NOTICE

Materials in our digital Oral History collections are the products of research projects by several individuals. USF Libraries assume no responsibility for the views expressed by interviewers or interviewees. Some interviews include material that may be viewed as offensive or objectionable. Parents of minors are encouraged to supervise use of USF Libraries Oral Histories and Digital Collections. Additional oral histories may be available in Special Collections for use in the reading room. See individual collection descriptions for more information.

USF College of Public Health Oral History Project
Oral History Program
Florida Studies Center
University of South Florida, Tampa Library

Digital Object Identifier:	C53-00010
Interviewee:	Glenn M. Dykes (GD)
Interviewer:	Charlton E. Prather (CP)
Interview date:	August 12, 1999
Interview location:	Unknown
Transcribed by:	Brendan Driscoll
Transcription date:	January 17, 2014 to February 10, 2014
Audit Edit by:	Will Clark
Audit Edit date:	February 11, 2014 to March 19, 2014
Final Edit by:	Peter Cannon
Final Edit Date:	July 7, 2014

Charlton Prather: Good morning, it's a pleasure and a privilege to have with us this morning Mr. Glenn M. Dykes, a longtime sanitary engineer with the old State Board of Health of Florida. But with governmental reorganization, he went to the—from the State Board of Health to the environmental control organizations of Florida. But it's truly a privilege to have Glenn to agree to come and share with us some—his memories of to public health from a sanitary engineering's point of view. Mr. Dykes, I thank you for coming, and it is our—

Glenn Dykes: It's a pleasure.

CP: As I recall, you have a civil engineering degree from the University of Florida. What got you in to public health from civil engineering?

GD: Well, it was kind of the least of the alternatives. I started out in accounting and found out that I wasn't doing too well there, and about the only course I was doing good in is the high-type math that was necessary in [the] technical field. I had a good friend in the city of Tampa that recommended or suggested that I might consider sanitary engineering, which was then the overall department at the University of Florida in civil engineering. It's one of the branches of Civil Engineering. So, I decided that was a good approach, and so I went into Sanitary Engineering and managed—

CP: As a freshman? As a freshman at the university?

GD: At the—at—basically, I—they went back and I just had to redo my freshman year, because it took me four years from that point to get the degree, because you had to go back and get all the curriculum straightened out. And I did manage to graduate with honors after all that struggle. I did all right. I survived it. But then shortly after that, like about two weeks, I had to go into the army because I had gone on a ROTC scholarship. And I spent two years in the military and then I came back and decided, "Well, I've been away from it [for] so long I went back and got a master's degree in sanitary engineering and I was fortunate enough to also get a minor in structural engineering, which was a difficult task at that time because they normally didn't let you major and minor within the same schools. It was a—a real undertaking and after that, they hired me at the State Board of Health, Bureau of Sanitary Engineering.

CP: Directly out of college? Directly after the completion of your masters?

GD: Directly out of College, in 1957. In August.

CP: You remember the date? (laughter)

GD: I think it was the twenty fifth of August when I started.

CP: (CP laughs) Well, very good. And today happens to be the twelfth of August.

GD: Yeah, close to a few years ago.

CP: Yes, it is. What was your first assignment?

GD: I was first assigned under a good friend, you'll recall quite vividly, as Ralph H. Baker.

CP: Yes, I remember Ralph H. Baker.

GD: Baker was heading up the wastewater group, at that time, because the head of that group was at—off somewhere. John Wakefield was getting ready, and he finally changed, and left, and went with the federal government. And Vince Patton was the industrial waste man, there was nobody there, so Ralph put me over doin' industrial waste stuff at that time; and I stayed with Ralph in the wastewater group for five or six months, I guess.

And—the—there were several people left, the bureau, which was a continuing problem within the Bureau of Sanitary Engineering; we were really a training ground for engineers. At one time, I had a list of like a hundred and sixty engineers that—before we abandoned the Bureau of Sanitary Engineering—the complete list of just the turn over the people that had been there that period of time that—that—that I had been involved with. And so, anyway, the—

CP: Over what period of time was these a-hundred and fifty-six engineers that you—

GD: Well, that was from the inception of the agency what—the—the bureau—I don't know when the bureau really got started. It was such a broad scheme, way back there. John Miller, who I was placed under next, started with the agency in '36. So, he had a long tenure there; and it was well recognized in drinking water, and I was put under him in the drinking water program. And where I stayed 'till we came in to the environmental period and, 'course in the—it all moved over to Tallahassee and all that.

CP: Yes.

GD: Which was a—a—history, as you can well recall.

CP: I'm just shocked with that turnover. And obviously salaries or work environment?

GD: But they—I had—I had the same thoughts when I went to work at the—in fact, it was some of the people you talk to would say that, "Well, there's—this is a good training ground. You learn all about what's going on in the field and you learn how things work and you can get a job, out with consulting engineers. That they're tenure and to think for a while, right.

CP: Oh, and then they money. Yes.

GD: And of course, with that—normally, their salaries were enticing. We had a couple of years and to go out into the industry. And there's a lot of—a tremendous number of people that were in large firms that started out with the old Bureau of Sanitary Engineering. And they became presidents of—of many of the engineering firms, even our full partners and for our long periods of—periods of time.

CP: Good training ground.

GD: And some of them, the old buggers are still around today, just like me. (laughter)

CP: What—what was your concerns in waste water management? Your first assignment?

GD: Well, I worked some with these typical waste—sewage waste for subdivisions and municipalities. The plans came in and we reviewed all the plans at that stage of the game. All the engineering work was reviewed by the Bureau of Sanitary Engineering.

CP: For—to—for treatment plants?

GD: Treatment plants, for also all the collections systems, and the whole—whole thing was raw reviewed, at that time; and also handled—the big problem seemed to be about that time of the dry cleaners. And all these—those types of facilities having to submit all their work, how they were cleaning up their—their waste and clean ups, as you—

CP: That's as early as—

GD: More recently, we'd have a lot more problems than that.

CP: Yeah, it's back in the newspapers these days, here in Tallahassee.

GD: Well—well, the trichloroethene type of chemicals are—stay around a while, and they break down into other components; and, of course, the overall rules of—for chemical contaminates has greatly increased since 1957.

CP: Fifty-seven. Oh, I bet you.

GD: The least of which was, uh, we went into the Safe Drinking Water Act, and then the—ever year, they have to come up with new—new chemicals they got to test. Like there's nothing else to do; we didn't have enough work before that. (CP laughs) The—so, that's added to a lot of things we now look into drinking water for. Which, in many cases, is not a bad idea; because everybody worried about the, say, waste or sewage, and yet you're talking about parts-per-billion and parts-per-trillions of some of these chemicals, and you only take a gallon spread out over here, and it just messes up a acre of land, and that—

there's a lot of problems with it. So, that's—that—uh, tremendous changes in the last four years or so from—

CP: That quickly? Did your minor in structural engineering set you in good stead for plan reviews earlier?

GD: Well, we didn't have to review the structural aspects of any projects. It always—when we approved that—we were approving the sanitary engineering-type aspects of the project to make sure they was goin' to handle the sewage, handle—or the drinking water was adequate to handle the distribution, and the plant was big enough to handle all of the people they had on the system.

CP: That the surge could run downhill and the water could run uphill? (laughter)

GD: Hopefully, it all runs downhill. Except when a pressure sewer line erupts sometime and it didn't always run downhill, it might go the other way on the pressure mains, but generally speaking the—the—when I moved over to drinking water—

CP: When did you do that?

GD: That was in—

CP: When you went—when you went to Mr. Baker?

GD: No, I went—started out in August [of] fifty-seven and worked with the wastewater group and Ralph Baker 'til about, oh, March. I stayed there about six months with the waste group and then, like I said, there were several shortages came up, some old-timers left the drinking water program to go out into industry and other groups. And so, they were short there, and so, they moved me over. And I was very fortunate to work under a very fine gentleman that—Mr. John B. Miller.

CP: He was nationally known for his water.

GD: Excuse me?

CP: He had a national reputation as an expert in water, did he not?

GD: Well, he was an expert; and if you look back at his history, he ran the Bureau of Sanitary Engineering back during the war.

CP: Yes. Second World War, that is.

GD: Yes, Second World War. He wasn't quite old enough to be back in the first one. But he's a very distinguished gentleman, very professional and well recognized. Not only for drinking water, but in the overall sanitary engineering industry, he was recognized; and was always would be spoken of with favor.

CP: Ah, good. So, it was—it was kind of fun and a privilege to be associated with him?

GD: It really was, he—a very—had a sense of humor you sometimes—you didn't quite figure out. He wouldn't smile sometimes when he—

CP: (CP laughs) When he was telling a joke.

GD: What was humorous; and so, you didn't want to get too far off in left field. It might be the wrong direction.

CP: Well, history has shown that he's a good teacher, Glenn?

GD: Well, I—

CP: Because he endowed you with the—some of the similar reputation in water?

GD: He—he let us all down the primrose path that he—he let you know what he thought was right and if you strayed as something that you—that he didn't think was right, he would tell you on the Q.T. you know, would never—

CP: Embarrass you.

GD: Take it out in front of anywhere. But he—

CP: He's a good supervisor for that.

GD: Would let you know that he thinks you ought to do something a little bit differently.

CP: Yeah, yeah, good. And you spent essentially the rest of your career in water?

GD: Well, water of one type or other. (CP laughs) The big changes, of course, with the whole system came, as you know, when the environmental movement started in, oh, the sixties; and everybody started looking more at what was happening to the fish, and the birds, and the wildlife; and, in my opinion—and to others in drinking water—we thought to the detriment of the drinking water program—

CP: 'Cause you're (inaudible)—

GD: Or drinking water in general.

