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Hoy: We're going to begin at the beginning and talk to you about your life in Little Falls, New York. You know, I didn't know there was a Little Falls, New York. I knew there was a Little Falls, New Jersey. Where is Little Falls? How big of a place is it?

Clarke: Little Falls sits on the Mohawk River. If you do any research on it, you will find that it got its name because of the fact that there were the falls in the river. Actually it's an old, pre-revolutionary town. I suppose there was a portage there at one time, way back in the beginning. It became an industrial town because water power was used to power all kinds of early industries, primarily the knitting mills in the late 1800s. I remember as a boy looking through the windows of the knitting mills. They were all driven by water power with belts to drive the knitting machines. I guess it made an impression on me. It was a very difficult system, but of course, free power. And that's what really started the town.

Hoy: How far is that from New York City?

Clarke: It's about 220 miles, I would guess. It's seventy-five miles west of Albany. It came into further prominence when they put the Erie Canal through. Because of the falls, there was a series of locks there initially. And they finally put in one

big lock to take care of the drop in the river, which was about forty feet. It was'a mammoth engineering undertaking. It was the highest lock in the world at that time. Today, by our standards, it wouldn't cause much comment.

Spray: Is that where you got your interest in engineering?

Clarke: Oh, I don't know. I suppose no. It's a little hard to say. I wanted to be an engineer. I think really it came out of a lot of work with the Boy Scouts when I was a boy. We seemed to have a very active group. We went out and we builtlittle timber bridges and this sort of thing. I think more than anything that got me started.

Hoy: I notice that you've remained somewhat involved with the Boy Scouts as you've grown older. Is that why?

Clarke: Well, I had spent a lot of time as a boy in it. And when I came back to Washington (D.C.) as commissioner, it was sort of traditional that the engineer commissioner take an active interest in the Boy Scouts, and particularly in putting on their annual scout circus. By tradition, the engineer commissioner was the chairman of the scout circus committee, so that got me into it. Then I became

interested in some of their long-range planning for camps, and I worked with them on the establishment of one that they have down in southwest Virginia. I was trying to get them started on a new camp for the 1990s, but we ran into the same problems you run into in any organization. They didn't have enough money to go that far. I think they're still paying off one that we did down in southwest Virginia. But I have not been active in it for, I'd say, the last five years. I think I'm a member of their advisory committee, which is sort of an emeritus status.

Actually, I had wanted, when I was getting out of high school, to go to the University of Michigan to study engineering. Several of my friends had gone there. This was right at the height of the Depression. And I figured if I had $500 I could get a start out there. Tuition, I think, was $100 a year -- some tremendous sum. But I thought with $500 and working I could get through.. I was having trouble getting $500. So I happened to read in the paper one day that there was a competitive examination for West Point and I took that. That put me into West Point instead of the University of Michigan.

Hoy: How did the appointment come about? I remember in talking to General [Herbert D.] Vogel, he had an uncle who knew the congressman.

Clarke: Ours was a little different. The particular congressman that we had at the time (Wadsworth was his name, but he only served one term) decided to run just an open, competitive examination. He put a notice in the newspaper and anyone who wanted to could apply for it. I applied for it and went up and took the competitive exam.

Hoy: How many were there? Were there many who took it?

Clarke: Oh, I suppose about thirty took it. And I was lucky enough that I came out on top. So from there I went to West Point.

Hoy: Back to Little Falls, is that a fairly small town, then?

Clarke: It's now about 7,000. It was about 10,000 when I was a boy. It's one of the towns in upper New York that has been decreasing in population. It's part of the distressed area, industries have moved out. I'd call it a small town.

Spray: Did most of the people work for the textile industries?

Clarke: Well, the industries in the town were textiles, leather, and -- when I was a boy -- the biggest

industry in town made equipment for dairy farms. Now that has also moved out. All the dairy farms moved to Wisconsin. And the particular firm that built the equipment -- my father had worked for it -- moved to Wisconsin, too. This was just before World War II. During World War II, all those plants made shells and fuses and this sort of thing. And of course the knitting industry and the textile industry all moved south. They closed in the Depression and moved south. I don't know where the tanneries went. It really left the town with very little. It had a bicycle manufacturing plant, but that was sort of passe in the 1930s. I guess today it's probably coming back in popularity.

Spray: How large was your family?

Clarke: Well, my mother died when I was a small child. She died in the influenza epidemic in World War I. I was three when she died. My father and a sister, both of whom are now dead. My father had come from a large family and there was a myriad of aunts and uncles around. My sister became a nurse in World War II and married; she died in the 1950s. My father died right at the end of World War II.

Hoy: But you lived your whole early life in Little Falls and you didn't really move around at all?

Clarke: Yes, right.

Hoy: And your father worked for the dairy company?

Clarke: Yes, the dairy equipment manufacturing company. He was the foreman of the machine shop in that particular plant. My father's side of the family were the Irish who had come over in about the 1880s, I would guess. He was the thirteenth of thirteen children.

Hoy: Kind of like my story. My grandfather might have been on the same boat.

Clarke: And my mother% side, they were what we called Mohawk Valley Dutch and had-been in the Mohawk Valley, I guess, since the 1700s. I never tried to trace them back. My grandmother, who lived to be ninety, did trace back at least to the Revolution, and she had her D.A.R. certificate. If I understand it correctly, the wealthy Dutch came and settled along the Hudson, and the other' Dutch went up into the Mohawk Valley. And that's where we were.

It was a small town. The high school I was in graduated eighty people by the time we had gotten through high school. And,-of course, in the Depression not every boy or girl was finishing high school. An awful lot of them were getting out and trying to work-at anything they could get at

that time. It was a poor town, really, dependent upon industry, which just collapsed during the Depression.

Spray: Did you have a job when you were in high school?

Clarke: Yes. I went to work for Western Union about the time I finished the junior year of high school; and I was a combination teletype operator, counter man, and delivery boy. Then I worked for them after school during my last year of high school. And during the summer I went up to one of the resorts in the Adirondacks. They opened up a summer office (there wasn't anybody there during the winter), and I operated in that office for the summer. And then there was a year's gap after I got out of high school and before I went off to West Point. I worked full time then for Western union largely as a teletype operator. This was back in the days when the first teletypes were coming on the line and we had both a key in the office and a teletype machine. I never did master the key, but I did master the teletype machine. And then I found that to get into West Point I had to go back and take at least one high school course. I did that during that year, too.

You ask what drives you into engineering, or what causes you to go into it. I guess on the

mathematical side, we had courses in drafting, and a pretty good science course in high school; and I seemed to gravitate into those courses rather than into history and English. And I think it stood me in good stead when I finally got to West Point.

Hoy: Plus the more practical things with Boy Scouts, so you had a combination.

Clarke: Well, yes. And actually it was a good basis. In the high school that I went to, they had one curriculum which was sort of collect college preparatory, which is the one that I was in. It was heavy in mathematics and high school science. They had other curricula: just sort of a general get-through-school curriculum; then business application, which would have been bookkeeping and typing and that sort of thing. Mostly girls took that, I guess with the idea of looking for secretarial or bookkeeping positions.

Spray: Were there any particular people -- teachers or relatives -- who influenced you?

Clarke: Well, there were a couple of teachers who I remember in particular. One of them was the woman who taught history. She was an elderly woman named Mesick. I was sort of a half orphan, and she took a particular fancy to me. She used to kick me along and make sure I did the right things, and encourage me.

I give a lot of credit to some of the people that we had as scout masters, too. And my father was interested in my pushing ahead. Unfortunately, we were a family without too many resources.

Hoy: He could have asked you to quit school and go to work.

Clarke: No, that was never a real possibility. My father had never finished high school, but all the time I was a boy I remember him taking these international correspondence school courses, which I think still go on. It seems to me that their main office was in Scranton, Pennsylvania. He was always taking courses, and he was pretty well self educated. I don't mean in the sense of a real college education, but as a practical mechanical man, he had really pulled himself along.

Hoy: I find that so many people, like your father and like my father, had this tremendous faith in education as a way of bettering one's life.

Clarke: I think they probably did. My father was born in the. U.S., but many of his brothers and sisters were born in Ireland as well as his parents. I think the whole group -- and I suppose it's true of all immigrant groups coming in, about the second generation -- had a great faith in education as a way of getting ahead.

The town that I lived in was really an immigrant town. It was filled with a lot of Irish, and an awful lot of people out of Eastern European countries who had come early in the twentieth century. A lot of Italians.

Hoy: Did they all have their separate churches?

Clarke: We had an Italian Catholic church, we had a Greek Catholic church, we had a Ukranian Catholic church, and there was the Irish Catholic church.

Hoy: I taught in Plattsburgh, New York, and they had three Catholic churches. A French, an Irish, and then a newer one.

Clarke: Well, I don't think we had any French. The big church was Irish. Then there was an Italian, a Greek, and a Ukrainian church. There was also a separate Russian Catholic church, and there probably was a Polish Catholic church.

Hoy: When you think of such a small town, that's always interesting.

Clarke: That's right. And really, a poor town, when you stop and think of it. But they supported all that. The Italians, I recall, built a church when I was a boy. It wasn't a grand edifice or anything, but they wanted a separate facility so they built their own. I would suppose the town was highly Catholic.

I suppose better than 50 percent of the people in the town were Catholic, and that accounted for their churches. We still had the Methodists and the Presbyterians and the Episcopalians and a few Baptists.

Hoy: Did they all have schools?

Clarke: They had a Catholic school and a public school. They were the only schools. I went to the Catholic school for eight years and then I went to a public high school. I guess they still have both. I haven't been back there much. After my father died and my sister moved away, occasionally I went back. Then my grandmother died. She lived about twenty miles outside. Really, I had no close ties any more. I still have one elderly aunt up there who is ninety-three, whom I have a great deal of affection for. I know one of her children fairly well who happended to be in high school with me, who, obviously, now is in her early sixties. But aside from that I don't really feel that I have any ties with the community.

Hoy: What a change for you to have lived your whole life in one place, and then the career that you chose, never . .

Clarke: Well, my wife, after I had retired, woke me up one time and said, "Do you realize we have moved twenty-eight times?" But I don't think I've moved around in

service as much as a lot of people that I know. I seem to have had several jobs where I stayed -- or at least stayed in the same location (it might have been for different jobs) -- for as much as five years at a time; and that% quite a lot in the military.

When I was looking at schools, as I said, I wanted to go to the University of Michigan. I guess I was impressed by a couple of friends of mine who had gone there and talked a great deal about the school and seemed to think it was a good engineering school. And I guess it was. I had applied there, but I had also looked at other schools in the immediate area. Cornell had a pretty good engineering course. Rensselaer was right down the road and that was a possibility too. But when I finally got wrapped up with West Point, I dropped all the others and ended up there. So I guess I was interested in West Point, but it wasn't until I saw a notice that I could apply. There wasn't much of a tradition of West Point around my home town. There was only one graduate in the town, and he was a man who had graduated from West Point thirty years before I did. He did have some good advice for me, going down there. And he did give me a letter of recommendation to the congressman. But that's about the only association I'd had with West Point up until that time.

Hoy: So you took the exam and then you were just notified that you had come out on top?

Clarke: Well, then there was a follow-on to that. After winning the competition, I had to go down to New York City to take a validating exam to get into West Point, which I did do. I also had to take a physical. After passing that, then I finally got the notification. It was the first time I'd ever been in New York City. It was a lot of fun, too.

Hoy: Was it really? Well, I guess when you think of 200 miles.

Clarke: Two hundred miles and no reason to go to New York. I hit New York right at the height of the Depression. It was the bank holiday, which you historians should know about. And I was down there with a check in my pocket to pay for my expenses in New York, and there wasn't a place in New York which would cash a check. I was staying at a YMCA hostel down there, and they were good enough to give me credit, anyway, for the time I was there. You're going back farther than I've thought about in a long time.

Hoy: Is that right? It's kind of interesting, the little things that compare in some ways to General Vogel. I noticed when you said drafting, that was one thing, he said, that interested him in engineering.

He liked to draw. He used to draw these cartoons for the high school paper. And then he liked the drafting part.

Clarke: Well, I didn't go quite to the cartoon, but I did like the drafting. I don't know why, it just appealed to me.

Hoy: Yes, that's what he said.

Clarke: I guess it goes back a little bit. My father, as I told you, had been taking these courses, and he spent a lot of time at home drafting. After all, in a machine shop, you're making funny little mechanical things, and you have to design them and machine them and put them on the equipment. So he was doing that at home. And I guess that meant that we had some drafting equipment at home. I remember that he had a set of drawing instruments that I used and a drafting board. That started me into that side of it.

Hoy: When you got to West Point, did you find that you had had a good education in high school?

Clarke: Pretty good. I did find that, even in one year of being out of school, I had gotten out of the study habit a little bit. Once I got back into it, I never really had any problem. And the mathematics came very easily, so I'm sure I had a very fine foundation in mathematics. In carrying on in the drafting, when

I got into the courses that they had there in topography and drawing, that was right down my alley. I loved that course and had absolutely no problems with it. I had taken French in high school, which gave me a good lead into the French. I think really that the program that New York State had then, and I think still has, of the New York State Regents setting up the standards and the common examinations throughout the state to evaluate students, must have been a pretty good system. I really had a minimum of trouble with academics at West Point. It just seemed to come easily.

Spray: When you first got to West Point, what were your impressions? Was it as you expected, or was it completely different?

Clarke: Well, I'm not sure that I knew what I expected. It was a little rough. I had heard enough about it. Particularly those first few months, which are arduous, physically and a little mentally. The physical part of it wasn't too bad. Again, I had stayed in pretty good shape. I had been enough of an athlete and all so that that part didn't seem to bother me. I think I did lose about six pounds in the first couple of months that I was there, but that came back in a hurry.

The hazing, or the beast barracks treatment, was probably a little sharper than I would have anticipated, but never to the point that it seemed to bother me or any of the others around. We just took it in stride. We knew it would end. It was a sort of game in a way. (It's been interesting reading about these poor young ladies who are up there. I don't know whether you read the New York Times yesterday, but apparently it's having more of an emotional impact on the young ladies than it has had on the men. It was a little rougher than they had expected.) One thing about all this harsh treatment, it was never brutal and I never felt it was particularly demeaning. It was a sort of game and a facade that was put up. I guess it tested people and pushed you, physically anyway, as far as you probably could go. But I never felt that they were punishing people when they were doing it.

Hoy: What was life like at West Point during the Depression? Do you suppose that it was very much different before, 'or even after?

Clarke: I'm not sure I can answer that. I'll tell you, the sensation that I had was that most of the people who were at West Point during the Depression were not from wealthy families or even the better than average

well-to-do, although there were a few in that category. I think most of them, during the Depression, came there with little resources of their own. One of the reasons I remember this, they had asked when you became a cadet to put down a deposit of $300 to sort of carry your purchases until your pay caught up. I had managed to do that, with my father helping and all, but there were a large number of cadets there who did not have the $300. They just carried them, and they were in debt a lot longer than the rest of us. Of course, the pay as a cadet was very small, and you payed for everything that you got -- your uniforms, your textbooks, your meals -- out of your pay. There were quite a few there who did not get out of debt for at least a year and a half while they were there. So that was one reflection of the times.

Of course, the cost of doing things was considerably different than it is now. We used to go for a weekend in New York City when I was a firstclassman with $15 in our pockets. That would pay for meals, a hotel room, and transportation down and back. Now, those days have gone! You could stay at a hotel in New York, the Astor Hotel, for $3. As I recall, our pay was $90 a month.

Hoy: I wonder if it was better for some people than it might have been even at home? Sometimes in difficult times you can be protected very nicely by a larger institution if you're a part of it. You have better meals than you might have at home. I don't know that that% true.

Clarke: I don't know that I was eating better than I had at home. I suppose I was eating a more balanced diet than I had at home. Because in our household, with a father and by this time two children pretty well grown, we were sort of three people going three different ways, and cooking and doing whatever we had to do on our own.

Once you got into those walls there, at that time, you were pretty well sheltered from the rest of the world. Your whole life existence was within that reservation. At the time I was there -- and if you go back to General Vogel, I'm sure it was the same way -- we did not get away from there for a year and a half. The first vacation when you could leave there was a year and a half after you went, the second Christmas. So except for trips to a few football games -- perhaps four a year -- I don't think I was ever away from West Point before that year and a half.. We had visitors, the family would come down

to visit occasionally, but our whole life was there. Now this sort of thing has changed, and I think changed for the better. We were so isolated from what went on in the world; I don't think I read a daily newspaper for a matter of probably a year after I got there. We were enmeshed in studies and the cadet life.

I think it was really too restricted. I think the changes that have come about are for the better. And even after we had gone away for that second Christmas, we came back and were enmeshed again. Finally, at the end of the second year, we did get one summer off -- ten weeks leave during the summer. From then on, it was a little more relaxed. But that was the only lengthy vacation in the four-year period. I think that, too, has changed now. Again, I think for the better, to allow people out of there.

You asked what it was like. I guess my first -impressions were that suddenly this group of young men that I was thrown in with came from all over the United States and parts of the United States that I had absolutely no knowledge of. The first roommates that I had there -- one out of Massachusetts and one out of Wisconsin, and I didn't really know much about either one of those places; and the boys across the

hall -- one from the west coast and one from the South, it was a matter of even learning to understand people from the deep South. The intriguing thing to me was that we also had a considerable variation in backgrounds. There were people like myself who had come out of high school all the way on to people who had already graduated and had a degree from a university, and all shades in between. One of my later roommates had had three years in a university. And he was the man who had the greatest difficulty with the academics. I don't think it spoke very well for some of the southern university systems at that time. Then there were other friends of mine -- I had one who had graduated with honors from Armour Institute in Chicago. He was going to West Point and repeating courses. Every cadet took every course. There were no electives the way they have set them up now, which again is for the good. So when he went back to take elementary mathematics, it was just a cinch for him.

Hoy: Were you treated differently if you came from a family who had had uncles and fathers who had been in the Army?

Clarke: Not treated differently, no. I think perhaps some of them had a little better understanding of what

we were trying to accomplish as we went through. And that might have been different in their viewpoint for perhaps the first year, but not after that.

Hoy: Or even later with assignments?

Clarke: No. I don't think it had any bearing at all later, on assignments or on anything. Perhaps it might have helped some of them with their knowledge of military life -- not through preference but just because they displayed more knowledge -- to become the early cadet officers that we had. It certainly didn't help them academically. And I think by the time the first and the second years were over, all the differences had been erased. I never had any doubts in my own mind but what the systems that were employed, in almost everything up there, were fair and impartial. And I think we all pretty much understood the basis on which selections were made for various things. Those cadets who made the early cadet leadership jobs, I think we sort of recognized that yes, they were the ones who seemed to show up best in the early phases. And by the time we had finished, individuals then began to show on their own merits; and by that time, we all had sort of a common base, so the selections for what might be called the choice cadet jobs always appeared to me anyway to be impartial -- people that

we ourselves recognized were the people who should be in those jobs. So I never questioned the fairness of the system.

It's been interesting trying to recollect now, going back, because of the recent honor questions and all. It was so simple, we thought. The rules, although they were not written, were clearly understood.

