a 12000 series?

I think was a 12038.

(B) Okay.

(R) Does the library have historical records on a book like that, do you know, Burt, have you looked at that?

(B) They are charged to have at least a copy of every IDO report. They may be on microfiche but I have gotten CERT reports out of there and also Bruce Schmatz's reports. Yeah, I've gotten lots of reports out of the library over the years and I left all my reports in my office at the site when I retired, except for the ones I turned back to the library...

Now what's the relevance of this. I have copies of this report of mine, and I gave a copy to Richard Dickson and it seems like...

(B) Xerox?

No, it was one of the actual issues, but it seems to me also like when I talked to Tom the other day I mentioned that report as being one of the most important ones. It even impressed the shit out of me when I first, when I sat down and read my own writing, I got a chill up and down my spine. God damn, you sure did that good. I was so proud of that thing because it just reads so, it gets you right in the nose, on these points where I was telling how

goddam careful we were to, and so one, but when I mentioned this to Tom, I said that's a very important one, and he said, yeah, we have that, there's a copy on record in the public reading room.

(B) Okay, that's what you expect.

I think that's what...

(R) You mentioned a couple others though.
(B) Yeah, but the other two are published. No, they're published reports, Analytical Chemistry or Journal of Health Physics or something like that?

Yeah, yeah. And I can get you copies of those if you want. The summary reports. Well, actually, one of them was in a paper that I presented at a Heidelberg conference on inhalation or measurement of internally contained radionuclides or something like that in Heidelberg. But in any case...

(R) A final summary report would probably be the most...

Well, there are two of them, like I said. The first one just summarized up to 9 years and I think that was published in Health Physics. Then I think the later one which covered 18 years or something was in the introduction or the first couple of paragraphs in this paper I presented in Heidelberg, but which was subsequently published in a book.

(R) I think that would be important though.

(B) Do you happen to have the, uh, from the beginning index, references in the Health Physics Journal?

(R) Don't they have that on a tape or a disk?

Yeah, I do, but I think the library's got them also.

(B) Okay. All right. We can research that pretty easy.

You threw your Health Physics Journals away?

(R) For a start. I have had to move; I had 15 boxes of journals and I decided I was not going to move them any more.

You could give them to the library.

(R) The library's already got copies.

Of all of them?

(R) It's a piece.

(B) What was Gary Grothaus hired in?

Oh, shit, Burt, I mean shucks, Burt. I'm being taped. I don't know. It was a long time ago.

(B) Was he hired in to...

Now wait a minute. He was hired in twice.

(B) Okay.

I hired him one time, originally, a million years ago. Then he left and went to Los Alamos, I think, and then after I had retired, he came back and got rehired back in his old job.

(B) Oh, all right. All right.

(B) Was he originally hired to work the whole body counter, when you hired him?

I don't believe that that's why I hired him. I think at that time we had other people. I think Roy Howard was running the whole body counter and we had other people.

(B) I remember Leroy, yeah, uh huh.

His son works out here at TRA now.

(B) Leroy Howard's son?

His name, of all things, is Roy Howard.

(B) Roy Howard. Does he work at the warehouse at TRA?

Yeah, in that store room.

(B) Well, I didn't know that was Leroy's boy. So that's Leroy's kid, huh? All right.

(R) Don't lose your tape.

(B) Oh, thanks.

(B) I've got another entry here, a question to ask you. There were some individuals, citizens of England, Great Britain, subjects in the United Kingdom who were injected with radioactive barium or strontium or inhaled nobium, and then were whole body or check counted at several different AEC sites.

I have no memory of it at all.

(B) Okay.

That doesn't mean it didn't happen though. Somebody might have said, oh, we got a guy coming through here from... In fact, I can remember something about somebody coming through that was making the tour, taking whole body counts and somebody says, we're gonna count him, too, and I said, fine, go ahead and do it, no problem with it. I have some kind of a memory of something like that having happened but I don't know any details.

(B) I can understand that. That's why these names that you tell us are so important because you were the branch chief and you had people working for you, you had a section chief who had people working for him that were involved with counting these people and so it's entirely possible it's one of those things that they, well, we just won't bother Claude about them.

Tell you another name, too, you ought to put down there; it's Bill Gammill. If I remember the chronology here, it seems to me like Bill was Percy Griffiths' No. 1 man way back in his early days. Bill Gammill and Clyde Hawley worked for Percy Griffiths back in the days of cows and iodine and stuff like that.

(B) Hawley's up in Salmon, isn't he?

(R) Yeah.

I don't know where he is. But then Bill left and became some high mucky muck for NRC, some kind of a division manager in Washington, and then he retired two or three years ago, four, or something, but he might have some very real memories of what happened back in those days. I don't know where he is, uh, he lived in, I think in Anapolis when he was stationed in Washington. Now that was two or three years ago when he retired, so whether he is still in Anapolis or if he's moved somewhere, I don't know. William P. Gammilll.

(B) I'm about run out here.

(R) Claude, uh, why if anything comes to mind, give us a call.

(B) We have some specific questions here which, without referring to this thing, you've done a good job, Bryce, of catching them all up. Uh, a question here on these ingestions of the sealed capsules of radioactive material for calibrating the whole body counter. The idea of doing this, was that internally generated, people in the branch saying we've got to do this, so this is how they came up with doing it?

Yeah.

(B) Okay, it was not that at the time it was standard procedure that was used in othe facilities.

Oh, hell, no. This was strictly experimental. I'm sure this would most likely have originated with [redacted] He had this rotoscanner, and he wanted to put a known material down the GI tract and as this scanner went

around, he positioned on the nose (i.e., he started the scan on the nose) and as it goes around and down, when it finally got down to the hips, he'd turn around and come back up, so he wanted to be able to put something in the GI tract and follow it down and plot this journey on the scanner. So he probably came to me and said, what do you think, and I said, hell, yeah, I'm in the mood right now to give human volunteers deliberately that small fraction of what they give out here in the work place that nobody gives a damn about, and if it'll get some calibration data, fine, go to it and let's do it but under the conditions outlined in this voluntary consent form, and that has to be filled out first. Not only did I sign, it but it was very important that the chief of the medical services branch also signed it, so that he verified there would be no problem. For example, I remember we worried about whether somebody could ingest a polyethylene capsule that big without it getting into some obstruction down here and so on, so that's why we went to the chief of medical services.

(B) Might hang up in the appendix or something.

(R) As I recall, you tied strings on capsules at one time, swallowing them and then pulling them back up. Uh, does that strike a...

No, no, that doesn't strike me as being feasible. I don't remember that. It wouldn't work with me, boy, I'd vomit all over you. I remember when I've had a couple operations where I have had to swallow these tubes and, shit, I just swallowed them without even batting an eyelash.

(R) And they came back up again, huh?

But I don't remember any strings being pulled out. Just leave them alone and they'll come out the other end by themselves. That's not the kind of thing Claude Sill would have thought of.

(B) Well, we're about to run out of tape and I think we're about to run out of time, and you said you were interested in getting on down the road today.

I told my wife that undoubtedly I would be home by 3 o'clock.

(B) Okay, without a doubt. All right.

(B) This concludes the interview with Claude Sill.