CP: Yes.

GD: Because Florida's a water-rich state, but yet, we use all of the—the vast majority of the water we use for drinking comes out of the ground.

CP: Yes.

GD: But whatever you do in cleaning up the streams and taking it out of the streams and putting it on the land, then it's ultimately going to end up in the groundwater at some point. So, overall, you have that problem to contend with, and it's a never-ending problem; and we've been dealing with these changes and the environmental field all of that period. As you recall, I think the first law passed in the state, which started breaking things down, and you also recall the fight we had trying to get the State Board of Health as a health and environment group, I think is what we tried to set up.

CP: That's right.

GD: Well, some of the doctors didn't think we should go that way, that we should have it a pure State Board of Health. And then, there was another bill that had the want to put it all in Tallahassee, and it was kind of a mixed batch that year. And I think it was '67, I'm not sure exactly.

CP: That's correct, it was '67.

GD: We ended up splitting the wastewater group to the Florida Water and Pollution Control group at that—Air and Water Pollution Control, I think is what the name of that one at that time.

CP: Yeah, yeah, air and water, yeah.

GD: And they managed to take from the State Board of Health, at that point, the wastewater program and move—well, part of it moved over to Tallahassee and the rest of it stayed with the health agency until '72. And then they got the rest of the wastewater group. And then, the—that didn't satisfy 'em enough; they decided they needed the drinking water program too, so, in 1975, they got that also. So, it eventually ended up that we were all in the environmental program here, which at that time in '75, the Department of Environmental Regulation was formed. And we became—the drinking water program became part of this agency in Tallahassee.

CP: Did you still have the same (inaudible) as drinking water?

GD: Well, I still managed the drinking water program for the state, but they kind of worked it differently at that point. When we had it in—in Jacksonville, with the State Board of health and the old Bureau, John Miller retired in 1972, and I was made director of the drinking water program at that point. So, I handled it until '75, when it was all moved over here. Well, all—well, not all the people. That's a misnomer to say that they took the whole program, they wanted as many vacancies as they could get—so they could do their own shifting and do what they wanted to with people. But our basic program came over, and you're really kind of administrative and all the work was handled in the district offices, all the plan review and all of that, then switched to the division from Tallahassee division to—to field programs. So, then, you're a—an oversight in trying to manage the people that way. Most of them that were still the same people, we were dealing with from the old Bureau of Sanitary Engineering area or arena—over into the new arena. So, we had a good working relationship, there was no problem with that.

CP: Good.

GD: And—

CP: And the programming from the public point of view really didn't change very much, did it?

GD: Well, not really, but I think you—as time progressed, there were a lot of changes in how the overall looked at the drinking water. The drinking water program was kind of pushed in the background. And with the changes administratively, there was a lot more, well, I don't know how to put it, the politicians got more in control of everything they wanted to do and whatever they thought politically was correct and that's what you did.

CP: That's what we had to put up with, eh?

GD: When we were in the State Board of Health and the old Bureau of Sanitary Engineering, that was not the case. Everybody met—we met with professional people. It was on a professional basis, discussed the problems, and whatever was resolved there was normally agreeable to both the engineer and our engineers; and normally, the engineers that brought the project in could handle it with their clients.

CP: It was professional dialogue towards professional decisions.

GD: That's right; and, unfortunately, had a number of decisions within the D.E.R. [that] were strictly political decisions that should not have been made.

CP: Told up from upstairs what was politically expedient for the next budget year.

GD: Well, you—you hold what direction you think should go and—you may recall what was one of the—probably the biggest thorns in the side of some people was back in '74, '73, somewhere in there. I was doing a lot of review of drinking water systems in the South Florida areas that typically expanded as it has all these years—

CP: Yes, it's (inaudible).

GD: Those three counties there have just grown, grown, grown. And I was doing a—we were reviewing a project for a very big trailer park and, oh, it was six or seven hundred trailer spaces or something. It was a big one.

CP: Whoo!

GD: And they were going onsite water in that hollow rock that they have in South Florida and going onsite disposal with the wastewater treatment plant.

CP: Whoo-hoo-hoo.

GD: And it's just sittin' there in one big envelope and you're just pushing in here and taking out there, is the way we were lookin' at it. And so, I was carrying on an argument with the consultant on it, and he was very staunchly opposing it, which I know what—how that would be, the—probably the owner didn't want to spend that much money in the first place, and it would be a while before public utilities would get to him. Which is typically down there. A lot of the stuff was built out and we had that situation. So, I finally went—by that time, David B. Lee had long since retired, and Sid Berkowitz was our chief of the Bureau of Sanitary Engineering; and I went and talked to Sid, and I said, "You know, I'm doing battle with this one utility, one man, one project." I said, "But this thing really is for the whole South Florida area, why are we trying to do this for this one project? And here we are at this—you can calculate the amount of water taken out of the ground for drinking water can be matched about fifty per cent of it coming in from wastewater disposal and septic tanks. So, we are certainly recycling half the water they drink, they're recycling it. There's no way of getting around it." And so, we agreed and—I don't know if you had taken over or if it was still Dr. Sauder then, I've got—

CP: I took over in '74.

GD: I think it was '73, I think we did that. Anyway, we came out with a—a memorandum, signed by Dr. Sauder, out of our group, that all water facilities in those three counties would have to go to complete treatment.

CP: All right.

GD: Well, we had a lot of wailing and gnashing of teeth about that time. And—but it did—some of the major utilities then started looking to—they had to expand and start picking up some. It helped the bigger utilities try to get more into the overall

responsibility of—but for a long time that—and I don't know what the—some of that stuff way down in South Dade, whether it's all still picked up or not, but we had a lot of problems that have been experienced since that time that certainly prove our point; as you will recall, the typhoid outbreak in South Dade Labor Camp, about the same time we had a—

CP: I remember that.

GD: A boil water notice on Miami Beach[1] and the good mayor over there was drinking water on national TV, "Now there ain't nothin' wrong with our water." Of course, he died a couple years later. (CP laughs) It was from a heart attack, not from the water. (laughter)

CP: I remember that.

GD: I used to use that when I used to give speeches all time about the importance of drinking water. "Yeah, he drank the water? Well, he died." After they got through laughing, then I'd tell it was from a heart attack. (laughter) But that—that was just the start of it, I think; that, really, we had to get to that point. And if you have followed the overall environmental rules of EPA through the years, they finally accomplished that same deed in what the, I don't know, '86, '87 amendments after they'd been in the program for twelve years and then they decided we ought to treat all the water that has surface water contamination.

CP: Yeah, very true.

GD: And we couldn't even get 'em to support us for chlorination. Now that's how much things have changed since we got in to the Safe Drinking Water Act in 1974, So—.

CP: Our water system is unique in all the United States. It seems to me, our limestone is subsurface.

GD: Well, we have a lot of—people don't probably realize that some of the interchange that we have; certainly Dade, Broward, and Palm Beach Counties, that south end of the State there; I think they've realized that on several occasions, they've had upsets and contamination problems, and the least of which was the typhoid outbreak, which was a direct discharge into—through that limestone, right into the intake.

1The typhoid outbreak and Miami Beach boil water notice both occurred in 1973.

CP: That’s right, that’s what went wrong.

GD: And unfortunately, as things happened, the chlorinator was also off at the same time that incident occurred, and then you had all of these—what was it, a thousand people? I don’t know, half of that labor camp reported in for the typhoid. Some of them didn’t because they couldn’t go to work if they did.

CP: That’s right. It—what—I don’t remember the exact cases, about a hundred and forty real cases of typhoid fever—

GD: Yeah, but there were like, two thousand people living in that—

CP: In—in the camp. That’s right.

GD: In the camp.

CP: That’s right.

GD: So—

CP: It was on national television. It got national attention.

GD: But they reportedly said that a lot of them weren’t reporting in because they couldn’t work.

CP: Yes, that’s right.

GD: So, we don’t know what the eventual numbers were on that, but then we knew that it was—it was fairly good sized.

CP: Yes it was, it—it was—it attracted international attention.

GD: Yeah. Especially the boil water notice at the same time at Miami Beach. (CP laughs) That—that really got to ‘em. That mayor got fixed up with that one. Actually we had—after that period right in there, we had difficulties. They needed re-chlorination on the beach is what the whole problem was. And ‘cause they had big storage tanks over there, and they were taking Miami water and puttin’ over into their reservoir, and it was just—with that hot sun, the chlorine would dissipate and they were putting that water in with no chlorine residual. And we finally told ‘em, “You’ve got to go to re-chlorination.” Well, they just fought—

CP: Well, people don’t like chlorine in their water.

GD: Yeah, but, you know, at the same time, we were—had the—just following that—well, it was right in the—say, I forgot what came first. But they had the both the Democratic and Republican National Conventions there in Miami, and we had to—all the—they—there’s was a threat that they was goin’ to contaminate the water supply and we had people runnin’ out our ears. Everybody was on the go and trying to check—

CP: Yes.

GD: For chlorine—

CP: The terrorists. The Terrorists is going to cut corners by—.

GD: Residual was goin’ to be our checkpoint. Well, on Miami Beach, they didn’t find any residual.

CP: Yes. (CP laughs)

GD: And then we were lost, I mean, you could not check anything because it didn’t have a chlorine residual. So, they had to—they realized at that point that they had to come up and go to chlorine—add chlorine in their systems.