Hoy: That's kind of the impression we got from General Vogel, too.

Clarke: Now we had a few people who tied things up and left because they were out to beat the system. I remember one poor chap who had come from the state of Utah and had been in a university for a long time. He was the man who, for the first two years we were there, had been number one academically in each year. Then, all of a sudden, he sort of ran out of the things that he had studied before. And the pressure to stay number one worked on him, and he finally got caught in a cheating situation. It was an individual thing as far as we knew. His roommate was the man who called it to the attention of the authorities. He left -very quietly and very quickly two months before graduated. But it was a real open and shut case. It wasn't one of these now that seem to be confused by numbers and all that sort of thing.

As a matter of fact, ironically, the same man turned out to be a kleptomaniac. A lot of things of no intrinsic value or little value -- records and underwear and socks, this sort of thing. Obviously the poor man was a kleptomaniac and just sick.

On the honor code itself, we understood the rules pretty clearly, and it was not unusual at all for people to turn themselves in for unintentional things.

Hoy: Do you have any feelings why it has happened, why the honor code is causing so many problems?

Clarke: Well, I think numbers have a lot to do with it, it's gotten so much bigger. You mean this current episode?

Hoy: Yes.

Clarke: I suspect part of it was the anti-Vietnam feeling throughout the country. And, of course, they have this type of program, that electrical examination that they were giving, which was a running type thing, and you were supposed to do your own programming and use the common computer terminal that was available. I think it made it so easy. And I guess the numbers grew and, all of a sudden, there was an acceptance that that was the right thing. I suspect that the breakdown comes 'from the numbers involved. And the other thing that I've sensed -- and I haven't studied

the Borman report, but I did read it -- was an attempt to use the honor system to enforce some of the regulations. Now that was not so when I was a cadet. They did not use the honor system for making people live up to the regulations. As a matter of fact, there was a pretty clear distinction between what was involved in the honor system and what was involved in the duty side of the house.

The simplest example that we had there was -- I don't know whether they still have it or not -- an honor card listing all the places you could go to be out of your room at certain periods, daily study periods for example. We had a button that you just moved down. If you were going to the library to study, you just moved it down to indicated the library, or anything else -- if you were going off to church service or something like that. And all it did was indicate yes, you were out of your room. It was pretty clearly understood that that button was sort of like a written statement --"I certify that I am at the library studying*' -- and it's legitimate. Well, if you left that button in the wrong place, at that time, you were required to report yourself for it. If you came back and said, "Oh, my God, I didn't go to the library, I went to do something else," that

might have been equally legitimate, you turned 'yourself in and got two demerits or something for being careless. But if you wanted to go out and do something that was completely illegal, you just didn't mark your card. You just went out and took your chances that nobody would inspect during that time.

As I say, these little 'ground rules weren't all written down, they were just understood. We had no problems with it. Well, curious little things. When I was a cadet you couldn't ride in an automobile after a certain hour; I don't know that that was a rule. If you were going out and going to ride in an automobile for some purpose or other, you just didn't mark your card. And if you got caught riding in an automobile, you got punished. On the other hand, if you marked your card and went out and did it, you turned yourself in for it. So I guess in a way they were using it to enforce a regulation which probably didn't have much point to it, but at least it was one of the regulations on the books.

Anyway, I suspect in General Vogel's time it (the honor system) was about like when I was there. It was pretty easily understood, and we had a minimum of problems with it. Aside from the one individual

I, mentioned? I don't think we ever had a problem with our academics and the honor aspects of it.

I spent a lot of my time there in later years as an academic coach to classmates who were having trouble in various things. We had the same system then that I think they still have. If we had a course in electricity, we'd have it one day for one group and another day for the next group. And I know that if I had had the first day's course, I had to be very careful in coaching my roommate to be sure I wasn't pointing him too directly at whatever the examination was that we had had that particular day. You have to go back and remember at West Point in those days you got marked every day in every subject. You took an exam of some sort, maybe just going up to the blackboard and working out a problem. But you got a mark every day in every subject, which keeps you on your toes.

Hoy: Shows that you're prepared.

Clarke: You don't go to class without having read 'the lesson.

Hoy: Did you have adequate time to prepare?

Clarke: I think so. I did. I had no problems. My roommate and the young man across the hall were convinced in some subjects there wasn't enough time

available to bring them up to speed. But they got through.

Hoy: Have you kept in contact with many of your classmates?

Clarke: Oh yes. I stay in pretty good contact with them. There are quite a few of them here in the Washington area.

Hoy: Who are some of them, as a point of reference for us?

Clarke: Frank Taylor, who is president of International General Industries; General George Olmsted of Financial General, he's here; Bob Gildart, who has just retired as the administrator of the Montgomery County Community College; Finn Unger, who is the governor of the Old Soldiers* Home, he's in the area. Then there is Roy Lutes, who has just retired as a teacher in the Alexandria school system -- after he got out of the Army he went into teaching. A man named Delk Oden, who has just come back from Iran where he was with Bell Helicopters, training the Iranians to use helicopters; Bud Underwood, and I'm not sure exactly what Underwood is doing, but he was very active in the Association of the U.S. Army. Then, of course, I've maintained quite a bit of contact with some of my friends who are not here in

the Washington area, who are spread around the country. We are going back together the first of June for our fortieth reunion from West Point. There will be a pretty substantial number up there. I think' indications are we'll have over 100 returning out of 297 who graduated with our class. And, of course, quite a few of them are dead by now.

One of my classmates is just ending up a tour as ambassador to Pakistan. He's had six- jobs as an ambassador. Anyway, I'm looking forward to seeing a lot of them. I guess there are about twenty-eight classmates in the Washington area; most of them are working on a second career, although not all of them. Some of them are fully retired. That% a pretty good collection. But I guess even all through the years, and particularly our later years in service, we probably had about that same number working in the Pentagon or some other military assignment in the area.

Spray: Do you have any recollection of any big events that happened? When you get together with these people do you mention "I'll never forget the time that . ."?

Clarke: Oh, I don't know. If I want to go back to the plebe era, I think one of the things that made the

biggest impression on me was going to a funeral in the middle of December, and it was the coldest day I could ever recall. We all stood around and froze our ears. This is the type of thing we are likely to remember.

I think we remember certain of the instructors up there with a great deal of nostalgia for them and a great deal of affection for them. Many of these are people that we had seen later in our careers. I particularly recall when we were plebes in mathematics, and they were trying to illustrate to all of us the benefits of theoretical mathematics., A group of the instructors went together on one of these campaigns that department stores have to guess how many pennies are in a jar, and if you did you won an automobile. They went at it very scientifically. They went to the store with surveying instruments and measured the size of the jar. I'm serious now. Then they went back and studied *'dropping pennies into the jar" to get the densities that would go in and established a range of probabilities about the number of pennies that were in the jar. Then they got all their friends to go in the store and buy one thing, so they covered this whole range. Well, to make a long story short, they tied for it the first time,

then they had to go back through a runoff. And they went at it again in a very scientific mathematical way and they won an automobile, which probably was worth all of $500, a brand new automobile. They paid $50 to the person who had given them that particular number. Well, this made an impression on all of us.

Hoy: I can imagine.

Clarke: And those particular instructors did. Cadets in a way could be rather cruel toward some of the instructors and the tactical officers. Of course, we collectively adorned them with pet nicknames, and some of them were rather cruel. We actually -- I say "we," the entire Corps of cadets -- drove one officer out of that place because we didn't quite appreciate his attitude toward the cadets. It got to the point where life for him was so miserable that he left. You know, you wonder in retrospect, this group of brash young men being so critical of somebody who was probably trying to do a wonderful job for us. And we just never appreciated it. Now that sort of thing sticks in your mind.

The leaders that we had -- I'm talking about the officers there -- made some very deep impressions on all of us. Most of them favorable. Certain very

stern individuals we had great respect for; and later, when we were serving under them, we learned to appreciate them even more. But I'm not sure we fully appreciated them as cadets. The commandant that we had there one particular time -- Lieutenant Colonel Buckner,[1] who later was killed on Okinawa as a lieutenant general -- impressed us. All winter long, it could be the coldest day of the winter (and it can get cold up there), he never wore an overcoat. Well, we again gave him little pet names and people wrote risque little songs about him. But basically we had a great deal of respect for the man.

Oh, if you stop to think of the things that really made an impression of us, it would be hard to single them out. An awful lot of our life at West Point revolved around the athletic teams and their chances -- all of which doesn't seem quite so important any more. The cadet shows that we put on, they seemed to be big events. Of course, we had a pretty good social life there too.

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1 LTG Simon B. Buckner, Jr. (1886 - 1945). U.S. Military Academy, 1908. Infantry. Commandant of Cadets, U.S. Military Academy, 1933 - 36. Commanding General, Alaska Defense Force, 1940 - 41, Alaska Defense Command, 1941 - 43, and Alaska Department, 1943 - 44. Killed by Japanese shellfire while commanding general, Tenth Army, Okinawa, 18 Jun 1945.

Hoy: I noticed that you married about the year after you left West Point and I wondered, perhaps, if you had met your wife there?

Clarke: I met my wife there. She was working for the World Peace Foundation at the time I met her. The old League of Nations Association. When the U.S. did not join the League of Nations, the people who were sponsoring the U.S. entry into it formed this League of Nations Association. She worked for them in New York as a combination secretary and research assistant. I met her through my roommate. She came up to West Point about a year and a half before I graduated, and we got married a year after I graduated.

Every Saturday at the Point they had a dance they called a hop. There seemed to be a great number of girls who showed up at West Point, and in those days, they paid their own way and their own meals. We didn't have any money. I always remember when my wife came up. We'd end up down at the hotel for dinner on Sunday; the standard menu down there was $1.50 for dinner, and I'd say, "I wouldn't pay that much if I were you." She would come up about once a month or so.

Then, I think, the other things that made an impression on us were some of the maneuvers or summer

travels that we had. Particularly, in our first class year, they moved us around and took us down for some flying training and then moved us down to Georgia to Fort Benning for a time and to Fort Monroe in Virginia. Those were impressionable trips. I guess when we go back and reminisce we remember that. We remember the night that Joe was supposed to be in camp and he sneaked out for the night and got caught coming back.

Hoy: Escapades such as those I'm sure you'll talk about.

Clarke: It's hard to remember graduation speeches, but I guess that's true of any university. Very few people remember what was said at their graduation.

Hoy: I think that's true. There are so many other things on their minds.

Clarke: You form very close associations up there with particular individuals. I had quite a few roommates because I lost several of them through academic attrition.

Spray: You were talking about your roommates?

Clarke: Well, I had stayed with two roommates -- there were three of us in a room, which meant we were double decked. There were normally two beds, so we double decked on one and we rotated that around.

I became very close to those two people. One of them, unfortunately, was killed early in World War II. The other one got out of the service right after World War II. But I think my closest friend was a chap who lived down the hall. We just seemed to have more of a kinship. We ended up doing things together, double dating, and always seemed to be with one another. I guess this is true any place in life.

But, within a group of about twenty five, we all lived together in that same group for the four years. We shifted roommates to some extent. With each one, we became very very close and have maintained pretty close relationships even now, by comparison to other relationships anyway. Of course, the way the Army is constituted, you keep running into these people periodically. You are stationed with them and get to know their families pretty well. So I would say out of it came some very strong friendships that we have, maintained over the years. And my wife has gotten to know them and we've gotten to know their children. I guess this same thing would happen in other universities. I've been watching my son and the relationships he maintains with the people he's gone to school with.

Hoy: I don't think it's the same in a university, to be honest. Because you don't live like you live when you cannot leave.

Clarke: We ate together, we were in the same barracks area.

Hoy: Exactly. And you don't go on vacation, you don't have all the separate experiences that you do when you're in college together.

Clarke: Well, for four years there, we were together in one way or another for all except four or five months, so I guess it does throw you a lot closer together. But it stands you in good stead. During World War II, I had an occasion to make a trip by myself from the U.S. all the way across South America, Africa, Italy, and on into China. Every place I stopped, I don't care where it was, there was somebody I knew there, and knew well. Every stop along the way, even into the far reaches of China. Usually they were part of this fairly close group that I'd been associated with. It made it a lot easier to transact whatever military business we were transacting, plus all the reminiscences. So I guess it paid off in that respect.

Spray: A certain logic behind the system.

Clarke: In a way, yes.

Going back-to your question earlier about the military background of certain individuals. One of my roommates that I lived with for the last two years came from Washington. His family was military. He could go back 100 years to one of his ancestors who had graduated from West Point. I don't think that by the time we graduated he knew any more about the Army than the rest of us did. But while he was a cadet, because of this background, I suppose, and maybe because of his earlier schooling -- he'd gone to Western High School where they had had a cadet corps and he'd been a leader in the cadet corps -- I think it sort of pushed him into the leadership positions at West Point. He was our cadet company commander. But after we got out of West Point, I don't think it made a bit of difference as far as that particular background.

Hoy: How did you get to Cornell?

Clarke: Well, of course, the engineers always sent their young officers off to school. At the time I went, there were only three schools to which they sent officers -- MIT, Cornell, and the University of California at Berkeley.

Hoy: Berkeley? That's where General Vogel went.

Clarke: They only sent them to those three schools. So it was a question of which one of the three. Cornell was in the geographic area that I'd grown up in; this was one aspect of it. It was a very fine engineering school. I knew this from others who had gone there, so I elected to go to Cornell. Then, at the last minute, I tried to change my mind. I decided I wanted to go to California because of the hydraulics there. Unfortunately, it was a little late and we didn't have much money in the Army for travel. The transport had already sailed from New York. (That's the way you went to California under military orders in those days, because it saved money to go to New York and ride the boat through the Panama Canal to California. Several of my close friends were going out there.) But anyway, they didn't have the money to send me directly across country, so I went to Cornell, which was my original choice.

I did want to major in structures and soils and Cornell had a good -department in that. In retrospect, I'm very glad I went there. I think it suited my purposes more than had I gone to California and specialized in hydraulics..

Hoy: They certainly selected three very prominent universities. I was impressed by the fact. They could have sent you just to get a masters someplace.

Clarke: Well, in those days -- again you have to remember this was back in the 1930s -- there weren't too many engineering schools with high reputations. Now, there were others, obviously. Iowa State was coming into prominence and a few people had gone there, and that was in hydraulics, too. I don't know. I guess the Army may have had some favorable contract terms or something with these three schools. Today, of course, they will send an officer to the school of his choice -- actually they encourage him to go the university in his home state because it's cheaper to send him there. The tuition makes that much difference. I don't think the tuition was much of a factor back then because tuition at a university was very low. I think tuition at Cornell may have been $300 for the year. What is it now? It's $4,000 or something like that.

Hoy: Particularly Cornell is very expensive.

Clarke: Yes. But, over a period of many years, they had been sending people to Cornell, MIT, and Berkeley, and they seemed satisfied with the output. They did not prescribe what courses we would take. That was

left up to the individual. You had to take engineering courses, obviously. And you were there to get a masters in engineering.

Hoy: But you were able to select, for instance, whether you were interested in hydraulics, or as you said, structures and soils?

Clarke: Yes, you could specialize. I think, in all cases, they wanted a course in structures, which is what I wanted to go there for anyway. Then I branched out and took structures and soils. In fact, I wrote my thesis on soils, again because they happened to have a very fine department in that. And the structures man at Cornell, Leon Urguhart, was probably the preeminent structures man in the country at that time. He took a great interest in his Army students. There were, I think, fourteen of us at Cornell that year.

Hoy: Did you find that even there you stayed pretty much together?

Clarke: Yes, but not quite as much as at West Point, because by now we were all married, or at least most of us were, and babies were beginning to appear on the scene in some of the families. The group that I went there with was generally a different group than the ones I had known at West Point. Not necessarily even

from the same class at West Point, although I had six of my West Point classmates there. But they were people that I had not known particularly well when I was a cadet. So I got to know a whole new group of people there, plus people from other universities who had come into the Army and other classes at West Point. So it was a little broadening. Generally, for the year that we were there, our social life pretty much revolved around that group, some of the faculty who were there, and a few other people -- some neighbors we had met at the apartment we stayed in who were young faculty members. But I suppose most of our contacts were within the fourteen that the Army had there.

Spray: Had your courses at West Point pretty well prepared you for what you had at Cornell?

Clarke: Yes. Again because Cornell and MIT and California had been receiving the products of West Point. They knew pretty well what our background was. There were certain areas of mathematics that needed some strengthening on the part of most of us, and they pushed that. But so far as the general engineering, I think we were pretty well prepared.

Hoy: How about the humanities? Did you spend much time at West Point studying history and literature?

Clarke: Well, of course, we had two years of English. It was pretty good. We had three years of languages. I suppose two years of history, which was a good course. Pm trying to remember what else we would classify in the humanities. I think that was probably about it. So you end up on the average with two or three courses in the humanities, if you take English and foreign languages and history -- a little better than two courses continually out of five courses that you would be taking; so 40 percent of your time in English or foreign languages or history. But I wouldn't say it was a program that was heavily accented toward the humanities. It was much more the technical engineering and mathematics that we went through. I had two years of French, one year of Spanish, two years of history, and two years of English. Looking at the courses that my children have taken, I suppose that's more English than the average college student gets these days. Although my son, who was at Yale taking engineering, took a lot more history; he also took courses in religions.

Hoy: Political science and things like that probably.

Clarke: I guess he had one course in political science. He seemed to go off on his own. He felt he wanted to

study religions and he pushed himself in that area. On the other hand, he had far-less in the languages than we had had. And far less in what I'd call basic college English.

Hoy: One of the things we discussed at some length with General Vogel, and I suppose we don't have to discuss it as long with you, was Arthur Morgan's book Dams and Other Disasters because he had met Morgan and because of Vogel's connection with TVA. One of the things Morgan criticizes is the education that cadets receive and says that it's so regimented that it stifles all creativity. How does that kind of a criticism strike you?

Clarke: That would be a hard one to answer. Of course, I have a biased view too. I don't think it stifled creativity. Morgan, when he reached into his histories to be critical of the Corps, went back and picked a couple of particular examples. Here again, Herb Vogel knows much more about this because of his association with the Waterways Experiment Station and his later TVA experience. I think Morgan picked out an example of the arguments that had gone on between

(James B.) Eads and (A. A.) Humphreys[2] in an emerging science, or an emerging art, on the transport of materials in river bottoms. And perhaps Humphreys was a little less innovative or a little less willing to accept some new results than Eads had been. I never did go back and study that question in detail, but I read Morgan's book on it. I had asked our historians to see if they could ferret out from our records the substance of all the arguments that went on which had to do with the transport of material in the Mississippi. That led to the discussion of the control of the Mississippi outlet where Eads apparently came up with a much more practical solution than the Corps had been able to come up with. If you just look at that particular case, I guess you could say, yes, there was a group who disagreed with a man who was innovative, and the innovative man had

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2. James B. Eads and BG Andrew A. Humphreys. In 1873 a dispute began between Eads, a private civil engineer, and BG A. A. Humphreys, the U.S. Army Chief of Engineers, over the best method to deepen the Gulf of Mexico entrance to the Mississippi River. Eads insisted that jetties, constructed from the mouth of Southwest Pass, would contract the current and force it to scour out a channel to the necessary depth. Humphreys, an acknowledged expert on the hydraulics of the Mississippi River, preferred a ship canal to the Gulf as a solution. Eads won approval of his project and in 1877 the jetties proved to be a complete success.