CP: I remember those—.

GD: So, it did accomplish something.

CP: Dynamic events. I hadn't thought about those in years (GD laughs). Thanks for reminding me of all of that. You and I were—I was in a different capacity, but we was right in the middle of that.

GD: Well, we had—I don't know how many people—we had people—I went down there during—I think I—we—we shared time, some of them went down on the Democratic National Convention, and the others went down on the Republican National Convention.

CP: Yes.

GD: And I think I went down on the Republican National Convention.

CP: Yes, all right.

GD: And that was going to be—supposedly going to be the worst one, because they seem to be—(laughs) to be—the persons that everybody wanted to attack. I don't know. (CP laughs) Anyway, it came by and we didn't have any real—real problems with the whole situation at any time, or anything that we thought might be a problem. And we tried to do a lot of lookin' at what all the possibilities would be and—and I think it was figured out pretty well. That they had a good workin' crew down there.

CP: Um-hm. While you're in waste disposal, I'm recalling the ocean sewage outfalls and all the mess of trying to get the cities from—to quit putting their untreated sewage into the Gulf Stream.

GD: Well, I had gotten out of wastewater, and that was Ralph Baker's job, but Ralph Baker did a yeoman's job of trying to go do the battle with that for all those years. Now, the problems that—the way we looked at it in the Bureau–that these waste outfalls—granted, some of them didn't have primary treatment, which I think would have probably removed most of the problems you had. But if you—at that point, if you could go offshore and get in to that 100 foot-deep with five, I don't know, five, six feet per second velocity current that closed in that thing, they found no problems when all the surveys they did of the outfalls, there was very little problems. It was always, if this happens or that happens, they had to fix all the conditions. You might have something float back on the shore.

CP: Yes.

GD: And some of them that weren't quite far enough out to get in to the main stream of the—the Gulf Stream they sometimes would get little eddy currents in with some bacteriological contamination coming back in little bit shallow water. So—

CP: And other interesting things too.

GD: Right.

CP: I remember. (CP laughs)

GD: Well, they used oranges I think. So many oranges used to float back.

CP: I'm recalling a picture of a man in Hollywood by the sea, standing in the surf with a condom hanging on his nose. (GD laughs) Do you recall that?

GD: Well I don't remember that picture.

CP: That he had picked up swimming. Yeah, excuse me.

GD: Well, those things, the floatables like that, I think if we'd a gone to primary treatment and sludge digestion, I think that could have been handled. But what the—the powers that be and the politicians decided, "Well, we're gonna mandate eighty-five percent treatment for all that waste going out in to that ocean." Well, that just about used up all the potential money for waste treatment. When, really, the best thing they should have done in that area and avoid putting in tens and fifty thousand septic tanks down there in that shallow aquifer that's strictly limestone, you're not doing anything with it, it just flows out in the water, that could have put the money into collection systems, and you broaden your base of what you have to do to treatment. If something later found you've got to increase treatment, you've gotta tremendous base to provide the funds to do it. We put the horse on the back of the cart and start trying to push it rather than doing something outstanding with it—

CP: Isn't that true in so many places that the economy and the politics of development—you know mine is only a thousand houses and I can't—I can't afford a central treatment plant.

GD: Well, that whole—that whole coast down there—they mandated that and they—they were handling the waste adequately, in general. A lot of the outfalls that were put in right, they examined those. And they even had video cameras at the discharge point on some of those that were put in a little bit later. And they found any—no accumulation of solids around the outfall.

CP: Oh, the outback. What do you call that? The orifice?

GD: And—but that—you know, they decided they were gonna' put all their money in treatment and that just took away the money for collection systems. And—which would have been really the way to—that we needed to go.

CP: Yup, jump right ahead. All of the development on the southeast coast, which was originally septic tanks. Man, there's septic tanks. Has that been replaced? We're talkin' 1999 now.

GD: They might of have, but I doubt it. Well, I was lookin'—something came out, it was in the specifier, about five months ago, I guess. I think they had given a ten year summary of septic tanks; and I forget, it seemed like the number 50,000 per year sticks in my mind. Here we are in this age, that we're still going to that level. Over in Jacksonville now, you got all the problems where the septic tanks are all, you know, they're in bad shape and they need to be replaced and we got to put in collection systems. Well, what we tell 'em all those years ago? We kept telling, "Don't, you know, just go to look—work towards central systems is the way to do it." And I don't know if you remember, but in the—just before the whole thing was split completely up, there was a committee formed on the septic tank issue. And it would—had the developers on it, the septic tank providers, some engineers, doctors, our agency—I think Nick Mastro was on that committee. I don't know; it was a fairly big committee. And—and it would—had been selected and they worked for years trying to get that worked out that we would allow twenty-five lots initially, but it should be put in with the understanding that we're gonna have to go to central system. We thought possibly leading that you could take some of these things and put in the collection systems and go to [an] elevated septic tank draining field, you know?

CP: Yes.

GD: And that would be the start of it. So, that, as you recall, got introduced into the rules and regulations of the state board of health; and it took just about 'til [the] next session of

legislature; and the legislator decided they couldn't build their houses or they couldn't represent their client that was building the house; and so the whole thing was completely emasculated. And all that work—and [it] seemed like the number—five years, they worked and worked and worked, trying to work out all the details and get everybody in the same boat and this is what happens with the flick of the wrist when they appear in session for two months—

CP: I'm afraid so often our decisions are based on [what] the economic advantage is to me and the problems tomorrow, that's tomorrow's guy's problem.

GD: Well, I recall when they started in '75, when they started this—that bill was coming to split the drinking water program away from Health. I wrote a letter to one of our local members in Jacksonville, I won't use his name again, but I wrote him—I told him that we should keep drinking water with health, that we still thought that the drinking water portion should be with the health agency. And this gentleman wrote me back and his total answer to the letter that he had a project over in Madison County that they wouldn't let him put in septic tanks like he wanted to, so he wants to get rid of the whole thing over there. (CP laughs) So, it's basically animosity because he didn't get his septic tanks in and he did—get rid of the heath department or health agency out of all this stuff. Well, that's—that's one way to look at it, but that wasn't—

CP: But we're suffering the consequences—

GD: Still.

CP: Right now, we're suffering the consequences.

GD: If you look—if you look at how many septic tanks go in, say 50,000—which I think that's a fairly—I was going to cut that out and keep it, and I failed to do it. At three people per house, that is a 150,000 people served, and we say what the new growth in the state is? 300,000 a year?

CP: Yeah.

GD: We're selling—we're providing—

CP: Half.

GD: Septic tanks for half of that group coming in all the time.

CP: No.

GD: Still! I mean at this late date.

CP: Yow!

GD: I mean, we're still heading in the same way; we've never improved about it.

CP: Are there any studies on our aquifer, particularly in South Florida? I'm aware there's salt intrusion, I'm aware that—that Pinellas County is beginning to agitate the lack of water. Lee County is worried about water supply. Manatee [County] is having trouble with its river for water supply.

GD: What, low? I haven't heard of that. I don't—

CP: Yeah, yeah. I think. I may be screwed up. But the East—West—South West Florida Counties Lee and Lee mainly—in Sarasota, not Manatee, Sarasota. I'm sorry—are beginning to worry about a continual water supply because of salt intrusion.

GD: Well, they—we, the State of Florida, is the leader in reverse osmosis technology. And our first plant, we went in for that, I think it was in the sixties. And you look at what we have now at—we're treatin' water all over the state. And they're even considering one now in the Tampa Bay District. That they're gonna treat salt water. Which is absolutely ludicrous. You got all the brackish water you ever want there in right where they're going to put in the plant. There is brackish water underneath that site. I don't know what they're going to do; they gonna go out in the Bay and put an intake in that salt water? Man, that's the nastiest water I've ever seen. They're trying to use intake and the intakes will just get messed up in nothing flat.

CP: Yes, yes.

GD: There's no way to do that. I wrote a letter to both—I found out—about I wrote to *Tampa Tribune* and *The St. Pete Times*. *Tampa Tribune* published the letter, but *St. Pete Times* didn't, and I think that's where the big hullabaloo is at; That the water management district is gonna put a lot of money into it to keep the cost of the salt water down, but they'll still be paying four to five times what they could pay for treating brackish water.

CP: Yes, yes.

GD: The state has plenty of brackish water.

CP: Yes, we do.

GD: We've been using it for years. And it's around the state, really, we're utilizing a lot of brackish water treatment. And so, even—even in Dade, Broward, and Palm Beach, some of those are putting in low pressure membranes. Actually, what they call "membrane softening," where you just take good water and you just—can—low pressure, and you come out with a relatively economical plant. It's not that much more expensive when you consider all of the property and the land that it takes to put in a regular plant versus the compact—compactness of an R.O.[2] facility, you get a million-gallon plant in a fairly small area—

CP: You can't.

GD: You can't do that on lab softening, and filters, and all that jazz. So, it's—

CP: That's fascinating.

GD: They've done a number of cost studies on some of these plants and a lot of the plants now in South Florida have both R.O. or membrane softening technology, and they're—

CP: (inaudible)

GD: —meeting with their line of treatment. And one thing that has brought probably a big change this way is that with the continuing regulations of EPA and, of course, we in state agencies all across the country have to mimic or copy that. In fact, through the

2"Reverse Osmosis"

years, our—our rules were normally more stringent than federal regs anyway, but back when we—when the Safe Drinking Water Act came out in ’74, our rules were as strong as they were.

CP: I remember a lot of hullabaloo about that too.