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a solution. Now, whether you would condemn the whole system for that, I don't think so.

Morgan also condemned the Corps for not going into the creation of a laboratory and testing and modeling early enough. Of course, that's when Herb came on the scene.

Hoy: General Vogel says Morgan was an old man when he wrote a lot of this.

Clarke: I think he plagiarized from other material, too. I don't think a lot of that was independent research and analysis.

Hoy: I kind of summed up a few of his charges. He was saying that the Corps has a history of overestimating costs, of blocking scientific progress, of covering its blunders by classifying information.

Clarke: Well, you don't even want to take the time to refute some of these statements, or at least I wouldn't. It isn't worthwhile.

Hoy: The only thing that somehow caused us to question it was that these same arguments are the things the Corps seems to be quite heavily criticized for today. Maybe it's not more so than before, maybe it's just that we're more aware of it. But it seems that critics have picked up on at least what he says, some

of hisarguments. Wasn't it Adlai Stevenson that wrote the introduction to his book?

Spray: No; it was (Senator) Paul Douglas.

Hoy: But I was surprised, for instance, thathe would write the introduction. That kind of indictment. As you say, you almost wonder if you should refute it. Why someone in that position would write the foreword to it. And again, as I said, so many of the things he says generally crop up again in newspaper articles and things that are said about the Corps.

Clarke: You know, many of these criticisms, particularly the underestimation of costs, you can refute, but you have to go back -- it's very difficult to talk about these things in generalities. You have to go back to a specific project and trace the history and indicate what happened on it. Now, you could rationalize in general. The thing that I used to say was that many of the projects of the Corps for which they are currently being criticized were projects that were conceived back in the 1930s. They were authorized by Congress at that time based on an estimate in the 1930s but not built until the late 1940s or 1950s or 1960s. By that time, things had changed and the requirements were a little different. So the example we used to use was that in 1930s we got Congress to

authorize a Model T Ford. In the 1960s, we built a Cadillac because of new requirements. Now, you can't go back to the estimate of the 1930s, which might have said that this dam will cost $60 million, and all of a sudden now it's $250 million. It isn't the same project any more.

Hoy: Plus it takes a lot longer time to build a dam.

Clarke: Or inflation. Lots of things have happened. Plus new requirements are added. Anyone, for example, who was designing a navigation system in the 1930s, based on the projections of commerce at that time, then then built it in the mid-1950s or the early 1960s -- the whole economic pattern of the U.S. has changed, the demands have changed. And you probably don't build the same sized thing. You may not even put it in the same location. A lot of the criticism, I think, stems from that particular problem -- of the length of time and the changing concepts as to what is required. But if one were to refute the statements, you'd have to go back to the individual projects.

I used to scream at our district engineers on their estimates on things. The Tennessee-Tombigbee Waterway is an example. When that was originally conceived, I think the cost was maybe $200 million. What is it now? It's a billion plus, I'm sure.

But thirty years have gone by, and it is a different type of project. I used to scream at the district engineers, and they'd come in and say, "But sir, the cost of moving dirt has gone up a little, we're building a little bigger waterway now than we originally talked about, our locks are more costly than the original designs." And every year we would be reporting the increase to Congress; and here I was jumping on them saying, "We can't have been that stupid that we came up with this estimate." And they're proving to me, by escalation and added features and all, why the costs have gone up.

Lock and dam twenty-six on the Mississippi went through the same pattern. That original lock and dam, I think, was built in the 1930s for $38 million. Now we're going to replace it, or want to replace it. And I think the costs are pretty well up around $500 million to replace a $38 million structure. But again, it isn't quite the same type of thing. There has been tremendous industrial development along the edges of it, the railroads in there have to be bought and moved, and the costs have gone higher. We are now talking about much bigger locks than we had. We're talking about dual locks. This sort of thing creeps into it.

I never found -- and this is from my side of the fence -- any deliberate effort to underestimate costs for the purpose of getting a project authorized. You can say we were stupid, that we made the wrong estimates, but I think they were honest efforts. But the same thing is true no matter what you do. If you tried to build a house -- if you go out to build a house today and you bring an architect in, he'll tell you, 'Well, I can build it for you for $75,000." And. all of a sudden you start building it, and your wife wants to move the wall out about two feet and a few other things, and it suddenly is a $100,000 house instead of $75,000.

When they accuse the Corps of lack of innovation or imagination, this is a little harder to refute. Because you never know exactly what they're trying to p,ut their finger on. If they are saying that the Corps does not give enough consideration to alternatives -- of course, today this is the name of the game with the environmental assessments and all, to be sure that you have evaluated the alternatives. I think this was done in the past, but largely it was not put down on a piece of paper so that you could trace through all the alternatives that were considered. Insofar as the use of new design techniques,

new construction techniques, I think the Corps is as far advanced as anyone in this field. But it's a hard thing to refute; it's an easy charge to make.

Hoy: I think you're right. It's very difficult to make statements such as that. You have to force the other person to be specific and then say what are the facts.

Clarke: Then you have to have the other person say, "This is what you should have done in lieu of what you did do." It's very difficult to refute. When I used to see these types of charges, my blood pressure would go up and then I would sit back and say it's not worthwhile trying to refute them. If people are going to believe that, if they're not willing to come in and talk to you about it and to evaluate what different might have been done on particular projects... But there are certain things, and I guess the Corps is like all engineers in this. If something has worked you're inclined to try it again and again., and try to make modest improvements in it.

I do think Herb Vogel, in creating that laboratory when he started, was probably one of the best things that ever happened to the Corps -- to get a group down there who was out of the stream of being directly responsible for things being done and who

could think about new approaches to problems. And there are several other groups that the Corps had instituted over the past two decades to do the same thing -- the Institute of Water Resources, which is really a think tank down there at (Fort) Belvoir. That's its job in life, to think of new approaches to water problems of the country. And it is. It's not really a novel approach, but this idea of flood plain management (where you're thinking of other than structural measures for getting rid of flood hazards) really came out of the Institute of Water Resources. It has been pushing it for a long time. One of the problems is that you can come up with fine theoretical solutions, but they're not necessarily politically acceptable.

Again I'll go back to some of the preaching I used to do to our district engineers when we were getting all this criticism, and we could see that certain solutions were not acceptable. I said, "We could be the best engineers in the world, and we could produce all the drawings and designs for almost anything, but if the public doesn't want it, we've wasted our time. I think, from my observations over the last decade or more, the approach of the Corps has been to try to solve a problem in a sensible way

that the people will accept. Now when you say "that the people will accept," then you have a real problem. Who are the people? I finally rationalized that the only group that we could look to to speak for the people were the elected leaders of the people -- the congressmen, the ones who are accused of being in the pork barrel. But there is no other group that I know of where you could say, well, they represent the people of the country.

Hoy: That's where you get the authority to do what you're doing. I guess you would go to that person...

Clarke: Well, I had a specific case in a discussion I was having with one of the public interest groups. It was on this structure on the Rappahannock down here, the Salem Church dam, which I guess will never be built. They were saying, "You really should take it back to the people." And I said, "All right, tell me which people do I take it to?" They said, "Well, the people in the area are concerned, and the people in the state of Virginia are concerned. But on the other hand, the interests are even broader than that." So I said, "That's what we do. We work with the local groups. We take it to the body of Congress where all the people have put their representatives, and we ask

them to say yes or no." And we don't care whether they say yes or no. It didn't make any difference to us.

Oh, periodically I'd wake up and feel frustrated. When Mr. (Richard M.) Nixon stopped the cross Florida barge canal,[3] again my blood pressure went up. Then I sat back and said, "Why should I care?" We're only the, engineers to advise the country. If they don't want it, fine. We'll try to work up some other solution. It was interesting to me on Tocks Island, when the state of New Jersey withdrew from supporting it. I happened to be up in New York -- this happened after I had retired -- and I was talking to Jim Kelley, the division engineer up there. I asked Jim, "What are you going to do?" He said, "All I want to do now -- they've spoken, they don't want that solution -- I'm recommending to Congress that we accept the, state view. We say we're never going to build anything at Tocks Island, and get it de-authorized and get it off the books so that we don't have that argument and now we can do other planning to solve

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3 The Cross-Florida Barge Canal. Long a dream of local boosters, coastal shipping firms, and engineers, it was finally begun after World War II, but canceled on ecological and environmental grounds by President Richard M. Nixon in 1971.

other problems of the area." I think this is the right approach to take.

Well, I keep looking as I'm on the other side of the fence here now in the private consulting business. A customer hires us to do a job, and we come up with a solution. If he doesn't buy it, we don't care. He pays us for what we've done, and if he doesn't like that, we'll try something else.

In the type of thing that Arthur Morgan and the other writers publish -- who have been so critical not only of the Corps but of the whole water resource problem -- there aren't very many new ideas being expressed in all that writing. If you go back over the last ten years, you'll find that they read each other's articles, and it comes out in different words and says the same things. Arthur Morgan has been very critical of the work of the Corps on this reservoir in Pennsylvania on the upper Allegheny.[4] It had all the emotional problems mixed up in it that you could think of. It had the Indians, it had the people

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4 Kinzua Dam. This flood control and recreation project, known as Kinzua Dam or Allegheny Reservoir, was long a subject of controversy. Its construction involved breaking a long standing treaty with the Seneca Indians and the eviction of many citizens from their homes. The dam is located in northern Pennsylvania, near the New York State border.

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who were being displaced from their lands, and all the arguments against it that you get on any reservoir; But I think if you go back to Pennsylvania now, 'after the project has been completed, you'll find that people accept it. It's part of the natural landscape. But Morgan was very critical of that, and he was retained as a consultant by some of the people who were opposing it. He spoke out very strongly on that'issue. And I suppose there were more hearings on that particular reservoir than on any other up until that time.

The man that used to have the morning program for NBC, Hugh Downs, was deeply involved in that at one time and was about to castigate the Corps. Whoever my predecessor was at that time invited him down' to go over all the records that the Corps had -- all 'the hearings and all the arguments that had been made and the refutations. And he finally decided he was going to staysilent on it. He just wasn't going to-get involved, on that morning program, in that big argument. But at least he was convinced that we were trying to do an honest job at that time.

You know, there is no project that the Corps builds that doesn't hurt someone or someone doesn't feel aggrieved about. And they can be very very

vocal about it. It's hard to find a project where someone doesn't feel that they've been injured, or at least that they haven't benefited as much as others. And they speak out and this is their right. This is where the political leaders have to make their judgments in the final analysis of what lies in the best interests of the country. This is the type of thing that Mr. (Jimmy) Carter is going through at the present time. I've been talking to General (Jack) Morris[5] about these projects in sort of a general way, and General Morris' attitude very plainly is that if the President wants to rejudge these projects by his criteria,. fine. This is not a matter for the Corps to get into an argument on.

One of my predecessors got into an argument with one of the secretaries of war -- this was back about 1940. The particular man made the recommendation to the secretary of the army that a particular project

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5 LTG John W. Morris (1921 -). U.S. Military Academy, 1943. Corps of Engineers. Engineer Aviation Battalion, Far Eastern Air Force, 1944 - 47. Engineer School, Europe, 1949 - 52. Deputy District Engineer, Savannah, 1952 - 54. Commander, 8th Engineer Battalion, 1st Cavalry Division, Korea, 1960 - 61. District Engineer, Tulsa, 1962 - 65. Deputy Chief, Legislative Liaison, Office of the Secretary of the Army, 1967 - 69. Commanding General, 18th Engineer Brigade, Vietnam, 1969 - 70 Division Engineer, Missouri River Division, 1970 - 72: Director, Civil Works, 1972 - 75. Deputy Chief of Engineers, 1975 - 76. Chief of Engineers, 1976 - present.

was a good project and should be approved. And the secretary of war said, "You haven't answered the next question. Should this project be built when we have all the other demands in the nation for doing things?" And my predecessor said, "That's not my job as chief of engineers. That's the political leaders' job, to decide. We're saying it makes sense. There are a lot of other things in this country that we could put our resources into that make sense. The priority of this as compared to educating children or doing other things is a political judgment."

Hoy: I really think that% where the confusion lies, to be honest.

Clarke: I agree.

Hoy: If one doesn't understand the political process, I think that's where the criticism comes.

Clarke: There are so many good things -- that appear to be good, anyway -- that could be done. This program that the Corps is involved in is just one part of the whole national scene. And I think the Corps has been very fortunate, generally, in that it has managed to stay out of the political argument. It has tried to maintain itself more or less as a professional engineering group.

Periodically we would get a district engineer who became an advocate. I know in my experience, and when General (William) Cassidy[6] was chief, occasionally we'd have to call a district engineer or division engineer and say, "Now, relax. Let the politicians fight the battle. You just come up with facts and figures and indicate whether or not the project makes sense. But don't get into the argument as to whether it should be built or not built."

Hoy: If you get them too late, though, that can really do a lot of damage, can't it? If one of your district engineers, for instance, gets into the political fray?

Clarke: Oh yes, it can do a lot. And at about that time we would move him, pull him out of there. Now I'm not sure whether the Corps has the best system in the world. On this idea of moving district engineers on

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6 LTG William F. Cassidy (1908 -). U.S. Military Academy, 1931. Corps of Engineers. Commanding Officer, 815th Engineer Aviation Battalion, Air Force Service Command, North Africa, 1942 - 43. Commanding Officer, 21st Engineer Aviation Regiment and Area Engineer, Italy, 1943 - 44. Mississippi River Commission, 1947 - 50. HQ, Far East Air Force, 1952 - 53. National War College, 1954, Division Engineer, South Pacific, 1955 - 58. Director of Civil Works 1959 - 62 and Deputy Chief of Engineers, 1962. Commanding General, the Engineer Center and Ft. Belvoir, 1964 - 65. Chief of Engineers, 1965 - 69. Retired, 1969.

about a three-year cycle, I think there is some merit to it. They do not become too attached to whatever the particular project is, and they don't become too parochial about what the local interests want. And they are a little more objective, I think, than in some of the other departments where the man stays for a lifetime.

Hoy: Sure. You could become so identified with a project that you would see it almost as yours.

Clarke: That's right. We had a terrific argument going on out in the state of California about Dos Rios dam. It was authorized and on its way toward being funded. And our people out there began to get deeply enmeshed in the local politics of it and were called on people to support it. We said to wait a minute, to back off.

Hoy: Well how would you find this out as the chief, for instance? Does it get back to you when somebody says so and so called him, or does it get back through the newspapers?

Clarke: You find it out from the newspapers, this is one way you find out. And actually, in this particular case, the district and division engineers told us what they were doing. They weren't doing it under the table or anything like that. We just said to back off; it is not the Corps' role to get into these arguments.

If the people in California want that project, it will go ahead; if they don't want it, it won't.

Hoy: Is this something that you learned through your experience, or as a cadet? I guess that's what I think is the value of history -- to understand the role of the Corps throughout various decades. Is that kind of a course, for instance, taught; or is it something that you begin to learn just through experience? Maybe you can't teach it.

Clarke: I think you pick it up more. I don't know whether it comes out of the cadet life. I suppose the thing that sticks with you from the cadet life as much as anything goes back to the honor system. You report factually and honestly what you think should be done. But this trying to live in a political atmosphere, Pm not sure that comes out of the cadet life. I think that comes out of later experience. I guess the system that the Corps has, having been in existence more or less from 1820 until the present time, the organization and the system that has been developed fosters this somewhat objective role. Because certainly the experience of the Corps over the many years has been that more projects have been suggested by far than have been recommended.

I think the record is something like only one out of every three projects that ever gets studied in detail is recommended. This leads you to be sure that your facts and figures are appropriate, and it keeps you from putting too much of a political bias on the judgments and recommendations.

The Corps set up a very fine group in a board of engineers to review projects to be sure that objectively they were sound projects and not just politically motivated.. And surprisingly, over the years the Congress and, I think, the executive department and the public at large have accepted that the judgments of the Corps are fairly objective. When you get through all the chaff of the criticism by people like Morgan, you find down underneath it a pretty good respect for what the Corps does.

It was intriguing to me, in this two and a half years since I retired, in working with the water quality commission and going around the country meeting with all kinds of groups on the water quality problem, to note the great respect that they had for the way the Corps operated -- pretty effective, pretty professional, and very objective. This came

out time after time in the hearings that we held. Perhaps I am deluding myself, but I am vain enough to think that by and large the Corps does enjoy a very fine reputation.

I had occasion to talk to later Vice President (Nelson) Rockefeller because I worked directly for him on that commission. It was very interesting, listening to him. He had his arguments with the Corps about projects in New York State, but he had a great respect for it. He had respect for its integrity. I don't think he would have said that Corps engineers were the "finest engineers that you could ever find in the world," but he said they were honest in their approaches. It was very interesting, one day -- it was a sort of tragic day in his life, in a sense; it was the day that (Spiro T.) Agnew quit. Rockefeller was still governor of New York at the time, and I had an appointment with him that afternoon. Agnew had quit and the press was after Rockefeller, and he had to have a television show. As a result of that, my appointment with him was delayed. So instead of meeting with him, he came out and said, "I'm awfully sorry, but I've got to go down to Washington.'* I said, "I'm going back to Washington." So he said, "Ride down with me" (in this little jet that he had).

There were just the two of us going down in the airplane, and riding out in the car. I suppose we had a couple of hours together. The Agnew thing obviously was bothering him. We were sitting there in the airplane and he said, "Tell me, Fred, how do you get the integrity that you get in the military?" Well, it was a real tough question, sort of what you're talking about. I said, "Well, I suppose as compared to political life, as you grow up in the system (and I'm not talking about just West Point; that's just one of the hurdles), you're continually tested and evaluated. People know each other throughout the system. And every time you're looking for someone to do a job, you look at what people have done. People keep jumping hurdles to get advanced. And there are so many tests along the way that those that rise to the top, by and large, are pretty well tested professionally and obviously for their integrity." And he said, "I sure wish we could do something like that in the rest of the system."

I think within the Corps the same thing happens. The people who get to the top get there because they've passed a lot of tests. They have been judged

for their professional ability, their management ability, and their integrity.

Hoy: One of the things, though, that now comes to my mind that Morgan said, along with this idea, something about the fact that because you know each other so well, there's such an esprit de corps there, that it becomes difficult to draw the line. You have somebody, and you might feel that what he's suggesting is not the best, but .... That you support one another ...

Clarke: Oh, no. Let me cite a couple of things that might dispel this a little. I used to have, and they still have, these division engineer conferences every six months. They hold them either in Washington or out in one of the areas. We had one at Jekyll Island down in Georgia. I invited down the undersecretary of the army, and he brought along with him a colonel who was his military assistant. So there we've got our eleven division engineers and me and these people observing and participating. We started along, and this man caught me at the first intermission. He said, "I have never been in a conference like this where people are allowed to speak their minds so much and criticize each other." And it was true.