GD: In fact, ours were stronger, because they wouldn’t do anything with secondary standards; which is all the sulfates, as you well know—in one argument we had in your office (CP laughs) about somebody you told the guy he didn’t think he would have any trouble, people buying laxatives there and he didn’t understand, “What you talkin’ about?” But the sulphates and all those things in—in Sarasota County, in that area. And we were taking care of it. We wanted to take care of it. Not the federal government, they weren’t gonna touch it.

CP: Yeah, I remember.

GD: They wouldn’t even back us on chlorination. I mean they were—the whole thing was a can of worms. They finally got to the point now that they’re trying to cram just more and more regulations down everybody’s throat. It’s—it’s gotten, I think—past a point of being beneficial. You’re really—you’re compounding, and everybody’s gotten so worried when really, there’s other things to worry about other than what they’re trying to look at.

CP: More eminent words. But in the—is the septic tanks generally, your feel for its impact on our aquifer water supply? You already has it—I’m recalling the studies of Flora May Wellings in the epidemiology research lab in Tampa, which she did a lot of sewage effluent, down flow, and I’m not familiar with those data—

GD: Well—

CP: I can’t recall them back up right now.

GD: You know, it’s always been difficult when you start looking in the virology as one virus can cause a disease, where as for typhoid—what does it take—thousands of those little boogers before you inoculate—

CP: Impracticality, yeah. Technically, you can do it with—theoretically, you can do with one, but actually it takes a bunch.

GD: What, viruses?

CP: No. Typhoid.

GD: (CP and GD laugh) Not the other way, it's not. Well, remember we had a little problem in Dade County, that again, relating to the memo that we put out that everybody had to go to complete treatment.

CP: Yes.

GD: And there was a system in South Dade, which the decision down there was to handle the overall problems of the area. It was going to be the county on the total utilities, counties and municipalities and they were trying to extend and pick everything up into the one basic system. Because they had complete treatment in all their plant. Well this is way—where it was down in South Dade and they just were away from everything and they couldn't—couldn't really get to it. But they did have—well, I don't know if they had a waste water plant that wasn't functioning right or whether it was septic tanks, I'm not sure. Seemed like it was septic tanks. But anyway, we had an outbreak on one of the water systems there. And Flora May went down and did the huge volumes of water you have to take for all the samples; and she did like twenty samples on the water, and then she did—they did cultures on all the people that were sick and everything else. Well, I think of the twenty samples she did on water, there were two—two contaminated with the same whatever—the trademark would be if that organism that they found through the—

CP: The patients.

GD: Yeah.

CP: Yeah. Uh-huh.

GD: So, they did tie directly over to water being the culprit of what created this particular outbreak. And this was of course after the fact, everybody had gotten sick but they still found these two positive in the—in the water system.

CP: Water supply.

GD: So, that created quite a hullabaloo in—in South Dade or in Dade County. And—

CP: I bet it did.

GD: Even the—the doctor there at that time didn't really want to get too much into that. (CP laughs)

CP: Just the health officer?

GD: Health Officer.

CP: Yes.

GD: And, for some reason, the data was there and we had a meeting but after that, the data could never be found.

CP: Oh, it got lost?

GD: So, I—somewhere, I think it got—got pulled away. But we definitely had a tie between the viral problems and—and drinking water in the waist highs. Several things—places that I got Flora May, when we took over in studying some areas that we felt needed additional treatment. I don't want to put any names into it, but a couple of cities we've been after to go to complete treatment. We thought they needed complete treatment because they had, like, colored water once in a while in their wells.

CP: Whoops. Whoops.

GD: That means ground water contamination is gettin' over into your wells. There's no way of gettin' around it. And so, on some of these, we had a contract that we ran out of some of our safe drinking water funds to let her [Flora May Wellings] do studies on those particular ones. Well, on two of the ones that we had studied, we found viral contamination. Several positives over a period of time.

CP: Oh boy.

GD: Well, in one city that I had been after, I convinced them that we would go ahead and start doing complete treatment. Because I didn't want to go to the press and tell 'em we had viral contamination. And they kind of agreed that they would go ahead and start aiming that way. Well, they did. They finally put in a complete plant. And another one. And there was a trailer park that we were skeptical about further up the state in a limestone—shallow limestone problems. And we found a contamination there. We got things arranged that they would get on the municipal system. So, that's—we used some of the viral studies, you know, to get it but we did find viral contamination in some wells. And if—as far as the overall septic tank problems state-wide, we keep on going more and more and more, and we have not really moved in a direction that I think we should have been moving all along, and I think most of those in sanitary engineering and the State Board of Health people feel that, you know, we should be moving more towards central sewage systems. And the septic tanks are not the panacea that everybody thinks they are.

CP: Yeah.

GD: In fact, you get in to some of the meetings in the other state sanitary engineering groups which I used to be active in some of them, and they always called Florida the septic tank state. Now I really—I almost have to agree with them. I mean yeah, we were that way.

CP: Yeah. Statistically, we probably have more per capita than most other places.

GD: God, I don't know how many hundreds of thousands—how many millions do we have right now?

CP: I bet you it's in the millions. Yeah. And we are—it seems to me we are the septic tank capital of the world. Our development kind of depended on it, I guess.

But I have said recently, being challenged by a group of public health leaders, what could I consider to be the public health problem of the year 2000. And I said, "Water supply." React to that.

GD: Well, I don't know if our water is that bad. I think the—we have a lot of good water in the state, and if you look at, say, some of the problems of, say, the biggest water problem everybody thinks about is the Tampa Bay area.

CP: That's right.

GD: I was born in Tampa.

CP: I won't hold that against you.

GD: And the—in growin' up there, I remember quite succinctly that we would travel across the north highway out there. Going to Tarpon Springs out through the area that now is basically all—all developments.

CP: Wall-to-wall housing.

GD: And if it had rained recently, most of the cows probably had some water around their feet when they were eating the grass. Of course, this is a very rich recharge area. They've shown that. That the water percolates down and that's where the drinking water recourses come from. And, of course, developers realize that they can't really build any houses with that much water around. So, we start—every time you start a development in that whole area there; you had to put in drainage structures, ditch it, start gettin' the water off the land and—to develop the land. Okay, what happens when you start doing that? It had, it wasn't just back originally; I mean it has continued through the years. Drainage, drainage, drainage, drainage, drainage.

CP: Yup. Off to the ocean.

GD: Well, out through the lakes and out through the bay—upper bay. I had a friend in—or my family had a friend—a church friend that I grew up with in Tampa there. That—they offered to my family an opportunity to go to their lake place. "What—pick out whatever week you want and come down and you can stay at the lake." I think they was—they—their family—I think they had one of the boys had one on another lake and the couple that owned the major one were gettin' so they didn't really go out their that much anyways. So, we—we took advantage of it, and normally during the summer we'd go down there and spend a week.

CP: Good.

The last time I went was like in 1975, just after—or ’76. Just about the time we were changing over to the new agency. They were already had been complaining for years about the water utilities using all the water resources out there and that was just terrible that—that they had to do something else for their water supply. That period, they had just completed putting about a two-foot ditch in the westerly end of the lake where we stayed. It could never come up to anywhere near its original levels. And I understand that it drained all through keystone. That lake had also been ditched. So, you’re ditchin’ the whole area you’re draining. Two feet of groundwater out to reduce that much recharge and say, “It’s the problem of the water utilities. The water utilities are causing all these problems.” And I don’t believe they’ve ever looked at it from the true perspective of what the problems are. Now, in so doing, you’ve reduced a lot of the normal recharge and probably a lot of septic tanks out there are making up for the recharge. So, you’ve got less water to dilute with the septic tank, effluence, that’s in the area.

CP: Fascinating.

GD: Isn’t it?

CP: Yeah, fascinating.

GD: And then we wonder why—why do we treat the water that—like we do? When you fly over the state, particularly if you’ve sometime—well—we fly around the state aircraft, you know? They—we had to fly us up with a group, they’d take the state aircraft. Flying it at low levels and you fly over, “Look at that big drainage ditch goin’ out across there?” They wouldn’t know why they were all there. And then, “What’s happening to the water in the State of Florida?” “Draining it off. We got to drain it to make development.”

CP: Drain it. Where would we build houses?

GD: That’s right.

CP: For the profit for one or two folks.

GD: So, the utilities get blamed but—

CP: Doing it, in actuality—

GD: In actuality, they're not the biggest water user.

CP: Yes. What do you see as a solution, Glenn?

GD: I don't know. It's gettin' further and further from rational decisions. I think we're all going to end up going to R.O. treatment or something. It's more economical—more—slightly more expensive, but it does produce a better water emitting—all the drinking water standards, which you don't have to worry about drinking water standards with that because you strip all of that stuff out. So, that's another reason that some of the—the agencies have gone to that situation. That they figured they can meet the standards in the future, whatever the future might bring. They'll basically be able to meet it.

CP: But if we don't have a—

GD: And there's about that much problems.

PC: If we don't have enough water to treat, so what if we meet the standards if there's not enough?

GD: Well, somebody's going to get some buckets to figure out how to bucket it because we get—any state that gets fifty inches of rain, which a lot of the state gets more than that.

CP: Yes.

GD: They get fifty inches of rain and can't manage when the states of California and some of the other states get twelve inches? And we can't manage with fifty? Something's wrong.

CP: Yeah. How do you react to the idea in our papers within the last year, a lot of boo-ha-ha over Saint Petersburg wantin' to put a big pipe into Wakulla Springs?

GD: They've had that opportunity ever since they have owned the spring since it was ever commercialized I think—or close to it. They were back—originally they've owned the rights on that water.

CP: Oh.

GD: They've bought it a long time ago. I don't really see that—that much [of] a problem of taking the spring water and using it.

CP: And pumping it out of Saint Petersburg?

GD: Yeah.

CP: Okay.

GD: But, the problem is when you start talking any of that and you get into these long transmission; like people talking about taking water from North Florida, pumping it to South Florida, you put in a hundred miles of pipeline, you've got some money. Real, real money. (GD laughs) It's a lot more than say, going to R.O. treatment over what your local resource is. Whether Saint Petersburg will get to that, I don't know, remains to be seen. It's certainly is a possibility and we have, in the state, I don't know how many billions of gallons of water flow out of springs all the time?

CP: That's wasted, it's wasted from our human consumption of water.

GD: Well, it's like—like some of the arguments in—over on the Saint John's River there and wantin' to get rid of the big pond there that was built by the Cross-Florida Barge Canal. I think it's ridiculous to get rid of that. Now just north of that, they've been talking about that the recharge area for Jacksonville, in that vicinity is probably, maybe twenty miles north of there. I don't know exactly. Not too much difference in grade probably. So if you got into a real straits for a water resource, you could pump that water into recharge basins up there in that area and recharge that sand.

CP: Oh, really?

GD: But everybody, “Oh, we gonna’ get rid of—we’re going to have to get rid of that—that lake.” Well, I think that’s a foolish situation.

CP: Yeah.

GD: That river can never be like it was because all the trees have died and fallen in by now. Because—right after—not many years after that, people up there fishin’ had to get out of there when a wind storm came and they get logged down through the boat. So, they learned that a long time ago. The lot of those trees. And the river itself would never—it would take eons probably to get that river back to what it was.

CP: That might be.

GD: But it certainly is a water resource, and it’s certainly is a—is a fishing resource right now. I’ve never fished over there, but a lot of people say it’s great.

CP: Yeah. I’ve fished there and it’s good.

GD: But uh—this is some of the things we have that—we have water resources just like Silver Springs. What is it? I don’t know, minimum flow probably two hundred million a day? I don’t know what the—

CP: It’s gigantic, I don’t know what it is either.

GD: I don’t know. I used to keep up with some of the total flow of some of the major springs but I don’t anymore. But there’s a lot of water that, when push comes to shove, there’s nothin’ wrong with that water. They used to say it was mineralized. What do you mean? It’s the limestone water, the same thing everybody treats for drinking, that’s all it is.

CP: It’s the same where mine comes from.

GD: Yeah.

CP: Have the water management districts, which were enacted for managing the water supply—came in ’76, I think—what impact have they had? Were you involved with the water management districts?

GD: Well, some good and some bad.

CP: Okay. (Laughs)

GD: They turned a deaf ear, I think, towards water utilities. Most of the water management districts—if you look at going back to—you know, they were in existence way back there. That—they’ve been involved in water resources. And some of the appointments now have changed somewhat. I don’t know—I don’t look at the appointments that much, but it used to be basically the landholders were the ones that were appointed to the—

CP: To the governing boards.

GD: Governing boards.

CP: Yes.

GD: All right, now they’re the ones that want to use the water for irrigation, sell the water, and this sorts of thing. Just like the Tampa area. Now, when all the rules and regs [regulations] are passed and—and we told some of the people in DER. here, when they—the waste water group, their the managing some of the—the water rule, whatever that rule used to be. State Rule 40, or something, I forgot what the number was. Anyway, that they’re put in this water areas of stressed that have to be special needs, and—all the special studies you got to do and—the only ones that have to do any study is the water utilities. You got to look at reusing the wastewater. Well, what about all the agriculture? What are they doing? Nothing. What about all the people draining the land? That’s where our resource is, that’s what’s happening to the resource and we’re draining it. What about that? Shouldn’t that be reconsidered in these water—that need being conserved? Not just the water utility saying, “Well, you’ve got to look at reusing all your wastewater before you can take in more drinking water.” We’re—after all, the drinking water people are about the third highest demand, behind agriculture, industry and—and drinking water. So, why should we be the one—have to do all the—

CP: All the givin’.

GD: All the givin?

CP: Well, that's—

GD: Why ain't the other part considered? If you've got a problem, consider the total resource for everybody.

CP: He did.

GD: That's what it should be. But doesn't seem to work that way.

CP: Oh, I thought that's what the water management distribution were—

GD: Well, I thought so too, but you look at something I read in—a rule came out and, what was it, drinking—the water—*Florida Water Resources Journal* came out from a rule on—I think it was Saint John's district. And all the hoops that they're set up in it is the drinking water and the utilities, which only utilities is water—waste water utilities, there ain't no ag [agriculture] utilities or industry utilities. They're the ones that have to look at all these different things that—whether you've got water or what you got to do or how you're gonna' manage it and the other parts. I think that's wrong. I've thought it all along. That—that it's got to be—

CP: Total water usage.

GD: Under broad presets. If it's—if you got a shortage just like in the Tampa Bay area, the total package has to be there.

CP: Put on the table.

GD: You look at over in Pasco Country where they're sayin' they've got all the problems. That water out there had to be drained too to put in all those houses.

CP: Sure it did.

GD: It ain't no different from what over there in Pinellas County and North Hillsborough.

CP: So true.

GD: They drain the land so they could build the houses.

CP: Yeah.

GD: With no—no consideration of what the whole total package is happening.

CP: Long range consequences.

GD: And I got into some of the water management supporters a couple of times in their ears. For years, we've had a sand mine—what's the—what's the most important water recharge area of the state?

CP: The central sand ridge area.

GD: What do they call that? Green Swamp.

CP: That's right.

GD: Right, Green Swamp.

CP: Green Swamp, that's right.

GD: And the Green Swamp—and I'll bet it's still there, one of the major sand producers, dewaters and pushes the water out through the Peace River, out of the Green Swamp. And that's been permitted all this period of time.

CP: Really? Really? As I said, I view our most significant public health problem of the twentieth century—I mean twenty-first century to be water supply. Yes, I do. I think it's gonna come haunt us—

GD: The resources if though we've improved water treatment facilities or water treatment processes and we're producing a better water under any circumstance we can produce drinkable water at a reasonable price. And I'm talkin' probably less than a dollar a thousand. But when you add on distribution charges and all, most utilities charge a dollar —their minimum charges are normally charged a dollar or more per thousand gallons. But even so, like David B. Lee[3] years ago used to say when you'd go out, he'd give anybody a thousand dollars if they could drink a penny's worth of water in a day.

CP: (Laughs) Fascinating.

GD: There ain't no way you can do it. There's one—one person I think—it seemed like there was a case somewhere in y'all's archives on the—on health that some lady drank, for some reason, I don't know why, drank, I don't know, three or four gallons and she died. That's about as much as you can drink to—

CP: Yeah, yeah, that would—that would do you in.

GD: I guess it just dilutes everything out and that would be it. But—even so, water's a—c cheap commodity.

CP: Yes, it is.

GD: People must—must think more of it, though, if they'll pay fifty cents for a liter bottle and not pay—paying less than a penny.

CP: Oh, your liter bottle must not be good, I haven't seen any for less than $1.19. In which I don't—

GD: (Laughs) I don't drink it.

3David B. Lee was the Director and Chief Engineer of the Bureau of Sanitary Engineering with the State Board of Health in the State of Florida. Lee was also an avid proponent of centralized sewage treatment facilities.

CP: I don’t drink it either.

GD: I’m tellin’ you all. What’s—how—when did they—how often do they test that bottle? How frequently they—how much shelf life does it—how long has it been on the shelf over there.

CP: Oh, the story that I like is that Broward Country got on to the water—pure water vending machines. You might remember that, but I’m gonna remind you. There was one company that—I don’t remember how they got on—but anyway, the investigation revealed that these vending machines, where you’d go with your gallon jug and get you a gallon of water for a buck or something, was hooked in to the city water supply and a spicket right back at the machines. Where they got their water.

GD: It is but some of them are supposed to add, like—like carbon filters and that sort of thing, you know, to straighten it up. But carbon is an excellent source for bacterial contamination.

CP: Yes, it is.

GD: It’s a good growing medium.

CP: Yes, it is.

GD: So, you better not use one of—

CP: That’s true.

GD: Those buggers too long or you’re gonna have some bacterial problems. (CP and GD laughs) May not be coliform, but there’ll be some bacteria.

CP: Yeah. What do you consider the highlights of your career, Glenn?

GD: I don’t know, I—just overall of being involved with a—in a state that has grown dynamically in the last thirty-five years—forty years, a bit of—

CP: And you were a witness to all of that?

GD: Uh, yeah. When you're involved in a lot of it, just like the R.O. facilities. I feel that was—I had a good hand in getting that started way back there and pushed it. I can recall DuPont coming in [and] talking to us on R.O. years ago. I guess in the—probably, the late sixties or early seventies, and what our views were on R.O. And I said, "I think it's the—it's gonna be the treatment process in the State of Florida.

CP: For our listeners, you—if you haven't been listening real well to Glenn, R.O. translates Reverse Osmosis, that he used in the early part of our conversation. But I tend to—just want out listeners to understand that we're talking about reverse osmosis with R.O.

GD: Right. Well, reverse osmosis is even expanded out now to you have ultra filtration and they—they—they've soft—membrane softening, which is R.O, but it's—they—they vary the—according to the water, they can now open up the membranes a certain amount and get more water through at less cost, lower pressure; and they've done wonders in the—in the field. I can recall the first plant we put in, and I did have—I had a picture in the—the guy that was selling it at the time, I told him, "I'm trying to find that picture" for him, of the original R.O. plant.