Again I go back to the Board for Rivers and Harbors. These meetings are now open, of course, to the public. But they were held in executive session before. Those things almost became acrimonious. People tackled proposals that had come up through one of the members of the board, and he'd already endorsed it and couldn't vote on that particular one. Other people were tearing it apart to find whether it was good or bad. There may not have been any personal criticism -- you don't say, "well, you're stupid" and all, but really tearing it apart intellectually to see whether or not the best solutions had been arrived at.

One of the things the Army did for me was to send me off to the advanced management program at Harvard.

Hoy: That was one of our last questions for today.

Clarke: It was really a course in human relations -- how do you get things done through people. That's what management is all about. No individual personally does very much. He's got other people, and eventually you get down to the people who are getting things done. But the most difficult problems in the industrial world -- and I think they are difficult in the military and the Corps of Engineers as well --

are having to deal with the man who isn't quite doing as well as you would like to have him do. But I think the military is more direct in solving those problems than what I observed from my friends out in industry who resorted to all sorts of subterfuges to move "John" out of his job and move him over to some other place. At least in the military, we could order him to another job where he might be, and he would expect to be, moved in a period of time. This is a problem in dealing with people. There is a matter of being sure you don't harm the individual and, at the same time, trying to get the job done. I think all of us in our careers have had to face this problem of how you move people around without destroying the individual and still get the job done the way you want it. You can go back to that old line, "the brave man does it with a sword, the coward with a kiss." You're always torn between these two aspects of it. We have moved people. Sometimes it's done. pretty bluntly, and sometimes it's done in a little more polished manner.

Hoy: You went somewhat later, in the 1950s wasn't it, to the Harvard Business School?

Clarke: That's a short course, the one I went to.

Hoy: It's a summer kind of thing?

Clarke: Well, it's a three-month course.

Hoy: Were many of you sent to that? That has a very good reputation also, the Harvard Business School.

Clarke: This particular course that I went to is for people in industry, usually at the assistant vice president level who had fifteen to twenty-five years experience. They were people who were going to move on up in the companies, some of whom had gone to the regular course at the Harvard Business School maybe fifteen years earlier. Insofar as the military was concerned, at that time we had, out of a total class of 130, ten from the military services. So there weren't very many there. I was the only Army engineer there. We had others from ordnance and transportation.

Hoy: Did you find your problems similar when you began talking about management?

Clarke: The problems were identical. There wasn't any difference at all, really. There was a much greater emphasis in industry, of course, on the profit motive which we didn't have in the military. On the other hand, we had to be cost effective, because we were going through budgets and this sort of thing.

When I came back from that course, my boss said, "How was it, what was it like?" And I told him, "It's a course in human relations, working with people and and to do it more effectively." I found the problems in industry and the problems in the military were almost identical. How do you get things organized, how do you pick people to get into the right jobs, and if you've made a mistake how do you get the right person in there. Some of the things we talked about sounded a little bit silly. We spent an hour one day on the coffee break. What do you do about the coffee break? It's a problem.

Hoy: I know from offices I've worked in, those are the problem areas -- those little things that you think are not important become very important.

Clarke: We spent one session discussing how to deal with the boss' secretary who is a little arrogant. How do you get to the boss through the secretary or around the secretary. It doesn't sound like a very important thing, but it was a common problem in all those outfits. We had great discussions on how heavily do you organize down the command channel and how do you organize the staff functions so that they fit the command lines, which is a continual military problem. Everybody was saying, well, the military

way is the such and such way; and I'd say, "Just describe to me, what is the military way? Because I've been trying to find it out for years." They have a concept of a boss up there who is just acting in an imperative manner and forcing decisions down on people. It doesn't work that way in the military any more than it does outside.

Hoy: I think there is that stereotype, though. And it comes through in things like what Morgan writes, that somehow you have no will of your own.

Clarke: That you have all these staff officers who are yes men? Well, this is what my friend down in Georgia was saying he didn't understand -- how subordinates could speak up that much.

Hoy: We don't have any more time left. I guess we might as well stop for today and come back.

Hoy: You wouldn't want to tell us what your nickname was for Lieutenant Colonel Buckner, who never wore an overcoat?

Clarke: Oh, I have to stop and think back now. Usually we referred to Buckner by his full name, always the cadets did -- Simon Bolivar Buckner. Of course, he was named after that South American patriot, Simon Bolivar. That's about all I recall for him. We had

others that we called by less endearing terms, such as "Paddlefoot."

Hoy: During the last interview, a couple of times we talked about professional groups and the fact that you wanted the Corps to be viewed as a professional engineering group. It struck me, as I was looking over your resume, that you've been very involved in professional associations. Before we leave the general topic of your education, I thought we might talk a little bit about those associations, and when you first became involved in some of these groups, ASCE (American Society of Civil Engineers) and others.

Clarke: I don't know that I became deeply involved in them. I guess I joined ASCE about 1960, so it was rather late in my career. Then about the same time -- this was when I was commissioner in Washington -- I applied for a professional license in the District and I joined the (National Society of) Professional Engineers. And I can't say I was really active in it. I used to make speeches to them, but that was because of the position I occupied; I think they would have invited me anyway.

I really have become more active in the professional groups since I retired from the Army.

I have more time to devote to them. Particularly with the American Society of Civil Engineers. I've ended up as chairman of its water policy committee. It takes some time, but fortunately now I've got the time I can devote to it. There is a lot of correspondence with a lot of people -- suggesting ideas, trying to develop policy statements, and testifying before Congress. While I was in uniform I could never have testified in front of Congress for a professional outfit.

Hoy: I wondered if they have programs, for instance, that might be helpful to a district engineer. Do many of them belong?

Clarke: Well, I think most of them join about the time they become a district engineer. Part of this is a matter of knowing the people that you're working with in the district -- knowing the engineers with whom you'll. be associating. It develops first name relationships. It's much easier to deal with people when you can call them on the phone and say, "Hey, Joe, I want to talk to you about something.'* I think this is one of the real benefits.

The programs that the professional societies have -- it's a little hard to put your finger on anything that is a direct benefit. I think the

benefits come in the acquaintanceships, talking about the common problems that you have. And eventually those begin to solidify into, hopefully, accepted solutions. This starts out at the grass roots, local level. I think you would find that most district engineers have become licensed professional engineers and have joined various groups -- basically so they'll know the people.

Of course, we've always encouraged people to belong to the (Society of American) Military Engineers. Most people join that early. Part of the pressure comes from their bosses; they feel it's a good association. It has a good purpose. It isn't quite in the same category of professionalism as the civil engineers or the professional engineers are, because the qualifications for membership in the Society of American Military Engineers aren't as strict. You don't have to have the professional background that you have to have for the others.

Hoy: They still have annual meetings?

Clarke: Yes, and they have a substantial membership of around 25,000. They have an annual meeting next week in San Francisco. I'm going out to it.

Hoy: William McMurren is on the Public Works Historical Society's Board of Trustees. We're also meeting

here, and he's going two places -- he's coming here and then he's going back to San Francisco to attend that.

Clarke: Yes. Bill is a wonderful chap. I've known him for quite a few years.

Hoy: What part of the armed services was he in?

Clarke: I don't know that he ever was. I'm sure he served in World War II, or I think he did. But you see, he's been the president of the Morrison-Knudsen Company, and it does a lot of work for the military. Of course, it was the lead outfit in all that construction work in Vietnam.

Hoy: Then it isn't restricted to someone in the military?

Clarke: No. You see, the purpose of the society, SAME, is to try to encourage an awareness of military problems of building and to bring everyone who is interested in it -- either from the military side or the builders or the engineers or the lawyers outside -- into association. So if there is an emergency, again you know with whom you're dealing, and you can get things done.

Not only because of the military engineers society, but over the years of assocation with a lot

of these people, I used to say that as chief of engineers I felt very comfortable about an emergency that might arise someplace in the world. I knew I could pick up a telephone, and there were at least half a dozen outfits I could call -- where I knew the chairman of the board or the president by his first name -- and say, "I want you to go to Funa Futi and start building an airfield." And they would go; they wouldn't even say, "How much are you going to pay me," or anything. They'd start, and then we would settle later. The capability was there to do it. It's a wonderful resource in the country, at least from the engineering point of view, to have companies like that. Well, the military engineers society fosters that kinds of a relationship -- a faith in each other, and trust.

The military builders (both the Army Corps and the Navy), I think, enjoy the highest reputation among the private engineering and building community -- the highest reputation for integrity and fairness and equity in dealing with people -- of any group in the country. And part of it is in understanding each other. They say we're hard and firm, but we're fair; we pay for what people do. All the professional societies foster this kind of a relationship.

The Society of American Military Engineers is a little more narrowly focused for that purpose. Joining societies just for the purpose of having it on your record doesn't really do much good. It's getting around meeting the people.

Hoy: I guess I was wondering if maybe you were encouraged to do this in your training, for instance at West Point, or later on. As student historians. we were very much encouraged along these lines, to pick out one group that might be of interest. If you assume that one day you might be "among the ranks," it would be good to share ideas. As you say, it is not so much the programs as just meeting with others who share similar attitudes.

Clarke: I don't think it came out of our West Point training. I think it came out of our early training after West Point, where we were encouraged to start joining. The first encouragement always came from the military engineers side. To join the (American Society of) Civil Engineers, you have to have a background of five years or more of professional work before it will admit you to membership.

In my own case, when we start talking about the early days, of course, World War II came along. No one was joining anything at that time. Then I found

myself in the Manhattan Project after World War II. It really wasn't until I came back from Pakistan in 1959 that it came home to me that I should join some of these groups.

Hoy: I guess APWA (American Public Works Association) is more like the Society of Military Engineers.

Clarke: Yes, APWA in a sense is. It's got a -- I don't mean to say a narrow focus, but it does focus on the municipal problems pretty much.

Hoy: And it likes to bring in all kinds of people.

Clarke: Right. And they don't have to be professionals in the sense of a professional engineer. They have to have an interest in solving the problems of the public entities.

But I can't trace that back to West Point, no. I think the only advice they gave us was what kind of insurance to buy.

Hoy: Is that right?

One other thing, before we start actually talking about your career. The last time, we talked about the stereotype of the military organization or structure. I think there is also a stereotype of the military man. One of the things that people say about you, whether you know it or not, is that somehow you don't fit what most people think is that stereotype.

Maybe the whole stereotype is inaccurate, but somehow, I think that's true, that somehow your perspective seems broader. How do you account for that? You went to West Point and spent your whole career in the Army, and yet...

Clarke: I don't think I was any more not a stereotype than other individuals that I think of. You know, it's interesting. When I came to Washington and became a commissioner and we began to meet a new group of people, my wife was always struck by the people who said, "Your husband is not a typical military man." Her answer was the question "What is a typical military man?"

Hoy: Maybe that's it.

Clarke: I don't know what the military mind is, as compared to other minds. I find in my associations with the military and my associations with people outside that I don't really see much difference. I guess the one thing in a military organization as compared to. a civilian organization that I've seen is that, generally, the lines of authority are much clearer.

I worked for General (Brehon B.) Somervell[7] during World War II. He was a fanatic on management. But he boiled management down to very simple principles. He said, "It's very easy. Every man should know for whom he works and who works for him." There are a lot of organizations in the world where the individual doesn't know who his boss is, or he may have multiple bosses. He doesn't know for certain whether the people under him really work for him, or maybe their allegiance is divided. The old biblical statement "no man can serve two masters" is a good management principle.

I don't think this is an attribute of the military mind, but I think most military people, when they think about organizing something, do try to establish fairly clear lines of authority and responsibility. It makes it easier to operate. Then when they pick up

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7 General Brehon B. Somervell (1892 - 1955). U.S. Military Academy, 1914. Corps of Engineers. Punitive Expedition, Mexico, 1916. Engineer Construction Staff, 89th Division, American Expeditionary Force, 1917 - 19. President, Mississippi River Commission, 1930 - 31. Assistant District Engineer, Memphis, 1933. District Engineer, Ocala Engineer District, Florida, 1935 - 36. Works Project Administrator, New York City, 1936 - 40. Director, Construction Division, Quartermaster Corps, 1940 - 41. War Department General Staff, 1941 - 42. Commanding General, U.S. Army Service Forces, 1942 - 46. Retired, 1946.

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the phone and they tell someone to do something, the man says, "Yes, that's my boss. I'll do what he wants." I think the concept of a military mind is that of a man who reacts sort of intuitively to a situation and goes ahead and tells someone to do something without considering all the consequences. But I don't know that the military is any worse for that.

Hoy: The thing that comes to my mind, I guess, is someone whose interests and focus are narrower, perhaps, because his training has been fairly controlled and regimented. I know I've talked to you about your daughter's interest in music and history, and you come across as having interests like that. I don't know why I should think that when there are a lot of people not in the military whose perception is quite narrow.

Clarke: There are a lot of people who are not in the military whose only objective is to make money, one way or another.

Hoy: Certainly.

Clarke: You know, thinking about this, I guess I was fortunate, in some of what I would call my relatively early assignments. They were fairly broad. I worked

for a couple of bosses early in my career who sort of turned me loose to do things. I used to make the observation that I had more authority as a lieutenant colonel in World War II than I've ever had since, to do things and get things accomplished. I suddenly found myself with a-really expanded horizon of activities in World War II, just by circumstances, and a boss who said to go do whatever had to be done. It took me into some very broad fields. Then when I went with the Manhattan Project, suddenly I found that in addition to the rather narrow administration of a contract, I was in essence the mayor of a town of 25,000 people, with all the problems that went with a town. It left an impression on me.

Hoy: We remarked yesterday that we thought your career seemed different from others.

Clarke: It's not what you think of as the typical career in the Army. I used to say I was the renegade in the Corps in that I'm one of the few officers who never served in civil works. The pattern of my career was such that I never got involved. My work with districts was always overseas, in Okinawa or Pakistan. And in lieu of the normal step that one might have taken of becoming a division engineer, they put me in the District of Columbia as commissioner there.

Of course, the responsibilities there were for the public works aspects of the District, but I was also involved in all the activities of the city -- education, welfare, hospitals, police force, and everything else.

Hoy: That might explain some of what I was trying to get at by my question.

Clarke: If you tried to probe for where it started, I think it was probably in the assignment I had in the latter part of World War II. And the early work with the Manhattan District[8] was a pretty broad experience. I [think I got that type of experience much earlier than my contemporaries might have gotten it. They might have been more narrowly focused into a purely military assignment or a purely engineering assignment. The truth of the matter is that after about the first couple of years, you become more an engineer-administrator than a pure engineer. I'd hate to think of the last time I picked up a slide rule and tried to design something specifically.

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8. Manhattan Engineer District. Established in 1942, this was the organization that constructed the first atomic bomb. It was under the Office of Scientific Research and Development.

Hoy: And all that drafting that you liked in the beginning?

Clarke.: Yes. I don't think I've really touched a drafting board, except for some home work projects, in thirty-five years. Probably since World War II. I worked on some design work then.

Curiously, we were discussing the. design of a concrete tank last night in the office. I said, "Well I could design that." Then one of these young kids came along and said, *'You forgot all about these things that have to be incorporated/' I said, "No, I take it back. I couldn't design that."

When I applied for a professional license in the District (of Columbia) -- ironically I had a large voice in appointing members to the board that examined people. In essence, I appointed the people to it. I went before them to get my professional license, and they only asked one question. They said, "What would you do if you went into practice tomorrow?" My answer was, "I would go out and hire some brillant young engineers fresh out of school to work for me." That carries out a little bit of philosophy I have about engineers in general. One of the attributes of a good engineer is that he knows when he's in over his head and when to 'call for help or more expert assistance

on whatever problem he has. Too often people get caught with a problem, then try to struggle with it themselves, and it just grows worse and worse before they finally call for help. There are a lot of instances of that, not only in the Corps but out in the rest of the U.S.

Hoy: Do you want to tell us a little more about what you did during World War II when you were with the Army Service Forces?[9]

Clarke: I had been overseas with a construction regiment -- I had one of the batallions of it. We put an airfield in on Ascension Island. This was back when Rommel was pushing toward Cairo, and there was great concern that we would lose northern Africa to the Germans. In addition to Ascension Island, which was a ferry field for light planes going primarily to the Middle East, they started building a new string of airfields across Africa. As a result of getting that job -- our regiment was to do it -- I was sent back to the U.S. to pick up the plans for the fields.

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9 The U.S. Army Service Forces, formerly the Services of Supply, was the organization responsible for all War Department technical and logistical support bureaus during World War II.

I got back here and picked up all the plans, and I was about to get on the airplane to go back to Ascension and then on to Africa, and I got paged at the airport. They told me to go back to the office. They were looking for a major of engineers, which I was, who had had a course at Leavenworth and who had been overseas. I was the only man in the Army that fitted that description. I went to work for what was called the planning division of Army Service Forces, under General Somervell. Except between me and General Somervell, there were several echelons of people.

I went into a small planning office. our responsibility was to work on the plans to be sure that all of the operations overseas were adequately supported. We only had a small office; we only had three people in it when I first started.

Hoy: That isn't very many people.

Clarke: But there were lots of other people in the operating office who were pushing supplies. Ours was a monitoring job and a planning job. After we started into the program and got going, it was evident that what you call the routine things -- the supply of food, to some extent the supply of ammunition, procurement of stand equipment -- was pretty well systematized.

The things that were causing problems were the requirements of the Army over and above the normal requirements.

The type of thing that I was involved in was trying to do the planning for long-range communications, airfield construction, port construction, road requirements, and hospital construction. Not exclusively that, but our emphasis was on trying to take care of things that seemed to be unusual. When I say we had a three-man office, at that time the Army was organized into the-technical services -- the engineers, the ordnance, quartermaster, medics, chemical, and all the others. Each of those had a planning outfit, and our job was to coordinate their planning.

The first operation we had was to be sure that the amphibious assault on north Africa went off on schedule and that they had the things that they required. We worked with General (George S.) Patton's staff in getting ready for that. And then, unusual requirements began to develop. Finally we found ourselves in a funny position. The so-called strategic planners in the rest of the Army staff, looking toward the long range future, were inclined to draw "goose eggs" and arrows on maps and say, "We'll go here."

It was our job to try to estimate what would be required of an unusual nature to allow them to go from here to here. Then we would begin to talk to them about the size of forces and which allies we would have with us. And from that, working with the various technical services, we'd try to come up with a plan of support.

Eventually this had to be translated into items that were going to be procured. It took two years to buy many of the items that we were speaking of. So we started a group of scenarios, I guess you would call them. They weren't quite plans, but in order to tie down what should be bought, we sponsored in our office (which these other two chaps and myself wrote) some scenarios for what the war would look like over the next year or two years. It was a crystal ball operation. But we did do this and we started into procurement, buying tremendous quantities of things.

One thing always impressed me. We were still fighting in north Africa and didn't know when we were going to get out. So we wrote a scenario that indicated we would have a long, tough fight in north Africa. Based on that, we ordered a lot of things -- a lot of railroad equipment, rail itself, trucks, hospital backup equipment, and all -- and started it

into procurement. Well, by the time it was delivered, we were in France; we'd made the landing in France. It wasn't so bad, though, because practically everything that we had put under order for north Africa applied in France. The railroad equipment was perfectly good, the rails were, the trucks and trailers that we had ordered became the "Red Ball Express" which supported Patton when he was charging across north France. So I think our planning paid off.