It looked like four rocket tubes on the side of a building. Four-hundred PSI and they had these huge pumps and there you could not go into the pump room without puttin' on hearing protectors. I mean it was that loud. And that was the first one. And it was on Longboat Key. And we put that in because they were trying to get water out there on to the Key and these people wanted to go in to put in this condominium, we told them they could move forward with the R.O. system. And they realized that they would put it in and as soon as the utilities got there with their central water system, they would just switch over to it. And I thought—you know, this—this was the way to go. And, in fact, many of the R.O. plants that we have had and for a long time, I was doing talks on, or give—had papers published in A.W.W.A.[4] journals and a couple of the R.O. membrane technology courses that they put on, but I kept that history up through the years until I retired or—a little bit before that. When I got out of drinking water and got over in the other group of cleaning up contaminated supplies. But in the other field, I did try to keep that—that resource, I mean that history up. And you could see every year we'd do it, we had about—still had about a hundred plants, but there would be like, twenty new plants and twenty of the ones that were there have now gotten central system to 'em. So, they have

4American Water Works Association is an international non-profit, scientific and educational association founded to improve water quality and supply.

abandoned their—some of ‘em moved on and they resold them to some other facility. And they were still in good shape and they could—they could put ‘em in another site.

CP: Relative expense of the R.O. system?

GD: Well, you can produce, like I said, the water—if you have to go to, say, lime softening, filtration and that bit. And many of the plants now, with the lower pressure membranes are putting in plants that they do some of the analyses of cost one versus the other. Have shown that there’s not that much difference because land has gotten so expensive. You taking a lot less land to produce that and when you lower—say, from the original four hundred PSI plant, we’re now talkin’ probably a maximum of two hundred PSI and some of the ultra filtration stuff and membrane softening may be a hundred PSI. So, we’ve gotten down into where the pumps are much more economical, and to handle a facility and all is much more—much better now than it was in—thirty years ago, when we got started in this business. The originals seat—they—well they’ve got one salt-water plant in in Key West; and which in most of the papers I—I wrote, I said, “That would be the only place we’d ever need salt-water,” but the Tampa Bay people decided that wasn’t right, so they gonna go into the bay and take water out of the bay, rather than go to R.O. Real R.O. is the better water—

CP: Too bad.

GD: But those type of things, I think, that when you consider all the progress that’s been made in it. And I did one paper a few years ago down on a national meeting on membrane technology that I surveyed all the states to see how many membrane plants we had. And in R.O.—the United States is the one that’s really pushing and out of the United States, the State of Florida has more than the rest of the States put together. Even though there are other plants around, we had as many as the rest of the other states put together.

CP: Now that speaks volumes.

GD: To our—our technology has really—we’ve really pushed the technology, I think, in Florida.

CP: And that’s part of the highlight of your career, is being on the cutting edge of that evolving technology.

GD: Right. That's been a very interesting—in fact, right now, most—going back and reading your articles in some of the journals—I don't read much of 'em. I try to keep up with what's happening in the R.O. field, but that's about it.

CP: Yeah. Yeah. How will history view—or do think the separation of water supply from the larger public health family has been a useful thing for the State of Florida?

GD: Has been a what now?

CP: Useful thing. Did—Have we done better—

GD: Well, explain useful. (Laughs)

CP: Okay.

GD: I'll pull a Clinton on you. (CP and GD laughs)

CP: Let me rephrase my question. No, did putting water supply into a family of environmental pollution control—if you will, an environmental control, better serve the public interests for a healthful, sanitary water supply in contrast to the health umbrella?

GD: Well, I think it was a detriment.

CP: Oh, you do?

GD: The people that I was involved with a number of times—and I would make the point specifically to them. As you know when—in one case in particular, it wasn't long after we'd moved into the agency over here. We had a—a hurricane alert for the state. And we got into the meeting and I went in and represented drinking water group—

CP: Concerns. Yes.

GD: Concerns. And the powers that be, most of them were from the—the environmental group that took over the agency; their concerns were whether people would come in after

they had—the tide came in and tore up their docks. They [were] afraid that they would have permits for docks and building facilities that shouldn't really be built. Now we kept getting in in all this stuff like that and I just sat there goin'. And I finally just jumped on all of 'em, I said, "What the devil you talkin' about?" I said, "We're talking about a contaminated situation where you—wells may be flooded, the whole system may be flooded, how's this get water back into the system, and you're worrying about the environment, whether somebodies gonna get a permit, or get somethin' done without a permit when they should've been?"

CP: Dock permit.

GD: That—that doesn't make two hoots in Hell whether that's a viable alternative. I said, "The people's health is what we're supposed to be looking at here. And certainly drinking water is being one of them."

CP: The first.

GD: "Well, yeah, that—that probably we were doing that." I found it. I sat back and shut up, I'll figure, I'll do what I want—needed to do anyway through—through the groups in the field. I—working with the county health department is better when we work with them. So—

But a lot of the—a lot of the stuff that I've seen through the years, working the environmental aspects, that always seemed to be the major thrust. That they're more—

CP: That whole precision process.

GD: Interested in—in that aspect then they are for the water for people. I—I can recall that—I don't know if you remember they had the federal government before they got into—were holding hearings all over the country when this environmental thing came up, you know, and they'd come in and listen to all the whims and wherefores about the environment, blah blah blah. Well, they had one in Jacksonville; I think, the State of Florida had two sites. I think Jacksonville was one and I think Miami was another one.

CP: Yes.

GD: Well, I testified at the one in Jacksonville. I think I was an officer in the Florida section of the American Water Works Association at that time. And testified to the importance of drinking water for people. I think you recall that John Miller was always this drinking water for people.

CP: That's right.

GD: You know, I mean—

CP: He wouldn't let us forget that.

GD: He'd never let us forget it.

CP: People at the height of the pecking order.

GD: And the total impact in that whole thing that the environmentalists just jumped all over me. That that, "Oh, oh, that's terrible." As I said, it's typically the long-legged wading birds, we were more worried about than water for people. And they didn't like us that—all—I can't help but that was my total thoughts on the way the whole situation was runnin'. And you know, they had volumes of—from the hearings of that thing and I imagine most of it was the same thing. Everybody in that whole thing was pushing the environmental aspects of water. But I don't think you can—it's right or reasonable to separate out the real concerns fordrinking for people out of that package. It better be at the head of the pecking order or we got problems.

CP: Well being in—being in public health, I agree to that. You tell us that you remember a debate that I was previously having once with a Floridian who is very much a pro-things environment. And our debate was which is the most important, people or the creatures of the forest? Well, it had our attention. And the conclusion of that was—his concluding point was that clearly the creatures should be our first concern because man can be taught to boil or filter the water and the creatures cannot.

GD: Well all right. (CP laughs) It gets—it gets—it gets deeper than that though. In trying to work in the state, look what has happened to the waste water; they made everything where you first went through the grades of type one, type two, type three, wait. Okay, that didn't stop them. Enough of it. So then they got outstanding Florida water here, they got one there, got one there, and all over. Everything's in out standing Florida water, 'cause you can't put anything there. Now, it gets worse than that. There's things written into the

rules that you can have almost anything to come up and, “you can’t discharge.” I ran into this with the R.O. technology. Here you are taking water, pulling it out, stripping solids out of it, basically it’s the same water that’s in the ground. You haven’t done anything to it. And you want to discharge that into brackish water, which it should be. It’s a better meld with the brackish water than rainwater is, for sure.

CP: Yes, yes, yes.

GD: You might have hydrogen sulfide, which you can handle. You can chlorinate it, aerate it back down and discharge it with no hydrogen sulfide. We did have some hydrogen sulfide plants that were discharging their H_2O. But you go look at it and here the sulfur’s slimes and all the darn little fishies all workin’, just—they goin’ crazy in that sulfur slime. So, it wasn’t really—it wasn’t a detriment. It did look bad because you had the sulfur slime there, but it’s not anything to really get upset about.

CP: Sounds like you might need some help (inaudible) here. Uh-huh.

GD: But it—they have just about made the—well, they—understand that they’re trying to get the thing turned around now. They classified the reject water from the R.O. system as industrial waste.

CP: Oh, boy.

GD: So, you got to jump through all the loops of a waste stream to discharge it. And at one point it was—it was not a class one water, it was not any tremendous class, it was a down on the—um—Stuart area or somewhere down there. And some of the back bay pipe stuff. But it’s a lot of water there.

CP: Yes.

GD: They put in for an—for injection here, you know? The local guy with the department said, “Oh, that’s a nursery. A fish nursery.”

CP: Huh?

GD: There ain’t a damn thing there but sand. What do you mean? (CP laughs) It’s not a nursery. You can’t argue with ‘em.

CP: Uh-huh.

GD: That’s what it says. He can declare it a nursery and then got to—

CP: And it’s a nursery.

GD: Yeah, it’s a nursery.

CP: If he declared it as that.

GD: That’s all it is.

CP: Yeah.

GD: So, they do it—I mean they’ve—they’ve created so many fictitious atmospheres—

CP: Barriers.

GD: That you’ve got to—to meet. Even for things like drinking water.

CP: That—that costs.

GD: It adds a lot of costs.

CP: It adds costs. A lot of costs.

GD: They—I had one in particular was Sarasota. That they would not—nobody would make a statement of—to release the effluent from the plant down there. Well, they had—that’s a real—really a complicated plant. They gots lime—zeolite softeners, which they use bay water, chlorinate it to back wash their softeners.

CP: Uh-huh. Yeah.

GD: They had some other item and we had R.O., and all this was goin' in together, or the reject.

CP: Yes.

GD: So, I was stripping hydrogen sulfide and that highly mineralized water there, as you well realize. You had some fluoride. And we did all this but they—they—all the effluent on your had—the back wash water from the zeolite softeners going together with the R.O. reject water, which had hydrogen sulfide, high sulfates and—fluorides were up, I'll agree to that.

CP: Yes, yes, yes. Uh-huh.

GD: All right, so he said, "Nobody would answer—won't give him a discharge." The plant was ready to open. And they wouldn't release it. And so, Ed Snipes, the—who's long—he was back with our agency when we were in the Health Agency, way back there. He was fussin' to me about, "We can't get this thing to—we can't discharge it." I said—he—they already did background studies of where the discharge was in the bay. Well, you have to realize that there's also natural radiological contamination in the bay. And they've got it—radiological in the ground water. They had fluorides in the ground water. So I said, "Okay, give me all of the samples you got in the vicinity of the discharge. And give me an analysis on the—on the reject, and combine effluent that goin' in there."

CP: Yeah.

GD: Well, he put all the package together and sent it to me. Well, the reject water was way below all the background; it was in the bay.

CP: Yes.

GD: I wrote a memo back to him. Said—

CP: Proceed.

GD: “It’s perfectly all right. It’s a lot less than the background in the bay.”

CP: Yes.

GD: That’s all he wanted. He said, “Here.” (CP and GD laughs) You go and start operating. I thought the—we’re—we’re just goin’ all around this thing, and there’s nothing there. You know, I don’t know. I—I have a different outlook. I’m lookin’ at the drinking water supplies side, and I—I can’t stomach some of this other stuff.

CP: And that all reflects. And I want to think that the majority of the public expects us government to give first consideration to safety for we, the human being, and then for the other thing secondarily.

GD: Well.

CP: Should our first concern in water supply be the human being? Is my question.

GD: For drinking purposes, yes.

CP: Yeah, yeah, yeah.

GD: It should be. The—it’s—that’s like, you know, something—shouldn’t get into that—the wastewater discharge end of it. I—I’ve wrote—I get ticked for years at—at septic tanks and our problems with septic tanks, and I often would write a letter to the editor or something that tripped my trigger. But later on, after I got out of the drinking water program, I was handling all the cleanup of wells for—well, the ethylene dibromide problems and the gasoline problems and the—

CP: Oh boy, I remember him.

GD: All that different pot of money that came in that we could help different ways for private wells or some of the other things.

CP: Yes.

GD: Well, we had us some flack around Tallahassee here about septic tanks, and all the people were gettin'—well actually, they were gettin' bent out of shape about the trichloroethylene. A couple of spots, we had trichloroethylene. And there was a gasoline spot or two. And they were all just—all just goin'—

CP: Hot and bothered.

GD: Just all mind boggling how bad it was, blah, blah, blah. So I wrote a letter to the editor and told him, "that all of this gasoline and all and everybody's complaining about." I said, "It amounts to maybe a gallon here and a gallon there. That's about all it is." He just comes out and you taste it or has some concerns with it. I said, "But yet, we have each septic tank puts a hundred thousand gallons of at least, at best, 50 percent treated sewage in the ground, and nobody complains.

CP: Yeah.

GD: I said, "It's gaggin' on a gnat and swallowing a camel. What the devil you doin'? You got all this other stuff but yet you're complaining about a little bit of dissolvent"

CP: Uh-huh.

GD: And I—

CP: Did they get any playback on—did it publish?

GD: Yeah, it published.

CP: Did you get any writin'?

GD: And some—some—some girl at work today, environmental health in the health department here in town. I think worked with the—with the main office here, wrote some letter back about it. And I happened to see some of the guys at work with it, I said, "Why

don’t you tell her what’s goin’ on?” (Laughs) She would—she was defending the septic tanks. There was a guy in the Jacksonville paper to—about a week ago, wrote one defending all the septic tanks over there. “We shouldn’t get rid of all of ‘em.”

CP: Oh really? Really?

GD: Yeah, I started up, “Cut it out,” I was goin’ to write a letter—

CP: Yeah, I wouldn’t be surprised if you did.

GD: I wasn’t goin’ write no letter.

CP: It’s gonna’ our—it’s gonna be a problem for those after me and you, Glenn. And they—‘cause we put in, you know, a gigantic number of septic tanks, beginning in 1948. We begin to put ‘em in like they were goin’ out of style immediately after the Second World War. I used to know the proportions and the numbers but that group—you know, there’s gonna certainly become a problem and this state is gonna really have to do some shuffling to get a central collection system for all them suckers.

GD: And pretty soon, it probably will be that every water treatment plant in the state will have to go to complete treatment.

CP: Yep. What do you think of injection pipes, for getting rid of our industrial waste?

GD: Most of those that we’ve had—there’s one around the lake region down there. One of those plants, I forgot which on it was. But it was put in years ago. It seemed to be holding up pretty well and sealed with no up flow. You get into, say, Dade County, most of that zone below is fairly mineralized. And they go down into that high mineral zone and I think they can—they can seal it off pretty well in what they’ll do.

CP: They can take the discharge—

GD: You know, we—even now, in some of the areas we put in—treat water and then put it back into an envelope in the ground. And then during high demand periods, take it out of that envelope, bring it back up and put it out in distribution. It keeps down demands during the dry weather periods that—that would aid the system.

CP: Yes. We're doin' all right.

CP: Mister Dykes, for out audience, we're using the word R.O. a lot and if they had been —what's R.O. mean?

GD: Reverse osmosis. It's like, osmotic pressure that we're all familiar with. A lot happens by osmosis, but reverse osmosis is adding pressure to reduce our—where the pressure pushes the water back through in the opposite direction. What a normal—

CP: Osmosis would do.

GD: Osmosis would be. So, you're just reversing the osmosis.

CP: I—I just didn't want our audience to misunderstand.

CP: On these injection wells, there was one in the Orlando area as I'm remembering, Glenn, that came to public attention. Which concerned a number—I think our using pressure to push down stuff. Did you get involved with that?

GD: To some major extent. (Laughs)

CP: Some major extent.

GD: The whole decision there was that they wanted to reduce the amount of water flowing out of Orlando south in that waste plant out at the airport, which was going to be a new, five-million gallon facility out there. And they wanted to direct inject into [a] strictly drinking water aquifer. And their theory was that they were gonna—they take their water—the city does, the City of Orlando takes their water out of the lower zone, so they were goin' to inject—treat the sewage to a high degree, and then inject it into the upper zone. Which be—would be overriding their—their own aquifer. Which there was not too many ties between the aquifers there. But there were already, some of the old drainage wells, you know, inject in to the upper zone down the downtown area.

CP: Yes.

GD: But that's kind a well away from most of the drinking water resources. We went round and round within the agency on this decision. And the decision was really made without ever lookin' at what was the effect on the drinking water resources currently being utilized within Orange County. So, that was my concern. That—that nobody else seemed to—to care about, but they're probably six hundred to a thousand public water supply wells in the upper zone in Orange County.

CP: That many?

GD: And there's no telling how many private wells were also in that aquifer.

CP: Yes.

GD: Even some of the city's newer wells are in the upper zone, which they failed to—to note in any of their discussions or paperwork involving that project. Strictly it was not the proper thing to do. And finally, through the legislature and the controls that were placed on it and the restrictions placed by the commission, when they reviewed it and—and said, what the standards has to be, which was required by the legislature, you have to set the standards for high—what the quality water's going to be to inject into the ground water there.

CP: Yes.

GD: Well, when you got into all of that, and got into the low carbon content and that levels, then the City of Orlando decided they couldn't provide the treatment necessary to get it to that level, so they abandoned doing that.

CP: The whole project.

GD: Yeah, so basically, I—I think it's surface water ponds around the airport and through that area there and it apparently percolates down into there, getting rid of the discharge that way. But it would have had a major consequence on—consequences for some of the people taking water out of the upper zone. In fact, there was a municipality—a small municipality that was trying to expand. It was immediately down gradient from that induction site.

CP: That site.

GD: So—

CP: And they could've had trouble. Potentially.

GD: At—luckily, it was—it was changed and no longer that way. And then, they also came up with their second plan for the area; that they would put discharge out in the orange groves there, which with the low level of some of the water tables in some of those lakes at the time, that probably would be great—a beneficial use of it. And I think driving through the area since that time, it look like some of the lakes have come up. So, maybe that did help.

CP: Good. Yep. Good, good, good, good, good. You—you spoke earlier of the highlight of your career—

GD: The highlights.

CP: Would it embarrass you to speak to the lowlights of your career?

GD: (GD laughs) Well, I think the—that particular drainage well situation was a low point—

CP: A low—yeah, it was.

GD: When you do this sort of thing to drinking water resources, and never—you're workin' the environment side, and nobody bothers to even look at what happens to the drinking water side of the shop. I think it's—

CP: It's almost criminal.

GD: Disgraceful.

CP: It’s almost criminal. Um-hm.

GD: The other side, I don’t know, the drown—downside, I really don’t have much really downside. I think I enjoyed my—my tenure in the state government. Thirty-five years—almost thirty-five years that I’ve put in.

CP: Great.

GD: And I met a lot of interesting people, and did a lot of interesting things around the state. I was involved in quite a few that I thought were good projects.