We did the same thing in the Pacific -- tried to order things in advance. We wrote a scenario, and the one we actually chose was one that they never fought. We came up with an advance up the Malay Peninsula and all the requirements to support it. But it was useful in the other operations. So this was one type thing that we did.

We used to get some unusual requests. We were fighting in China, and it looked as if our forces in China might break through to the coast, in which case we wanted to support them. General Somervell called us into his office one day and said, "When those people break through to the coast, I want to be certain that we have food, ammunition, added transportation, and medical supplies to take care of them."

We didn't know where they would break through to the coast, so we didn't know what kind of a harbor they were going into. And we weren't sure which forces would break through or what exactly they wanted. We came up with three shiploads of supplies that we loaded and got ready, and finally they ended up out in Manila.

Hoy: Did you regret that they called you back from the airport that day?

Clarke: I was prepared, and the outfit that I left had a wonderful time. They went all the way across central Africa, and finally up through north Africa, and into England, and finally into France. I kept trying to get out of that office. But every time we turned around and looked at the office, I was the only man who had ever been overseas. Finally in the late spring of 1945, I had worked out that I would be transferred to the Pacific. I had been working on a program to move supplies from Europe to the Pacific for the invasion of Japan. I had worked very hard on it, and I had been over to Europe and had been out to the Pacific coordinating all of this. (Thank God the war ended, because the system that we had developed wasn't very good.) About the time I was scheduled to go out to the Pacific -- in fact the chap had come

back from the Pacific who was going to take my job -- they dropped the first atom bomb. That ended that trip.

Hoy: So as far as the planning went, it all wasn't actually done from your office. From what you were saying, you made a number of trips.

Clarke: When you talk about planning and all, you've got a lot of coordinating to do.

Hoy: I know. That's why I was wondering how it was structured.

Clarke: Well, this involved talking to all the people on this side of the ocean who were involved in what could you produce, and how fast could you produce it, and how many ships do you have to move things in. And talking to the people on the other end -- what do you want, what do you think the future holds for you. One of the problems the overseas staffs had was that they obviously were very very busy with the day-to-day operations. Long range to them would be thirty days or, at the most, sixty days. Very understandable. On the other hand, if you're talking about supporting people from the industrial base back here in the U.S., it takes two years to get the things produced, get the plants in operation, get the priorities and all. We were trying to cover that longer range problem.

There were other people in the U.S. who were very concerned about the thirty-day and sixty-day needs of these people. But if it had not been planned for and had not been produced, it wasn't in the system.

You know, although the United States was a tremendously wealthy country and had tremendous resources, it could not produce everything that everyone wanted. So you got into priorities. Our job was like all jobs; I guess, we were sort of the middle man between the industrial base back here and the needs of the forces overseas. I did make I don't know how many trips to Europe to talk to the people there -- three or four. I made one trip at one time, very early, all the way from South America, Africa, ending up in China, to talk to the people about their requirements. And I came back with nothing very firm, but ideas that they had picked up. I went out to the Pacific to talk to those people, and I had to talk to all the port people. When I say "I" had to, our staff did it.

Somervell gave me another job. He sort of pulled me off for a matter of about four or five months. When it was evident that we were going to win the war, quite a bit before the end of it, he said, "I want to work out a plan so that the day the war ends we've

shipped everything overseas, we've emptied our depots, all our ships are en route, all our trained soldiers are over there." What he was talking about was utopia. He wanted to end up precisely with the right amount of men and supplies. He said, "You go back and figure out how to do it." In essence that's what he said. So he gave me two young men, recent graduates of the Harvard Business School. And we sat down and tried to work out this balance. And it led into some unusual areas.

For some reason or other, we got into the medical system and the requirements for medical facilities. One of the first things we tackled was the hospital ship program. We looked at the requirements on that and the numbers that were being built, and then tried to match that up against expected casualities, duration of stay, severity of wounds, and where the various stops should be. We worked very closely with the Surgeon-General, who had a wonderfulstatistical setup. Our little group concluded that if we started air evacuation we could save an awful lot of doctors, nurses, and ships. So we came up with a recommendation to stop the hospital ship program. Three kids telling all these people that they ought to stop it. Well, we went around and around on it, and we finally

ended up in front of General Somervell with all the other participants urging continuation. Somervell finally bought it and said, "Okay, we'll stop building hospital ships." And we went to air evacuation of patients. Fortunately, I don't think we ever lost a planeload of patients bringing them back to the United States.

That led us into how many general hospital beds we needed in the United States. We recommended a considerable reduction in the numbers. It was very difficult to tie down all the factors. We had wonderful statistics on World War I -- how many people died per wound, what they died of, and all that. But it was hard to evaluate the medical advances since that time and how severe the war was going to be. With different actions you get different casualty rates. I guess we gambled, and we were lucky. We cut back a tremendous number of hospitals to be built here in the United States.

We got into how many specialists of various types should be trained to keep a balanced flow of replacements going to Europe. One thing that intrigued me, when I got into this and was working with people -- they said, "You ought to go over to the Air Force and talk to a man up in the Air Force who has worked

out a very fine scheme of replacement of aircraft engines, supply of ammunition, pilot replacements, to fit the Air Force needs." So I did. I went up and talked to him. It was Robert McNamara, who was a lieutenant colonel in the Air Force at that time and was doing the planning. I think he had a simpler problem than the one we were trying to deal with. But this is the type of thing we did.

Now, it goes back to the point that you raised earlier. I think I got into some awfully broad areas in the latter part of the war. And, as I said, I was anticipating going to the Philippines and the invasion of Japan. That all came to a quick halt August 8th, 1945. Instead I found myself shortly thereafter headed into the Manhattan Project.

Spray: You mentioned General Somervell and something he had said about management. What are some of your other impressions of him?

Clarke: He was a very dynamic, brilliant man with a wonderful ability to see the "big picture." General (George C.) Marshall depended on him very very heavily for advice as to the capabilities of the United States 'to undertake certain operations. Somervell had under him the training of many people: the whole logistic support of the Army and essentially most of the Air

Force, which was then part of the Army. I didn't get to see him very much. He was way up the line. If I saw him five times in two and a half years, I guess that was a lot. The man who became my immediate boss and was finally the intermediary between me and Somervell, I saw him practically daily. He is still alive, he's in town here.

Hoy: Who is it?

Clarke: His name is Roy Lutes. He has to be in his eighties now. He had his fourth wife -- three of them have died. He's the father of a classmate of mine from West Point. He was a wonderful man with a very broad perspective of what had to be done to win the war.

So I can't say that I fought the war, in a sense. I was off building one airfield then I was back in the staff job.

Hoy: You went to Hanford after the bomb was dropped? After August 1945?

Clarke: Yes. Most of the people in uniform who had been associated with building the atomic bomb were reserve officers. Not entirely, but most of them were. They were somewhat specialized, but again not entirely. When the war was over, they all wanted out. So General (Leslie R.) Groves was looking around for a

whole replacement team to replace the large number of people who were leaving. That's the group that I got into.

Hoy: There were two years there, and you were in Hanford. Then you were in Albuquerque?

Clarke: Well, I went to Hanford in the fall of 1945 and left there early in the fall of 1947. Then I went to Albuquerque and stayed there two years. Then from there to Okinawa.

Spray: Was there construction still going on at Hanford when you were there -- building the town and all?

Clarke: Not the major construction. Practically all of that had been completed. We were still making adjustments in the town. Actually, we were going through a period when I arrived there where the number of people employed in the plant was dropping. They had gotten it into operation, and they felt more confident in their ability to operate it. So they were dropping. Some of the construction people were still there. During the first year or so that I was at Hanford, the town suffered a reduction. Then we started the planning and the work of expanding Hanford. That happened during the second year I was there. Then we began to build up again, and we started in again to add to the town. When I left

there, there was a fairly substantial amount of construction underway on the replacement and the expansion of Hanford. The last year I was at Hanford I worked for the Atomic Energy Commission. I was the last military man to be there.

Spray: How was that? What was the relation between the Corps then and the commission?

Clarke: I was just on loan to the Atomic Energy Commission for a year. I was still paid by the Army. The Atomic Energy Commission was kind enough to offer me a job if I'd get out of the Army and go to work for it. I decided not to, because primarily I was not a nuclear scientist; I was what I would now call an engineer-administrator. Although I had some familiarity with all the problems of Hanford and more than a layman's knowledge of the physics involved in it, I still was not an atomic physicist. I felt if I were going to be an engineer-administrator, I'd better go back to the Army, where I'd be used more in that capacity.

Hoy: I was curious how people that were still there, who had worked on the atomic bomb felt (many of them I guess didn't always know what they were working on). You mentioned that they felt more confident about what they were doing. I would think there would have been

a different feeling before and after August 1945, in the sense of their work having been somewhat successful, whatever part they played.

Clarke: Well, you're right in the beginning. The great majority of people who worked at Hanford did not know what they were working on -- up until the bomb was dropped. There were a select few, of course, in the top that had to know. But you must remember that Hanford was a plant that was built in about two years from some laboratory work on some microscopic bits of material. They did not build a pilot plant; they went into full production on a tremendous scale. And they weren't quite sure what all the problems would be in operating that plant. Even when I got there, we were still finding problems and then beginning to find solutions to the operation of the plant. By the time I got there, they had been in production for about a year, and most of these problems were being resolved. They didn't need all the people that they had had originally.

The DuPont Company, which was the operator of the plant (and the manager for the construction, for that matter), because they were pushing into a new field, had staffed that plant very very amply -- as a matter of prudence. We used to say they had gone in there

three deep in management, and as soon as they got the plant in operation (and this wasn't exactly true), they pulled out one team and left two teams there. Well, there were about two teams there when I got there. They started reducing that down to one. Then while I was there, we switched over from DuPont running it to General Electric running the plant. Most of the people who were there stayed and worked for General Electric.

They were having problems in the dissolving of the material as it came out of the piles; there were gases coming out. They were learning about the effects of those gases on local animal life. They were out taking measurements and all. Eventually they came up with a procedure that was relatively safe. And there were things happening in the reactors themselves that were causing them concern. The graphite was growing. It was a very interesting thing to me, and again, I never understood all the physics of it. Graphite has a very nice rectangular or cubical structure. It is as if you piled a lot of things up and they're all in perfect order in each dimension. What happened when the graphite atoms were hit by the neutrons was that those atoms were knocked out of place. The best simile that I could think of, one we

used, was that it was like putting sand in between the cards of a deck, and it grows. This was happening, and they were working on trying to resolve that.

We were trying to reduce our utility costs and to simplify our water setup. We had two plants, that had been built as a precaution, which were no longer needed because of changes in the process. We were dismantling those. But about that time, they decided to expand the program. So we went in and started planning additional reactors. They were working on a new separation process. Not only there but at the University of California at Berkeley, and (the University of) Chicago was working on it. We had started planning a new process. So, although the people certainly felt very proud of what they had done and were continually acquiring confidence, there was enough challenge in the new work that I think they were able to retain a very fine spirit.

Hoy: I'll bet General Groves was one that felt a lot more confident.

Clarke: I don't know whether he felt confident, but he always expressed confidence -- that it was going to be done. He was a hard taskmaster. A brilliant man.

Hoy: Did you ever meet him, either there or in Albuquerque?

Clarke: Oh, I met him quite a few times. The reason I went to Albuquerque was General Groves. He had already picked his group to go into the Manhattan Project. When I was closing out my activities at Hanford, I was in Washington for a trip; and I was under orders to report to a staff job at Washington. I was wandering through the halls of the Pentagon, and he saw me and said, "What are you doing here?" I said, "Well, I'm here getting lined up for my next job." He said, "Nobody told me you were leaving." So he stopped that "next" job. The next thing I knew I was sent to Albuquerque for the special weapons project, which was also under his command. I went out there to become the base executive or chief of staff -- whatever you want to call the job.

Hoy: Was that basically a research and development program?

Clarke: At Albuquerque? We had several missions. Our principal mission was to train military teams of the three services -- Army, Navy, and Air Force -- in the assembly of atomic weapons. It was a very complex assembly procedure in those days. Our job was to train teams to assemble the limited number of weapons that we had at that time. Our second job was to work with the people who delivered the weapons, the Air

Force and the Navy, on their systems, and to try to adapt our assembly procedures to their delivery procedures. Next, we were to work with the Atomic Energy Commission to improve the weapons -- to reduce the size and make them more deliverable and simpler, to get away from this horrible electronic assembly procedure that we had (getting it down to plugging something in so it was either go or no go). Then we began to work with other delivery systems -- air delivery, missiles. And the Army had that cannon that fired an atomic shell. (I don't know whether they still have it or not.) We worked on the development of that. Part of our people were at Los Alamos, and part were working with the scientists in the laboratory at Albuquerque -- working essentially for the Atomic Energy Commission. I don't know that you could set priorities, but our greatest effort went into the training of assembly teams. We were building a new base at the time to support all this, to provide the facilities.

Hoy: How large was it, if one were to compare it to the plant at Hanford?

Clarke: Much smaller. I think our total population at Sandia Base, including even ,the contractor people who

were working there, was in the range of 3,000 or 4,000 people.

Hoy: I see. And the other, you said, was about 25,000.

Clarke: About 25,000. Now Hanford at one time had had, purely for construction, 55,000 construction workers building it.

Hoy: What happened to Hanford when all these people started leaving it?

Clarke: The construction camp that they had lived in was a temporary type camp. We dismantled it and sold it. It was in an area where we did not want people living anyway. It was close to the reactors. And while the construction workers were living in this construction camp, they were building the town in addition to the plants. The permanent people went into the town, and the construction workers went off on some other jobs. Going back to Hanford, there were 165,000 construction workers who had worked on that project, out in the middle of the desert. The total cost of Hanford was about $300 million, which in today's work is peanuts.

Spray: Both of these places were pretty isolated, weren't they?

Clarke: Well, Hanford more so than Albuquerque. Albuquerque, for the state of New Mexico, was a good

sized town. We were right on the outskirts of Albuquerque.

Spray: Oh, it was very near Albuquerque, then.

Clarke: As a matter of fact, our plant there was on the site of the old municipal airport. So it was fairly close to town. Hanford was remote, but not really too isolated. There were two small towns within ten miles of the main town of Hanford reservation. Then you could drive forty miles to Walla Walla eighty miles to Spokane, a couple hundred miles to Seattle, and I guess about sixty miles to Yakima. I don't know whether you'd call that isolated or not. It was out in the country. They picked it because it was generally an area of low population.

Spray: You talked about some gases escaping and their effects on the animals. I just wondered about the effects on people and if you ever had any problems in the nearby towns. Of course, during the war, I'm sure not as much as perhaps after, when there wasn't a war effort going on.

Clarke: Oh, no. Their production during the war... well, I guess they were operating the reactors at what was their peak level. Now compared to things that have been built since, these were very small. We had one interesting experience. Part of the radiological

monitoring that we did was to keep our own sheep around the area and monitor what happened to them. The real concern was radioactive iodine; it would get redeposited on the ground and into the foliage. The animals would eat it, and it would get in their thyroid. It was a convenient way to measure how much they were getting. Then we started trying to find out how widespread the radiation was. We went over to Missoula, Montana, which was about 200 miles, and started putting counters against the thyroid of the cattle over there. We were getting very high readings. That's when we decided to change our separation procedures.

We were very concerned not only about the animals, but we were concerned about the water going through the plant, the radioactivity in it, the effects of 'it on fish life. We had an active monitoring campaign on the fish in the river. We were concerned about the propagation of salmon. We had a very active contract with the University of Washington; a Dr. Donaldson, in particular, set up a monitoring program on salmon, to be certain we didn't ruin the salmon industry of the Northwest.

The people who set up that program were very thorough and were very competent people. When I

was there, we were beginning to get the information back on these things and to modify some of our procedures. Now, of course, this is the type of thing that the Environmental Protection Agency and the Nuclear Regulatory Commission are very concerned about -- the escape of the least amount of radioactivity. We didn't know much at that time. Some of our fish monitors would go downstream in the Columbia, catch a fish, bring it back to the laboratory, and lay it on a piece of photographic paper; it would take its own picture. You could see the scales and the bones. That has all changed.

One of the aspects of that, of course, was that we had our own town. It was a government-owned town, government run, and not a very good situation. It was expensive to run; people were unhappy about not having much of a voice in their government, although we had a council. One of our efforts was continually to move toward making it an open town where the people owned their own houses, elected their own mayors or councilmen, and ran their school system. We had it worked out with the state of Washington to take care of the school system. And while I was there, we began planning to turn over the town. It took about eight

years before it was all completed. Now the city of Richland is just like any other city, except there is a uniformity to the old houses because of the way they were built. But they're all privately owned. The government got out of the business of running the town -- which is not a good business for the government to be in.

Hoy: One of the things that I was interested in -- how did you get your assignments to each place? You mentioned you were back in Washington trying to work out an assignment.

Clarke: Well, I never quite understood myself how I ever got an assignment.

Hoy: I guess I thought you were in one place and you got a letter that said move next month to...

Clarke: I never did really seek an assignment. I was always told that there was some group up there that worked out where you wanted to go. Every year, they used to ask us to put in a preference sheet. I would file the preference sheets routinely. I don't think I ever got what I asked for. Assignments come about in funny ways. After World War II, I know how I got

into the Manhattan Project. General, Groves[10] set up his criteria to bring people into the Manhattan Project. His criteria boiled down to 100 officers that he would consider -- in his first go-around, anyway. He wanted them generally from West Point, although not exclusively so, graduating in a time period from 1930 to 1940; and he wanted only people that had been in the top ten academically. So that gave him 100 people. I fitted his criteria, and that is what got me into the Manhattan Project.

The assignment that I was going to go to after leaving Hanford came because of a man with whom I had worked in World War II, Major General Daniel Noce. He had asked for me to come work for office. That put me in that job, and then Groves got me back out to Albuquerque.

Hoy: Were you beginning to think that you'd like to do something that most of the other people were doing?

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10 LTG Leslie R. Groves (1896 - 1970). U.S. Military Academy, 1918. Corps of Engineers. Nicarauguan Canal Survey, 1929 - 31. Chief, OCE Supply Division, 1934 - 35. Command and General Staff School, 1936. Army War College, 1939. Deputy Chief, Construction Division, Quartermaster Corps and Office of the Chief of Engineers, 1942. Commanding General, Manhattan Project, 1942 - 46. Chief, Armed Forces Special Weapons Project, 1947 - 48. Retired, 1948.

Clarke: Well, I was continually being requested by West Point to go back to teach. They wanted me to go back and teach physics or mathematics, and I was perfectly willing to go. But I never could get released from the Manhattan Project. And about the time they were ready to release me, after I had been in Albuquerque for two years, it was obvious that I should go overseas* I had not been overseas in a long time. First they were going to send me to Guam to command a battalion, but my boss at Albuquerque wouldn't release me right at that time. That got deferred; and the next time a request came along, it was to go to Okinawa. I got shipped' to Okinawa in the fall of 1949, and I spent two and a half years in Okinawa.

From there I was ordered back to school. And when I left school, because of my atomic background and because of a couple of people in Washington who knew me, I got into the atomic R&D desk in Washington -- I was requested for that. Because of my having worked for somebody during the war who happened to be in this large office of which my office was a small part, I got moved, at his request, to go up and work in another job. Then I went to the War College. I. was ordered to go to the (Army) War College in Carlisle

(Pa.), but my boss wouldn't let me go that year. So the next year I went to the National War College.

Again it was obvious that I should go overseas. I had been talking to the career people in the chief's office, and they kept telling me while I was in school that year (this was back in 1956-57) where I was going to go. First they told me I was going to go to Hawaii. And my wife and I rushed out and registered our children in the Punaho School there; we put down our $25 or whatever it was to get them registered. That didn't work out. Then the people in the chief's office told me that the man for whom I had worked in Albuquerque was in Panama in charge of the Army, and he had asked for me to come to Panama. They said, "Yes, you're going to go to Panama." So I said that was fine. Later, they said, "No, that's fallen through because he had to fill the job before you'd be out of school." They said, "What you need is a troop assignment in Europe." And I said, "Fine. That's exactly what I want." They said, "Well, we're going to send you over to command a group at Stuttgart." This was about in February.

The Army used to send someone from the Adjutant General's office over to the National War College. It was on Valentine's Day I remember, in 1957.

This chap came over and was reading out all the assignments. I knew.where I was going; I was going to go to Stuttgart. He started down: Brown is going to go to Alaska, and Chapman is going to go to the Pentagon. And he came to Clarke, and he said, "Pakistan." The personnel man from the Chief of Engineers was sitting next to me. I said, "Bob (Ploger), what happened?"[11] He said, "Honest, Fred. Up until last night, you were going to go to Europe. But we suddenly have a requirement to fill a job in Pakistan, and your having been in Okinawa, you are the ideal man to go." I didn't know much about Pakistan.

Hoy: How does your wife, with $25 down in Hawaii, packed to go ...

Clarke: Well, of course, she had long known that we weren't going to Hawaii, but she did expect to go to Europe.

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11 MG Robert R. Ploger (1915 -). U.S. Military Academy, 1939. Corps of Engineers. Commanding Officer, 121st Engineer Battalion, 29th Division, 1943 - 45. Omaha Beach Landings, 1944. Commanding Officer, 354th Engineer Combat Group, 1953 - 54, Korea. Division Engineer, New England, 1965. Commanding General, Army Engineer Command, Republic of Vietnam, 1967 - 68. Director, Military Engineering, Office of the Chief of Engineers, 1968 - 70. Commanding General, Engineer Center and Ft. Belvoir, 1970 - 73. Retired, 1973.

Hoy: And then you came home and said Pakistan.

Clarke: Well, I thought before I went home and told her I ought to find out a little more about Pakistan. So I went down to the War College library and got out the Baedeker -- which was probably dated in early 1930s -- about Karachi, where we were going. I remember this very well. I took it home to my wife. There was a little paragraph on Karachi. It said Karachi is a fishing port and a seaport, then in India (in the Baedeker). It talked a little about the climate. And it said one of the interesting things to do in Karachi is to hire a camel and ride out to the well about eleven miles outside town, where there are some sacred crocodiles. And it said for a pittance, the attendant will slaughter a goat and feed it to the crocodiles. So I took it home. Anyway, we finally went there.

Hoy: When you went to Okinawa, did your wife go, and your children? You had how many children at this point?

Clarke: Well, I had one child that was born on Okinawa. But my wife did not come for fourteen months or so after I arrived. I got there in late 1949. My wife was due to come in July 1950, because there was a shortage of housing there. Of course, the Korean War

started in June 1950, and that pushed everything back. She finally came in March 1951. In the interim, I had been back to the States on a couple of trips. I left there at the end of January 1952. In that time, we had one child, who is now twenty-five years old.

Spray: What were the main things you did while you were there?

Clarke: I was the executive officer for the district. Okinawa had been sort of a neglected spot in the Pacific, and in the summer of 1949 a typhoon went through there and just tore the place to shreds, ruined everything. At that time, you may recall, the U.S. had said it was going to pull out of Korea. Secretary (of State Dean) Acheson had said that Korea was outside our defense perimeter. So they decided to build Okinawa as a permanent base. We were there as an engineer district to be in charge of the construction of all the facilities on Okinawa -- the storage, the hospital, everything. We started that program in the fall of 1949 with an objective of developing perhaps $500 million worth of facilities over a period of years. We started the planning and got the initial contracts underway. That was my job.

I was the exec for the district, not the district engineer. I was too young to be one at that time. It was sort of a standard overseas district assignment.

Spray: Did it change then, when the Korean War started?

Clarke: Well, we got a great bustle of activity and the program started to move faster. We started putting in some temporary facilities where we had planned permanent ones. But we still did build many permanent facilities. I guess we got more money, really, after the Korean War started. It led us into a couple of other activities that we might not have gotten into, such as repairing a lot of equipment that was on Okinawa to be delivered into Korea for use there. The Air Force, of course, was flying regular missions out of Okinawa -- bombing missions into Korea. We were supporting all that.

But generally I'd say the program continued on about as they had planned with a little acceleration. Occasionally it suffered because of other priorities. Things that we thought were coming to Okinawa to help us would suddenly be diverted into Korea. I'd say it was pretty much a standard overseas district. Because of the problems of Korea and of trying to get equipment to do our program, we found ourselves going

to the Chinese mainland to get some items -- or going to the Philippines. We wouldn't normally have done that. We would have gone back to the U.S. for them. I don't know, I've seen a lot of overseas districts since that time. It was sort of a standard thing.

Hoy: Then you were brought back to the United States. Is that the usual practice -- you have an overseas assignment then you come back?

Clarke: Usually, yes. I came back for another school, Armed Forces Staff College.

Hoy: How beneficial was that year?

Clarke: I think it was of some benefit. Again, I got to know a few people in the other services.

Hoy: We're getting the same reaction we got from General Vogel.

Clarke: You see, I had been in what essentially was a joint command at Albuquerque -- Army, Navy, Air Force, Marines. We had all those people there. And I had been doing a lot of planning during World War II. I think the course was of more benefit to other services than it was to Army people. And to be perfectly honest, I felt that I could have spent the five months to better advantage some other place. I had already been working with a lot of people in the other

services and understood fairly well how they worked. It was pleasant. I enjoyed the lectures that we got. They used to have us work on problems and write up joint orders and all. This was pretty elementary, I thought.

Hoy: Does everyone go to the college?

Clarke: Not necessarily. I think the reason I went there is that I had not gone to Leavenworth for the full course, because of the way my career had developed. Instead of going to Leavenworth, they gave me constructive credit for going to Leavenworth. I think that's the reason I ended up at Norfolk. They felt this block on my card had to be punched.

Hoy: You always kept coming back to this area. Probably you've kind of made this your home, haven't you?

Clarke: Well, Washington is what I look at, really, as a home. In my total career, I spent an awful lot of time around Washington. I figured it out one time. I had two years at Belvoir, and just about three years during the war. Then I was here five years in the Pentagon and at the War College. Then I came back and spent three years as a commissioner and two years on the chief of engineers' staff. I went from there down to Belvoir and lived at Belvoir for about

five years. Then I came back to McNair for three years. Since retiring I've lived here four years. So I've spent more of my life in Washington than in any other place -- or in the Washington area, counting Belvoir. My wife and I have lived in four different houses in the metropolitan area in that time. I think we bought our last one, though, four years ago. The last one in this area, anyway.

The pattern was normally overseas, a stateside assignment -- maybe two stateside assignments -- then back overseas again. I think this is pretty generally what they're doing right now with people. I always said that in my career there were some things that I wish I had had more of, but I just never got to the right places. One of the ways that you get to know a lot of people, particularly in the Army, is through an assignment teaching at West Point. There is a large group of teachers there who are your contemporaries, and you get to know them quite well. I didn't get that. Leavenworth is another place where you meet a large number of your contemporaries, and you live very closely for about a year. And I missed that. The other is the Army War College, which is a little different in its living pattern from the National War College. The National War College is

here in Washington. You've got people from all services and the State Department there, and they live dispersed over the area. So you see them during class, but you don't see much of them after that. Whereas at Carlisle, at the Army War College, they live in acommunity and they get to know each other quite well. There are advantages to it. It goes back to the type of thing we've been discussing of knowing people and being able to deal with them on a first-name basis. So my career in the military, I would say, was not what you'd think of as a "typical career." I don't know how it got the way it did.

Hoy: Did you have, as you were going along, career goals? You wanted to teach at West Point, you said that.

Clarke: Well, that would not have been a career goal.

Hoy: No, it would have been a choice of location, I guess.

Clarke: Yes, and I felt I could contribute at West Point in teaching. And it would have been a pleasant location, a nice place to raise children.

I don't know. Back in the early 1950s, in the office that I was in, we started trying to pick people for what they called logistic careers. I volunteered

for that. It seemed that my experience and my interest would have led me into that field -- the administration of more than just the construction programs, broader supply and maintenance programs and all. But that just never seemed to work. I got back into the engineer family when I went to Pakistan. Then I went to Leonard Wood to the engineer training center, and I got picked to be commissioner in Washington. So I got back into the engineer family rather than the broader logistic family. And in retrospect, I'm very happy that I did. When you talk about having specific goals -- to say I want to jump all these hurdles and have these types of jobs -- I don't think I did. I made a rather fatuous remark, but there was a great deal of truth to it: I never had a job I didn't like; and with one mild exception, I never had a boss I didn't like in the military. So they were doing all right for me by whatever system that they had. By the time the late 1950s came around, it was obvious that some individuals in fairly high places were keeping an eye on me and requesting me for various jobs.

Hoy: I wondered when one learns that.

Clarke: But it wasn't necessarily the same individual in all cases. People were asking for me to go to

different jobs. You could sense it just by the type of jobs that were assigned.

Hoy: How useful was it when you were here for four years in the research and development position? That was logistics, wasn't it?

Clarke: Well, I didn't spend much time in research and development. I was only in that office five months or so.

Hoy: Where were you, then? We understood you were there for about four years.

Clarke: Not in research and development, no. I was in the same general office. I got a call from my immediate boss, whom I had known very well, and I went to see him. He said, "What have you been doing?" I said, "I haven't done anything." And he showed me what we used to call a "Palmergram" -- General Willie Palmer sent these down, and he always put "P" on the bottom of them, little 5 by 8 notes. All it said was, "I want Clarke to be my exec. P." He said, "What have you done?" I said, "I don't know. I don't even know General Palmer. I've never met him." So he said, "Well, you'd better go up and see him and find out what he wants."

I went up to see him. I stopped at the secretary and she said to go on in. So I knocked on the

door, and he said, "Damn it, never knock on the door. If you want to see me, come on in and sit down. When I'm ready to talk to you I will." He was a gruff character, and under the surface the kindest man in the world. So I sat down, and he looked up at me and said, "Who the hell are you?" I said, "My name is Clarke. I understood you wanted me to be your exec." "Oh yes. In three months the current exec is leaving. I want you to take over from him. Do you have any questions?" I said, "No sir." "Fine."

I went up and sat with the current exec for a little while, but I was still doing my other work. Never saw Palmer in all this time. Finally the other exec left. One of the jobs of the exec was to bring all the people in for a staff meeting, shepherd all these generals in and close the door, which I did. He looked up at me again -- he hadn't seen me but that once -- and he said, "Who the hell are you?" I said, "I'm your new exec." "Oh yes. Come on in. Gentlemen, I want you to meet Colonel Clarke, the new exec."

We got along fine. About the third day I was there, I did something which he didn't like, and he called me in -- he could be rough and gruff. He went

up one side and down the other; and when he got all finished, he said, "Now if you had to do it again, would you do it the same way that you did?" I said, "Sir, with the knowledge that I had, I'd do it exactly the same way that I did it." He said, "That's fine." We never had a problem after that. He was absolutely wonderful. I enjoyed working for him. He died about two years ago. He was a wonderful organizer. He was running the total logistics staff of the Army.

Hoy: How long did you work. for him?

Clarke: I worked for him about a year. Then I went off to that Harvard course to which he helped send me. It was fine. I had told him when I went, "I've got an assistant out here who is perfectly capable of doing what you want. There is no point in putting me back in this job." He agreed. So when I came back from the course, they put me in charge of the mobilization branch of the production division. It was the outfit that was concerned with all the industrial production plants that the Army owned, which had been closed down after World War II and the Korean War. We were trying to keep them in a standby status so that they could be opened up. I went in that for about two months or so. I guess I've missed the

order of things. I did go down first to what was called the construction management branch, which was putting together the program on construction. At that time we were putting in the NIKE sites, and we had a big program in Europe. I spent my time trying to get the program organized, preparing the budget, and going in front of Congress to justify. the budget. I did that for awhile, then I got called over to the production division. I worked there about a year, and enjoyed it, although it was a little out of my line. During that time, I moved into trying to get the missile production facilities budgeted and on line.

By that time Palmer had left, and another general, Carter B. McGruder, was in there. I had worked for him before. He called me up to his office. I was what was called a "special assistant." I had my own little office. He said, "You can work on whatever problems you think are important, and come in and tell me periodically what you think I should do." That was what I did. I'd probe around in areas, then maybe once a month or so I'd go in and say, "Here's something I think you should be doing." And he allowed me to sit in on all the meetings that were going on. It gave me a pretty broad view of what he

was doing. So in that four years that you have there, I had a variety of tasks. I was going around with the reputation of a man who couldn't hold a job.

Hoy: I guess we answered the question we began with, about your different career and your broader perspective.

Clarke: When I look at other of my contemporaries, people like Jim (James B.) Lampert (who incidentally someday you should talk to, who is now vice president of MIT), when I look at him, or I look at people like Dodd (A. D.) Starbird -- these are rough contemporaries of mine -- the broad assignments that they had. And, of course, Andy (Andrew J.) Goodpaster is another who went through a "non-typical" career and eventually ended up commanding all the forces in Europe.[12] I think among engineers there are more people who have

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12 General Andrew J. Goodpaster (1915 -). U.S. Military Academy, 1939. Corps of Engineers. Commanding Officer, 48th Engineer Battalion, Italy, 1943 - 44. Ph.D., Princeton University, 1950. District Engineer, San Francisco, 1954. Commanding General, 8th Infantry Division, 1961 - 62. Special Assistant to the Chairman, Joint Chiefs of Staff, 1962. Commandant, National War College, 1967 - 68. Supreme Allied Commander, Europe, 1969 - 74. Retired, 1974. Superintendent, U.S. Military Academy, 1977 - present.

non-typical careers. A good question to which I don't know the answer is: why do more engineers get into these non-typical careers? They're not that much more brilliant, but it's something in the way their career patterns develop that they get a little broader assignments. All of a sudden, they find themselves in entirely different career patterns than others in the Army might have.

You know, there was a time when the engineer corps commanded all the top graduates of West Point because they had a very separate promotion system, and they could advance faster. Obviously, people went into it. Now that separate promotion system has pretty well disappeared. I think the Corps attracts the top people from West Point because it offers a varied career pattern. The chances for promotion aren't that much better; I just think the assignments they get are much more interesting and broadening. I think the word percolates down through the system. This is what continues the practice of the top people going into the Corps, which upsets some of the other people in the Army. But when I was chief, I used to try to tell them, "These engineers are available for any assignments you want to put them on."

That may be another aspect of it. When I was chief, I worked very hard to be sure that our capable senior engineers were available, and we pushed to have them utilized in very broad assignments, feeling that it was good for the individual and it was good for the Army. I suppose some could say we were selfish, that we ended up with a lot of engineers getting promoted. At one time when I was chief of engineers, we had thirty-nine general officers whom I called engineers. Seven of them were lieutenant generals, and they were spread in various spots. But it wasn't because they were engineers that they were in those spots; it was because they were good people and they had been pushed into a variety of experiences. So that when some very complex jobs came along, they weren't the least bit fazed in taking them on. We had the man in charge of developing the ballistic missile system; we had the man in the defense nuclear agency; and we had people out in the logistics commands, deputy commanders in Europe, because they were broad people.

I feel this way when I look at some of these young men who are coming along (who are not quite so young any more). Like the son of General Groves, who

is now a major general and should be a lieutenant general. He's had very broad experiences and is very capable. I had the best of all worlds when I was chief. I had a group of division engineers that I had the greatest confidence in. They were really fine people. I had to run to catch up with them.

Your comment is interesting about being non-typical. I didn't know I was known for that in the military.

Hoy: Just comments that I've heard from people that know you, or feel they know you a little bit anyway. But maybe they all carry around this stereotype.

Clarke: These are not military people you're talking about then?

Hoy: Well, William Henson, who works in our (APWA) office. And, General Vogel. He had very nice things to say about you. He said there are not too many chiefs that he's had ... he said he's told you all this, though.

Clarke: He told me once, "No chief ever came up to the standards of the Corps."

Hoy: That's exactly what he told us. Except one, and he mentioned your name as that one.

Clarke: Well, he was kind enough to be talking to me at time. But I think he still has the same feeling. He said I might have a chance to do it.

Hoy: Well, he told us that you measured up.

Clarke: That was a good statement, I thought. I have great respect for him and I like him tremendously. I never really knew him until the latter part of my career. I don't think I ever ran into him until then.

Hoy: We really enjoyed talking to him.

Robinson: General Clarke, in your last session, you stated that you were surprised to be assigned to Pakistan instead of Europe in 1957. Would you describe some of your impressions of Pakistan when you first arrived?

Clarke: When we first arrived, it was hot. 'Of course, Pakistan has had its problems. When we arrived in Karachi, it was filled with refugees. I had been there in World War II; I had spent about a week there. And I remembered Karachi as not too large. I suppose during the war it had 200,000 people. When we arrived in 1957, it had a million and a half people, and it was still operating on the same infrastructure that it had had in World War II. That meant a real lack of water, no power, and a lot of

open sewers, particularly from the refugee camps. The poverty had a real effect on everyone going through there.

Robinson: Were your headquarters in Karachi?

Clarke: Our headquarters were in Karachi. Most of our work was upcountry. But Karachi was the main seaport, the main airfield, the point-of-entry, and the seat of government; so this is where we had our headquarters.

Robinson: Despite the unsavory conditions there, did you have a comfortable working environment in Karachi for your headquarters?

Clarke: Well, I 'guess so. We had a rule in our office that if the temperature got over 104 degrees at noon, people could go home for the day.

Robinson: I guess that's better than Washington, when the rule used to be ninety-two degrees.

Clarke: Well, it actually never got to 104 degrees at noon. By 4:00 it might, but not at noon.

Robinson: Did you take your family with you to Karachi?

Clarke: I took all but one son, who was going to school here in the States. Two daughters, my wife, and I went. One daughter left at the end of the first year and went to school elsewhere.

Robinson: What were their feelings about living in this foreign country?