CP: Worthwhile, yes.

GD: And I look forward to how that whole thing will work somewhere down the line, you know?

CP: Yeah.

GD: That everything will all work out and all will be great and glorious and grand.

CP: Well, it’s obvious that you continue to keep up with the goings on in your area of expertise and I appreciate you doing that.

GD: The latter part—the last few years you know, I spent in the—the—cleaning up all these private wells, that was—really, that was the best part, because I had all the money then and drinking water never had any money. (CP and GD laugh)

CP: Oh, good point. That’s right, well, speak to that.

GD: The—anyway—

CP: Give us the background of how this came to pass.

GD: Well, the—we—everybody started lookin' at what chemicals, you know, had been used and—and what problems we have and everybody was kind of voicing what had been used. Well, somebody said that, "Well, ethylene dibromide[5] had been used for nematode control for a number of years and hadn't been any problems with it." So, okay, so we started checking all the wells in the vicinity of orange groves and even had recorded—most of it was recorded because it was done under contract to the grove owners by the state.

CP: Yes, ah.

GD: So, the state had records of where these application zones were for the ethylene dibromide. Which, you know, controls the nematodes and they thought that was a great idea. And does better—makes better oranges and the groves do better and the whole bit. So, anyway, they got out and started doin' all these checks and balances and checking wells, checking wells; and actually, several thousand wells were checked in the ridge section where all the groves are. And, lo and behold, we started finding ethylene dibromide was quite ubiquitous.

CP: Whoops.

GD: And a lot of private wells certainly were contaminated, but it also ended up [in] some of the municipal wells in that zone. That were close enough to areas that had—they had been contaminated too. Some community water supplies that were located around groves or in some areas where groves had been torn out and put in developments were utilizing—some of 'em tried to utilize the irrigation wells there in existence when groves was—existed. And on a couple situations that the wells were tested initially when they were put back in use. Didn't show any contamination. So, they go in there and put the whole facility in and then start pumpin'. You go back and check it. Well, lo and behold, you've drawn it back in there and they got to go in again. So we had those types of wells also contaminated. So since the state had done that under contract, they were more or less felt that the state was then responsible for it. They started paying for the construction, or reconstruction, or doing something to these wells.

CP: Yes.

GD: Our basic function on all these private wells that we've got—we've got a contract with installers for carbon filters and put carbon filters on all the wells.

5Ethylene dibromide was used as a fumigant to protect against insects, pests, and nematodes in citrus, vegetable, and grain crops, and as a fumigant for turf, particularly on golf courses. In 1984, EPA banned its use as a soil and grain fumigant and is listed as a probable human carcinogen.

CP: Gotcha.

GD: And went back in on the routine basis and exchanging ‘em out. And, I don’t know, I think we had a thousand of those things under—under contract that we—we—that the contract for the carbon each year was, I think a couple million, or a million at least. I don’t the number—

CP: Are we—we, the state, still doing that?

GD: I would think they would have to as long as there’s ethylene dibromide.

CP: It’d be infected.

GD: You know, they would have to be doing that.

CP: Furnishing the carbon filters for (inaudible).

GD: And we got into some areas that there actually was municipal supplies or community supplies, system close enough. That we could extend it to pick that up.

And I got into a number of deals with cities to—

CP: Stand the line up.

GD: Put in some big line extensions. I got one up Highway 27, and I think the project cost about three hundred thousand dollars, but we got a water line up—up US 27 up there, almost to baseball city. And that there was other developments planning to come on, in fact, before we got through with the project, the—right at the end of the line, that property—piece of property right at the end of it was expanding and they—we ran an extension off to provide central water to them. So that avoided the same situation over again. In fact, that whole area then could go to public water supply. And that was one reason that I got into that program that I knew a lot of the water utilities that the personnel that we could get things done through them. And I would handle it on a—basically a one-to-one basis.

CP: Yes.

GD: A lot of this stuff. We had a big contaminated area in the City of Tampa from trichloroethylene[6] that had been there lord only knows how long. So, I started checking all of those wells and they found it or somebody complained, or—anyway, they checked one and then they started lookin'. We ended up with about twenty wells out of about thirty or forty homes were contaminated. So, I called the utilities director in Tampa and I said, "Look, we—we're gonna be catchin' the flack and you probably be catchin' it pretty shortly too." I said, "You got trichloroethylene in all of these wells out off of, I don't know, east side of town there. How about giving me an estimate of how quickly and how much it will cost to put water lines in to that two or three block area there and tie it off your system?" Once he had—he had water lines along the highway—of the highway there. And so, he called me back and in a few hours and said, "Oh, they cost about thirty five thousand." I said, "Okay. Let's go." I wrote him a contract, and gave him the money, and that—we figured our carbon cost at about, I think we'd figured long time—lifetime on it are about three thousand dollars or something like that. So, we always just estimated that against our—our—whatever the cost would be, well, it's gonna cost us three thousand dollars. So, that's sixty thousand dollars for twenty houses, so let's go. We would—we could do—it was a very—very convenient way that the—to get things done rapidly and that was—

CP: That's great.

GD: The first project we had on that program, and it was the quickest one. And we never got one done quicker than that—

CP: Yeah, I remember—

GD: But the City of Tampa wanted to get that corrected up too. So, they—they worked hard.

CP: Of course. There was a lot of public outcry about that.

GD: Yep. And—

---

6 Trichloroethylene was used as a degreaser, an extraction solvent for greases, oils, fats, waxes, and tars, a chemical intermediate in the production of other chemicals, and as a refrigerant and is considered to be a human carcinogen.

CP: About the ethylene bromide [sic].

GD: Well, the ethylene dibromide, but when we got into some of these others, they've also, you know, a lot of other—trichloroethylene, there's a lot of it around. Just like here in Tallahassee.

CP: Yeah, you can smell that here.

GD: Yeah, but the—you know, they had to put carbon filters on some of their wells here because of trichloroethylene elevation. And that the funding was different for the different compounds. Ethylene dibromide was done by the state. And so, that we had to fix. The others, it worked out some other ways how—what could be done and what couldn't be done because of the way that the law was written. But an awful lot was accomplished. In Dade County, we—out there in south Dade, where they had that trichloroethylene problem. I'd probably put three hundred, four hundred thousand dollars in that. And it was an extension of the city system basically in that area. But I could only pick up the ones that were contaminated. I couldn't pick up all of the others.

CP: Yes. Of course.

GD: So—

CP: And the city would've liked that. They would've liked that.

GD: Well, they like getting their lines in so they could use 'em later.

CP: Yeah. (GD and CP laughs) Glenn, you've obviously had an exciting career, Glenn.

GD: I have, I've enjoyed it.

CP: If you had it all over to do—do—do over again, would you still go into sanitary engineering back at the University of Florida?

GD: Oh, I'd still go into it. They don't call it that anymore. They call it environmental. I'd never moved up to environmental engineering. I was always a sanitary engineer.

CP: Oh, oh, oh, environmental engineering. I'm sorry, sir. I'm sorry, sir.

GD: They don't call it that name; I don't know when that switched over. They used to always think that sanitary engineers were garbage collectors anyways, so that's all right. Oh, well.

CP: (CP laughs) Yeah, you—and—it just pleases me that you look back on this as a pleasure. You laugh about all of those sad moments—

GD: Well—well, you know, you have—you always have a little bit of bad with the good. So, you just have to take it all and ride with it; but I think, overall, I had a—I had a good time. I met a lot of people and I enjoyed the people that I worked with at the—the people in the health agencies around the state. As well as the own staff that we—we brought in to the environmental agency. I could still, call up them right now, those that are still employed and get—get something out of 'em—the—

CP: Get help.

GD: Or some information on something. In that are if I wanted to.

CP: That's good.

GD: You know, like I'm still on a first name basis.

CP: Do you have any advice for young people coming up for a career in environmental engineering?

GD: Well, I think it's a great career, that—it's broadening out so much now that there—there are many more possibilities. And it's—you know—just like all the environmentalists and environmental stuff, more contaminants being controlled, wastewater is getting volatile, you got to do this, that, and the other and do more things. Go to advanced waste treatment. All of the—across the whole spectrum, there's more and more technology going into it. And it's very important.

CP: And it's almost many areas in a specialized area, where you were a generalist. You knew everything about everything in the early days.

GD: Well, that was because we worked with the State Health Department. Because we had it all right in one agency and we worked together and—and we crossed—talked across the room that—you know. "This has come up," "Hey, what about this over here?" Well, we were together, we would control the connection or distribution, and we made sure the collection system was getting built at the same time the extensions were getting built.

CP: Yes, yes, yes.

GD: Or we had some control on both sides of it. Now, I doubt that goes on.

CP: That's the reason that after the new asphalt road is put down, somebody comes back and digs it up to put pipes in. Is that the reason? (CP and GD laughs) Well, Mr. Dykes, on behalf of the College of Public Health and the University of South Florida, particularly the library division, and myself I say thank you sincerely for coming by and sharing with us. And we want to wish you well, and I want to encourage you to continue to think and continue to write those letters to the editor.

GD: Well, I hope so.

CP: Yeah, that's—

GD: It's—it's great. I—I've enjoyed all of the years, and being with you those number of years in the state agency, and since, I've really enjoyed you and all the others and the health field. It's been great.

CP: Well, I remember even after you left health, you pulled the hot potatoes out of the fire for me many times. I particularly remember one in Chattahoochee, but we'll not have time to review that now. Yeah, and I am Skeeter Prather.

End of Interview