Clarke: Well, the first daughter got sick; and that's why she had to leave. We sent her to Switzerland. It's like going into any new area. There was a period of accommodation. My wife became very interested in working with a local woman Pakistani doctor, in assisting her in some of her hospital work. As a matter of fact, when we left my wife said that she would have been willing to stay for another year. She felt she was contributing.

But we went through several bouts of illness that seemed to hit practically everyone in our organization. The big problem was amoebic dysentery. So it was a little debilitating in that respect.

Robinson: Did you have frequent social contacts with Pakistanis? Speaking now of your family.

Clarke: Well, it's hard to say. Most of our contacts with the Pakistanis were with the Pakistani military and a few other governmental contacts. And we saw a lot of Pakistanis either at American parties or at a few Pakistani parties. Some of the military, particularly the Air Force, was very good about inviting Americans to their parties. We enjoyed our meetings with them. Now, I don't think it would be fair to say we had really close relationships with a lot of Pakistanis. It just wasn't that kind of a setup.

And, of course, we were only there for two years. Those that we met we got along with beautifully. They were fine people. So many of them had been educated, or the military had been trained, in the United States -- they had a United States outlook, a western viewpoint. So it was an easy relationship.

Robinson: Was the Corps work in the Trans-East District principally focused in Pakistan during your stay there?

Clarke: The great bulk of it was in Pakistan. We did some work in Saudi Arabia. While I was there, we had two projects in Saudi Arabia. We did some additional studies in Burma, which later led to some design work. We did do work on a university in Burma. But the big project that we were going to start was a road from Rangoon to Mandalay. We designed it -- actually the design was completed after I left -- but it was never built, because relations between the United States and Burma broke down about that time. And we started some very preliminary road work in Afghanistan. But the big job was Pakistan. Next biggest, of course, was the Saudi Arabian program, which now has mushroomed to either $8 billion or $16 billion, depending on what figure you want to take.

Robinson: What were the projects in Saudi Arabia that you were involved in?

Clarke: Well, we got involved first in the Dhahran air terminal. That was a $5 million project arranged for by President (Dwight D.) Eisenhower, and was, I suppose, a payment to the Saudis for the continued use of the Dhahran air base. We built the terminal building there. We actually started it while I was there; it was finished after I left. It was a very impressive building. It won the first honor award of the American Institute of Architects as the most beautiful building designed by an American architect. Minoru Yamasaki was the architect on it. I've always said it's because of that building that the Corps is still in Saudi Arabia.

Robinson: In Pakistan, was it your job to support the Military Assistance Advisory Group (MAAG) there?

Clarke: Yes, but we worked only for the military construction program under the guidance of the advisory group.

Robinson: Specifically, what projects were undertaken in Pakistan while you were there?

Clarke: Of course, the program was started before I arrived. We had five military airfields; we had an armored division cantonment; and we built a Corps

cantonment with space for a brigade, several ammunition storage areas, naval warehouse facilities, wharfs at the main port, and a tank repair shop. I guess those were the main things. Later we took on the design and construction of a new runway at the Karachi civil airport. The total program probably was, on the military side, $140 million; and the civil airport at Karachi, about $5 million or $6 million.

Robinson: Were there any other civil works that you were engaged in besides the airport?

Clarke: No, that's the only other program other than military that we tackled there. Now, some of the studies that we did in Burma, and an East Pakistan (now Bangladesh) transportation study that we started while I was there, would have been civil in nature. The Burma program was. And, of course, the program that developed in Afghanistan was civil.

Robison: Do you recall any projects, or unique conditions on projects, that stand out in your mind?

Clarke: There were several aspects of construction that were unique. One, of course, was the use of manpower for jobs where you might use a machine here in the States. Or the use of donkey power to move dirt. It was ironic. You could hire a man more cheaply than

you could a donkey, because a donkey could carry twice as much. But, thinking about construction there, the total work force on our jobs ran somewhere around 19,000 people. They found when they first went into the area that -- of course, these were poor people -- in addition to paying them, it was necessary to feed them a good meal during the day in order to allow them to work the full eight-hour day (or a nine-hour day, and I suppose in some cases a ten-hour day). And it was probably the best meal that they got. There were also tremendous numbers of women in the work force doing hard labor.

And bricks. In one of our project, I guess we used 35 million bricks. They were all handmade in little family-type operations. The bricks were molded and then put into a race track kiln and coalfired. We got exceptionally good quality brick. Those that we rejected were sold on the local market and were still a fairly high quality brick. We still used a lot of heavy equipment for airfield work. It was a way to get the job done faster and to control the quality of it.

We were, as I mentioned,, in a high earthquake risk area. One of our jobs was at Quetta. In about 1937, they had had a very severe earthquake there.

It killed 35,000 people. So we were always conscious of this problem, and it had to be taken into consideration in our designs. But I suppose the most impressive thing was the use of manpower, human labor, rather than using heavy equipment such as you would here in the United States.

We had concerns about water, always. It was an arid region. To provide water for our facilities -- particularly the big camp that we had -- was an exercise in exploration, in trying to find new sources. Fortunately, we found them. They were in what looked like some dry streambeds that came out of the Himalayas.

And we had other interesting incidents. Relations between India and Pakistan were not the best. On one day, I know, and Indian observation plane was shot down not too far from one of our sites. It caused a little excitement to our people, but generally we were there during what you would call "peaceful times." We had two revolutions while we were there, but they were quite and peaceful -- except for the tanks in the streets.

Robinson: You mentioned the labor-intensive work. Did the government encourage this? In other words, did they

encourage you to hire a lot of locals to do this work rather than bring in heavy equipment to do it.

Clarke: No, that wasn't a factor. It was our contractor -- and we had basically one prime American construction contractor. In the economics of it, it worked out that this was the cheapest way to do the job. There were several items that the Pakistanis were past masters in -- brick laying, masonry work, plastering, and this sort of thing. I got criticized after I came back by the staff of one of the committees in its report because the quality of our work was so high. What they were looking at was the brick work and the plastering. And it was first-class work. But that's the way the Pakistanis had been building for a thousand years. And it was the cheapest way to do it.

We had other aspects. It was termite country, like so many other places. We used teak, which came from East Pakistan, for all of our door framing and window framing -- built-in lockers of teak for the Pakistani soldiers. And, of course, it was beautiful work. It's something you would have to pay considerably for back here; but over there it was an inexpensive solution to the termite problem, cheaper than metal by far. We did try to keep down the amount of

material that we imported, and we tried to use local material as much as possible.

obinson: You mentioned that there was one prime American contractor. Were there also construction organizations in the country that could utilize, or did all the organizations come from the United States?

:larke: Well, we subcontracted a lot of work to what could be called Pakistani firms. Most of them were the vestiges of British firms which had been in the country and had maintained an organization.

Robinson: Were these British-owned for the most part?

:larke: I'm not sure of the exact ownership. I suspect a substantial percentage of them -- well, there was Gammon, for example, of Britain, but this was a Gammon Pakistan corporation. I'm not sure of the exact ratio of ownership on that. We had Gammon doing structural work. I can't recall the name of the firm that did the mechanical and electrical work, but it was a local firm. Basically, the American prime contractor did all the heavy earth moving, managed the job and controlled it, and ordered the materials that had to be imported; the contractor also depended on subs for supplying labor and foremen and for managing the particular disciplines on the job.

Robinson: Did the climate over there present any special problems in terms of construction?

Clarke: Well, I suppose you could say generally it was favorable for construction. It was hot most of the year, although it could get cold in the winter. Up in the northern part of the country, it could drop below freezing. But I think the heat, more than anything, bothered us. You had to be concerned that the concrete did not dry out too rapidly in that very arid, hot climate. Putting down asphalt in hot weather was a problem. On hot days, the usual asphalt technique was to start about 4:00 in the morning and stop at 10:00, and then start at maybe 6:00 in the evening and stop at 10:00. So we got twelve hours of work. But in the middle part of the day, the asphalt was just too hot to put a roller on it.

For the Americans and Europeans working in the area, we built construction camps at practically every one of the sites. Fairly substantial ones -- these were built out of brick. You never saw a brick construction camp, but it was the fastest way to do it.

I have one little aside on this. The Air Force wanted an installation there, which we built. This friend of mine from the Air Force came in (a classmate of mine [Major General Richard T. Klocko]), all

prepared to move in prefabricated buildings to house his people. I told him, "We can throw up a brick shelter with a good roof on it cheaper and faster, using Pakistani techniques, than we could if you brought in prefab buildings. Because the people know how to work with it, and we can put a large enough force on it." And we did, and built them very rapidly. I think from the day we put our heel on the ground and said we'll built it here, it was sixty days and he had his forces in there. If he had tried to ship pre-fabs in, he might have been sixty days but not by much.

Robinson: Did you build projects in both East and West Pakistan?

Clarke: No. The only things we built were in West Pakistan.

Robinson: I see. What was the relationship of the Corps, particularly the program you were involved in, with the Pakistani government. What sort of liaison did you have with the government?

Clarke: On the matter of requirements, it was all handled by MAAG. The MAAG people worked out the program; we helped them. We would lay out the program with MAAG guidance, take it to MAAG, and they cleared all the arrangements with the local government -- the

criteria, the size, this sort of thing. At the same time, we were talking directly with the Army people primarily, although Air Force too, about the criteria. We had a sort of curious situation. We were definitely trying to upgrade the standards that were applicable to the military facilities from what the Pakistanis had before. But we still had to be conscious of the dollar costs. So the final result was somewhere between what they had had and what you might consider full American standards. These standards were discussed between our engineering people and MAAG, and then discussed between the engineers and the Pakistani military. But the final approval of the general criteria, negotiation of that, defense of the budget, was a MAAG responsiblity. Our concern, once we had the job, was dealing with the Pakistani government to clear the way so we could get on with the construction. This meant site acquisition, which the Pakistanis did. We had a great deal of trouble with our materials and equipment and the personal effects of the people that we had there -- getting them through customs. We did a lot of work in that respect. It was up to us -- a combination of Corps people and contractor people -- to work out arrangements with the railroads to haul things and

sometimes negotiate with the Pakistani government on sources of aggregate and haul roads. It was not too different from the types of problems you would have back here.

Robinson: What is your assessment of the engineering capability of the Pakistani military?

Clarke: I didn't really see much of the military in action. I did go, on one occasion, to watch some river crossing training that they were doing. They were doing a very good job. They had a good training site and mostly American equipment -- not exclusively, some British. They were well trained in that particular aspect. I never saw their engineer troops in action. They were not working with us on our jobs. The Pakistani soldiers that I saw were very impressive as individuals, particularly some of Pathans who had gotten into the Army. They were big tall rangy people people who seemed to have unlimited endurance. From all the reports that I had from my friends who were in the MAAG group, the advisors, they felt the soldiers were a pretty tough outfit. I did see some of their tanks moving around a bit. They seemed to know what they were doing. Judging from the types of things that we ran into -- for example, the mechanics who worked for us, not the military mechanics -- the

capability was certainly there. The Pakistani Army was, of course, more British than the British Army, in its whole operation. I suppose it was pretty effective. (I must say I was surprised later when they got whipped so quickly by the Indians.)

Robinson: Did the 1958 military coup have much of an impact on the Corps' work and MAAG?

Clark: No, none at all, really. There were two revolutions that took place in 1958 within a matter of a couple of months. Ayub, who took over, had been the chief of staff of the Army. And so far as our work was concerned, it made absolutely no difference. And I think the same is true with respect to the MAAG dealings with the government. We had been dealing before that largely with the government where the support for it was primarily in the military. I think the revolution just merely made a fact out of what had been under the surface. We were dealing with the same people, essentially. I don't know of any particular changes in the program.

Robinson: Are there any other events in Pakistan that stand out in your mind that you would like to relate?

Clarke: Oh, I don't know. I mentioned that we were criticized for building to too high a standard. One thing we did do; I guess water was always on my mind --

providing water for those cantonments. We thought we had provided a pretty ample supply. We provided at least 150 gallons per person per day for this particular cantonment. Later I was chided, when I came back, by one of my Pakistani friends that I ran into. He said, "You didn't give us enough water." But apparently, what they were doing was using it for irrigation at the same time.

There were a lot of humorous incidents that came about. We built them some fairly modern mess halls with walk-in reefer boxes. I went up to visit one of the camps one day, after we had turned it over, and found that the cooks, in preparing the meal that day, had slaughtered the goats and all and were cooking outside. They weren't using the reefers as we intended; the cooks were sleeping in the reefer boxes.

We did provide, I think, some very fine facilities for them. I suppose many of them are still in use. Some modern sewage treatment facilities, a fine hospital, and some beautiful shops for repair of equipment. I think we set a standard that I hope they're following in what they do in their construction now. The airfields were very well constructed. Most of them were built to handle the F-86 jets at that time. (One of them was the one that

Gary Powers used to fly on his ill-fated flight over Russia.)

I was very impressed with the capabilities of the American contractor that we had. He seemed to get work done on time; we met all our schedules; we stayed within our budgets. I give him a lot of credit for it.

Robinson: What firm were you working with?

Clarke: This was a combine headed by the Oman Company -- Oman out of Nashville, Tennessee, and supported by Farnsworth out of New Orleans and Wright out of Columbus, Georgia. But Oman was 90 percent of the effort on that.

Robinson: From 1960 to 1963, you were engineer commissioner for the District of Columbia. What were some of the duties and responsiblities of the engineer commissioner?

Clarke: The engineer commissioner was one of three commissioners. They were essentially equal in their general authority over the city. We did elect one to be the president of the board. He became, I suppose, the "equal among equals." But we did divide the duties of the District government up among the commissioners. The engineer commissioner, as the name would imply, had responsibility for keeping an eye

on all the public works programs of the city and a few other items that were not directly related to public works. For example, I had the veterans because of the military association.

You asked what were the duties. The duties were to carry out the responsibilities of city government. It involved planning, programming, defending budgets before Congress, and then supervising the departments of the city that had to carry out the programs. Most of my concerns seemed to fall into the areas of sanitation, highways, and transportation. There were several additional jobs. The engineer commissioner was the president of the zoning commission. He was also a member of the public utility commission. Then while I was there we formed, under a compact agreement with the states, a metropolitan area transit commission. I became a member of that and became chairman of it. Also, automatically I was a member of the National Capital Planning Commission and the Regional Planning Council.

One time I added up all the extracurricular activities. There were eighteen official or quasi-official additional assignments for the engineer commissioner -- working on the regional sanitary committee, and the traffic safety committee, and this

sort of thing. I also found out from the commissioners that it fell on the engineer commissioner to be the participant in the negotiations for a compact that finally led to the transit authority -- the subway builders.

Robinson: In an earlier interview with Dr. Bert Cowdrey (Historian, Corps of Engineers), you mentioned that many of your problems came in dealing with outside agencies. For example, what was your relationship with the National Capital Planning Commission?

Clarke: Well, I was a member of it. All of the projects of the city with which I was concerned had to be approved by the National Capital Planning Commission.

Robinson: How were the members of the commission chosen?

Clarke: I'm not exactly sure of my numbers here. Several were ex-officio. Then there were five public members. By statute, two members of the House and two members of the Senate were members of the commission, but they never participated. Then the other ex-officio members came from the National Park Service, the Bureau of Public Roads, the General Services Administration, the engineer commissioner, the chief of engineers -- I'm missing one. And then, of course, the five public members. I went in there at the end of the Eisenhower Administration. The five

public members changed when the Kennedy Administration came in.

We had our problems. Particularly, I think, our main concerns were with transportation planning for the city. The never ending question of rapid transit versus highways was the big concern. The city had embarked on an extensive highway program, had much of it planned, quite a bit of it underway. But it was beginning to run into trouble in 1960 and 1961. I always said it was when we started putting the bulldozers in the bedroom. The previous highway planning and execution had been tied in with the urban renewal programs of the southwest. So the area had been decimated anyway, and it was easy to get the highways through there. Now the extensions of the highway beyond that began to involve relocation of people and businesses. That is when the real problems of building highways within the District began.

We were beginning to talk more positively about rapid transit. From then on, I don't think the problem was any different from any other city -- the arguments of rapid transit versus highways. But we had a great deal of trouble, I would say starting in 1961, in trying to advance the highway program further

through the city. There are several monuments still left to that argument that never were resolved.

Robinson: Was this argument principally confined to the planning commission itself, or were there often a lot of outside groups and interests creating much of the controversy?

Clarke: It was not confined to the planning commission, no. This was a total community concern. The neighborhood associations, save-our-neighborhood groups, were very concerned about it. Before I came aboard, one of the District highway plans had carried a highway through northwest Washington. The objection to that was so great that there was actually a restriction in the laws from Congress saying you will not spend a nickel on considering a highway through this particular corridor of Washington for I forget how many years -- five or six years, anyway -- which precluded any consideration of building that one.

Then, as we started looking at alternative routes, other neighborhoods that might have been affected became concerned. They said, "Why protect that particular corridor? Why pick on us?" And the result was that to serve the area to the north, the northwest, and the northeast, no superhighways have

been built through the District, and probably never will be.

Robinson: What position did you take at this time on highway construction?

Clarke: I was pushing for additional highway construction. I was not trying to stop the transit, but I felt we needed both. I was very impressed with some of the predictions that were made by the transportation planners. If I recall correctly, we had laid out five highway systems for the District -- concepts of them -- and five transit systems, from fairly meager to fairly elaborate in each case. We ran each of those systems against each other according to the best prediction techniques we had. And the variations in ridership on the transit system as compared to the highways, in all of these permutations -- twenty five of them, five against five -- were only 3 percent. You still had a transportation problem when you got both of them in. I felt it was our responsibility to ease the transportation problem, and that we should go for a fairly elaborate system of transit. But we also needed a fairly elaborate system of highways, just to ease the lot of the person who had to move by highway.

Robinson: What were some of the problems you had with the National Park Service?

Clarke: Well, the park service, I suppose very properly, jealously guarded every bit of green space that it had. And I can understand that, because if you gave it up, there was no place to get more. So every highway project that went through the area was looked at very closely. I guess my first problem with the park service was to work out a solution for the Virginia end of the Roosevelt Bridge. General (A. C.) Welling told me as he left, "I've got the bridge designed and under construction halfway across the river." The Virginia half had not been designed, so we had to work out a solution to it. That took a matter of quite a few months.

'Robinson: Was there much opposition on the Virginia side to having the bridge completed?

Clarke: No. It was more the park service in this case. In Virginia itself, we were dealing with people within Arlington County. I don't recall any particular opposition there. This was almost entirely park service. We had long discussions, and I thought we had agreement on the Three Sisters Bridge with the park service. I recall working as closely as I could with Connie Worth, who was head of the National Park

Service, in laying out the bridge approaches through park land. We had an agreement which we all faithfully initialed -- Connie and myself for the District, the Virginia people, the state highway department of Virginia -- but that agreement lasted about a week, then it blew up. Well, as you know, they finally started the Three Sisters Bridge, but then all work on it stopped in the flood of 1972 or earlier than that.

One of my main concerns was the water supply of the District of Columbia. Still, of course, there is no satisfactory solution to that problem.

Robinson: It's been in the news recently.

Clarke: It's been in the news recently, but nothing has been done since the beginning of time to really solve the water problems of the District and the growing metropolitan area. It's a little ironic to me. Because later, as chief of engineers, I saw the same problem between northern Virginia, Maryland, and the District. Every solution that you could conceive of has been batted down. Northern Virginia at one time was going to use the Rappahannock as a source of water, and that project has been stopped. Essentially, all the projects in the Potomac area have been stopped. This is what Maryland and the District were

counting on. And now Virginia, having'stopped the project on the Rappahannock, is looking to the Potomac. Nothing has been done to increase the quantity of stored water.

Robinson: Would most of the solutions have involved creating large storage reservoirs?

Clarke: Well, I don't know whether you'd call them large or not. Certainly storage is the answer. The size of it, I think, depends on how much of a drought period you want to figure on. The Corps at one time had come up with a pretty thorough plan for the total development of the Potomac Basin -- sixteen large dams and a series of small, soil conservation type dams. Out of all that, only one dam has been built or is being built at Bloomington (Md.). The problem with it is that it's twenty-two days up the river from the District of Columbia, and water releases up there will hit here three weeks later.

The only real solution to the metropolitan problem, the one that makes the most sense, is the one that runs into the greatest objection. That's the construction of a dam on the main stream of the Potomac fairly close to Washington. But that runs into the parks, and there are objections from the wealthy landowners. I think one of the primary

objections to it is the fact that it would provide a public recreation area, still water, right in the middle of some beautiful hunt country. And people don't like that. If there had been a change in the ownership policies along the banks of federal reservoirs, I think there might have been more acceptance of it. Under what we called the Kennedy policy, if you buy a strip of land along the side for public use and public recreation, that just doesn't sit. I think this was the same problem on the Rappahannock, to some extent.

Robinson: Speaking Corps-wide, do you feel this is often a reason for the opposition storage reservoirs almost universally encounter now?

Clarke: It's one of the reasons. Obviously, in many areas of the country, if you build a reservoir, there would be substantial enhancement of the value of the lands around it, if the lands have access to the water. When you preclude that access, you cut out that enhancement. And the landowners, who then are deprived of their land and access to the water -- they had had access to whatever stream that was there -- are resentful; and it becomes pretty powerful at times. I think it would ease the problem if the shores were owned by the landowners whose land you

were taking for the reservoir. But I must say, deep in my heart, I agree with the policy that the lands around the reservoir should be open to the public. But it does create problems in trying to get one authorized.

Robinson: If, in fact, dams were built up the Potomac or on some other stream for water storage, could these structures be used for other multi-purpose benefits such as hydroelectric power generation?

Clarke: Well, in the past there had been consideration of hydropower. Obviously, you could get some hydropower out of them. During most of the year, you could get a fairly reasonable amount of it. The private power companies -- and I'm talking about long before I was commissioner -- objected very strenuously to that. So that got withdrawn from all considerations. Now, with oil at $13-$14 a barrel, the economics of hydropower I'm sure would justify some installations. You can't look to the Potomac to be a major power producer, but you could use the Potomac for pumped storage, for example, during a good part of the year, and shave the peaks on the use of other power plants.

Robinson: What were some of your responsiblities as chairman of the Washington Metropolitan Area Transit Commission?

Clarke: Basically, we had two groups that we were regulating: the bus system that we had in the area at that time and the taxicabs. These were the only two groups. I think we had more success in getting uniform rates for taxicabs in the area than we did in trying to regulate the bus rates. Of course, we're talking now of back at the time when the bus companies were privately owned. Roy Chalk owning the D.C. Transit, and AB&W -- Chalk was negotiating for it; I guess he bought it after we were there. We were trying to work out transfer rates, and trying to keep the bus companies operating at the lowest rates possible and still making a profit. To a degree we were successful in that, although every bus increase that we authorized was challenged in court. At least one of them was reversed. There were some rather difficult points that were involved in those.

The charter of the bus company -- and I'm talking particularly about D.C. Transit -- had some unusual wording in it. I can't recall it precisely, but something to the effect that D.C. Transit should be allowed to make a profit not in excess of 6 1/2

percent of its annual revenues. We never authorized a profit that would have run quite that high. But if you took 6 1/2 percent of its annual revenues (I'm not sure of the figure 6 1/2; it may have been 8), then the return on equity in the company could be substantially larger. The philosophy of the people in Virginia with respect to their routes was to allow up to 8 percent on annual revenues. We tried to keep it down in the District, because traditionally we had kept it at a lower figure. We ran somewhere around 4 1/2 or so. But it still allowed a substantial return on equity. And because of the rather unusual acquisition procedures that Chalk had when he bought the company from Wolfson, his equity in the whole system was not too great, and the return on that equity was pretty substantial. This is what was challenged in the court. The court, in essence, changed the ground rules when they reversed the decision -- from this return on revenues to a return on equity -- and opened up a whole new ballgame. I don't think that ever was finally resolved up until the day when the systems were bought out by WMATA (Washington Metropolitan Area Transit Authority).

Robinson: You were accused during this period of being anti-subway. What was the cause of this accusation, and do you feel it was justified?

Clarke: I made two statements. I was not anti-subway, I was pro-subway. I had two questions on the subway. One, I questioned the estimate of the capital costs. I thought it was low. What I really was questioning was: were we being honest in saying to the public and to Congress that a system could be built for, at that time, $793 million for a 100-mile system. I thought it was a low estimate and would be proven wrong. The second thing that I questioned was whether we were being completely honest in our presentations (I say "ours" -- the whole system's) to Congress, when we said that the bonds and the debts would be paid for out of the fare box. The predictions in the early reports were that not only would all the money that was borrowed be paid for out of the fare box but that all the other grants and capital costs would be paid for in the same way. I though this was an awfully rosy prediction. Because you could look around the country, and there wasn't a single transit system. that was repaying capital costs, and most of them were not making operating costs. So when I said this, I think I got tagged with being anti-subway. Actually, my

philosophy was that we couldn't get all the subway that we needed or all the highways that we needed. And I had a third part: we couldn't possible get all the parking that we needed, because of the many concerns involved. Anyway, I got pegged as anti-subway.

I must admit I was very shaken and concerned when the group that was formed to do the original subway planning, before WMATA, came out and not only advocated a subway system but -- I felt outside their charter -- went out and attacked the highway system. I thought this was unwarranted. So in my defense of the highway system and with my two concerns about the subway, I think I got pegged as anti-subway.

Ironically, all the time that I was being pegged as anti-subway, I was holding meetings in my office for one or two nights a week, going from 7:00 till midnight, trying to negotiate and work out the compact arrangements with Maryland and Virginia so that the subway program could go ahead. So I don't think I was anti-subway.

Robinson: On your conclusions that the subway would actually cost more than projected, do you feel you were able to convince many people that this would be the case or did your feelings at that time tend to fall on deaf ears?

Clarke: I honestly think that there were a good many people who thought my conclusion that the subway was going to cost more and my concerns about paying back out of the fare box were correct, but they weren't about to speak it politically. There was a whole campaign to "let's get the subway started," and in retrospect it was the camel's nose under the tent technique. Everybody had already spoken in favor of it. Congress -- in committee reports, establishing groups and all -- was definitely committed toward having a subway. So there wasn't any question as to whether something was going to get started. I just felt they ought to have been more open and more honest with the factors on it.

Now, I can't say that everyone was trying to conceal something. I know there were a lot of people who felt yes, the subway would be built for $793 million. In fact, I had some of those come and argue with me on it. I don't know. I'm not sure if inflation has taken care of all the factors that have led from $800 million to -- I don't know what the figure is now -- $6 billion or something. The system that they now have designed is a little bit longer than the one they were talking about earlier. But it isn't that much longer; and the extensions are the

least costly aspects of it, out in the suburbs in open land -- the above surface lines.

Robinson: What do you think of the system that is open at present? Have you ridden on it?

Clarke: I've ridden on it. I think it's a very fine system. My rides have been rather limited -- from Farragut Square down to the city hall -- but it certainly is clean, operates quietly and smoothly. A little brake noise, but that's a minor problem as I see it. And I think the subway will contribute much to the city. The real problem now with the subway is who is going to pay for it. That hasn't been faced up to yet.

Robinson: As engineer commissioner, you served on a number of commissions, as you've stated. Could you briefly discuss your work on several? For example, what were your principal responsibilities as a member of the zoning commission?

Clarke: Well, I was chairman of the zoning commission. I don't know whether this was written in the law or was tradition. The engineer commissioner had always been chairman. The zoning commission consisted of the other two commissioners, the architect of the Capitol, and the director of the National Park Service -- a five-member commission. Our job was to

hear all the zoning cases that came up in the city. Actually, Washington was the first city to have zoning. That had started under an engineer commissioner named Kutz back in World War I, or at about that time.[13] He was a little unusual. He was commissioner three times, and he was called back in World War II.

Perhaps eight or ten years before I came, the city had gone through an extensive revision of its zoning maps.. Under the law, the changes that we could make were not too great. We could make corrections in the zoning map where obviously errors had been made. But then we had a broader charter in that we could make judgments as to whether changes in zoning would be in the overall public interest -- for the economy of the

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13 Colonel Charles W. Kutz (1870 - 1951). U.S. Military Academy, 1893. Corps of Engineers. Assistant to the Chief of Engineers, 1903 - 06. Instructor, U.S. Military Academy, 1906 - 08. District Engineer, Seattle, 1908 - 11. Philippines Department Chief Engineer, 1911 - 14. District Engineer Commissioner, District of Columbia, 1914 - 17 American Expeditionary Force, Europe, 1917 - 18. Engineer Commissioner, District of Columbia, 1918 - 21 Division Engineer, Central Division, 1921 - 28. Mississippi River Commission 1925 - 28. Commanding Officer, 3d Engineer Regiment and Engineer Department Hawaii, 1928 - 29. Retired, 1929. Recalled to duty, 1941. Engineer Commissioner, District of Columbia, 1941 - 45. Retired, 1945.

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city or according to the way the city's development was going. Most of the changes fell in that category. While I was there -- it had started a little bit before, but it started building up at a more rapid rate when I was there -- we saw the development of the commercial area along K Street and Connecticut Avenue. There was a considerable amount of rezoning activity in that area. We kept trying to figure out ways to get more substantial rebuilding in the downtown area -- the F Street, G Street, 14th Street area. In retrospect, I wish we had worked harder on trying to encourage new buildings to go into that area, which was the traditional business heart of the city. We also were concerned, of course, with the Redevelopment Land Agency (RLA) and its work in redevelopment. That hit both the zoning commission and the National Capital Planning Commission.

The southwest redevelopment was pretty well ordained by the time I came aboard. But we were working on other areas of the near northwest, trying to work out the planning for those. Watergate came up during my term and was a matter for the zoning commission -- the handling of the zoning there for multiple uses on a fairly large piece of ground. We also had some multiple-use zoning for places like

Columbia Plaza, across from the State Department and across from the Watergate. This was an experiment in trying to mix residential, hotel, and commercial uses in the same area. Again in retrospect, it's very difficult for a public body or a planning group to figure out how people are going to ultimately live. Because I'm not sure that all these mixtures worked out as beautifully as they were proposed by the builders and accepted by the commissions. I think the southwest is one example. It still hasn't settled down to a stable neighborhood. I noticed in the newspaper that people are protesting that they're carrying out the original RLA plan. And I don't think the combination of shops and all in Watergate or Columbia Plaza has quite worked out to be the financial success that people had anticipated.

We got mixed up in a very difficult zoning situations with the foreign embassies. We had the celebrated case of the Russian Embassy wanting to move out on Oregon Avenue. I guess I'm responsible for that commission decision being reversed. I didn't open up to public inspection one document that I had, which was a note from Secretary of State Dean Rusk to me, saying, "I've talked to President Kennedy, and he wants the Russians to move into this

particular area," and that this was a quid pro quo for our getting a rezoning or a relocation of our embassy in Moscow. Well, we made the decision to approve it. Someone found out about this particular note and opened the case up in court, and the decision was reversed. These are the types of things that the zoning commission was concerned with.

We had a lot of minor corrections to zoning maps. People would come in and say they obviously made a mistake when they drew the boundary here; it should be moved over. The Georgetown waterfront rezoning was a perennial question. We neverwere able to deal with it because the desires of the local Georgetown groups in essence wanted a downgrading of the zoning to lower use, and the corporation counsel kept telling us, "You can't do that. That's taking without compensation.*' I think that question is still up in the air.

Robinson: What about your work with the public utility commission?

Clarke: Originally; until we took out the bus and the taxi operations and put them in the metropolitan area transit commission, most of our work was concerned with regulations of buses -- bus fares, bus routings, this sort of thing. We had a very limited number of cases with the other utilities -- the rate changes.

Compared to the activity in the transportation area, I'd say a minor amount of business with the gas company and the telephone and electric companies. But it was the regular work of a public utility commission in setting rates, establishing standards, auditing books, being sure we were getting a true picture of earnings and the amount of service. There were not too many complaints coming in, other than the taxis and the buses.

Robinson: Were there any complaints on electrical utilities?

Clarke: Not particularly. At least I don't remember that we had a great deal of activity there. There were a few matters that were a little unusual. There were some old systems in downtown that were still on direct current, and we were trying to get those modified to alternating.

Robinson: What were these direct current systems used for? Elevators?

Clarke: Well, I think it was a take off of power from the old electric trolley system. And, of course, the trolleys went out of existence during my time. The trolleys went out of existence in February 1961. Actually, they stopped running on Pennsylvania Avenue after that heavy snowstorm on the day of the Inaugural,

because we had put so much salt on Pennsylvania Avenue. That one trolley went out of service about a month earlier than had been planned. There were a few elevators downtown that were still running DC. They were take offs, I'm sure, from the electric supply for the transit system.

Robinson: At the time the trolleys went out of service, was there much public opposition, or were they glad to get them off the streets?

Clarke: I wouldn't say there was much. There was a group, the save-our-trolleys group, which felt they should be preserved. But the costs on them and the lack of flexibility in operations -- it was just ordained that they were going out of service. I can't say that we really increased the speed of transit very much. I think we went from something like an average speed of nine miles an hour to an average speed of ten miles an hour on public transportation in the city. But there was objection, nostalgia for the trolley system. I even went out on the last day and took my children to ride the streetcars because, I said, "You may never get another opportunity." Surprisingly, later I was in Yugoslavia and I saw those same streetcars.

Robinson: That's true, I guess they did sell the cars to a town in Yugoslavia, didn't they?

Clarke: I guess they went to Yugoslavia and maybe to Madrid.

Robinson: What about your work on the Regional Planning Council?

Clarke: The Regional Planning Council was not a very effective group. I served on it for three years; I guess I was chairman of it for one or two years. Part of our problem was that the Regional Planning Council had no political ties. It was sort of set up as a separate body. And over here we had this embryonic council of governments. Then we had a very strong National Capital Planning Commission, and many of the members of it were also members of the Regional Planning Council. So it was lost in the shade of these other two outfits. It did not have a staff that compared in size to the planning commission, which was quite active. Really, the planning commission was the outfit doing regional planning. So, the Regional Planning Council -- without any support from the council of governments and in the shadow of the planning commission -- was not a very effective operation. I don't recall that we did anything that I felt was awfully constructive. We endorsed the plan

came out of the planning commission. As a matter of fact, the council of governments nodded its head and endorsed it, and it went on the shelf. I don't think anybody ever followed it. This was the wedge concept of open spaces and corridor development, which was a noble idea. Without the constituents of the council of governments taking action to follow it, nothing really developed. I guess the land values just dictated that the planning continue, as far as I'm concerned, on a sprawl pattern.

I guess another thing happened too. The wedge pattern had a concept of yes, the rapid transit corridors would be built quickly; and yes, the highway corridors would be built quickly. And, of course, this didn't come about. So the key elements of the system just weren't there. I think it would be interesting for someone, fifty years from now when the transit system is completed, to look back and say what was the effect of the transit system on the type of development in the area.

Robinson; You mentioned the council of governments. Did it really have much clout at this time?

Clarke: No, it was embryonic, as I said. There was agreement that there were a lot of problems that were common to the area. And the council of governments

did make a start on some of them -- the easy ones. I think this is true of all councils of governments. Traffic was a common concern. We tried to tie together the traffic flow system throughout the area. We did not achieve full success even on that. We worked on bottlenecks that were holding up traffic around the area, and we had a lot of discussion on them and did something to clear that up. One thing we wanted to do and Alexandria, in particular, would not agree with us. We wanted to put all the traffic lights in the whole system on a central control system so we could expedite flow into the area in the morning and flow out in the evening. We had success on this side of the river and not much on the other.

We began work on wastewater treatment. The big spur was the interceptor from Dulles down to Blue Plains. That gave us a lot of things to work on in that area. And I think the work that was done in getting people concerned about wastewater has paid off in later uniform, or to some degree uniform, action among all the members of the council of governments.

We worked on air pollution a little bit; we set up some monitoring stations; and we tried to talk about the water but got nowhere on that. We didn't dare mention the social problems, because of the

black-white business. It would have fallen apart if we'd ever tried to tackle an issue like that. So on the easy problems, I think the council of governments began to make progress. The difficult problems, it avoided. I think this is a common factor for most councils of governments.

We began to talk about the rapid transit. Everybody was nodding their heads for it. But the real work on the rapid transit was done by a quiet little negotiating group trying to set up the compact. Then when the compact arrangements were made, the elected representatives from all the areas participated in that. Of course, that's been a very substantial contribution. Maybe the council of governments helped to ease the way into that type of an organization.

Robinson: After your term as engineer commissioner, you moved on to become director of military construction from 1963 to 1965. Could you outline your major responsibilities as director of military construction?

Clarke: I'll have to go into a little bit of the organization of the chief of engineers' office. Very briefly, he divided his construction effort between the civil works program -- rivers, harbors, navigation and all. The director of military construction had

all the other construction and maintenance responsibilities, primarily for the Army. In addition, the chief had a real estate director who served both military and civil in acquiring and disposing of real estate. Surprisingly, the chief of engineers has the real estate operation in the government, in terms of action that he has to take.

Robinson: Even more than GSA?

Clarke: Oh, yes. The budget of the chief of engineers for real estate, most heavily in the civil works program -- acquisition of land for reservoirs, flow easements for rivers, and this sort of thing -- is a pretty substantial program. On the military side, the real estate operation is not that great. There area matters of out-leasing lands that area not being used for agricultural and cattle grazing purposes and out-leasing industrial plants that the Army owns to people for other uses.

On the construction side, the chief of engineers has responsibility for all construction for the Army and the majority of construction for the Air Force. At that time, we were the construction agent for NASA (National Aeronautics and 'Space Administration). We had a little bit of work that we were doing in Saudi Arabia as a construction agent there; and in several

other parts of the world, we were doing some work for AID (Agency for International Development). Our total responsibilities were worldwide. They went from Korea, Japan, and Okinawa on the Pacific side over to Iran, Pakistan, Saudi Arabia, and Turkey going eastward. There were a few other odd jobs that we did occasionally -- occasionally the park service would ask us to do a job. But our big programs were the Army program, the Air Force program, and the NASA program. It was at this time that NASA was building its mainfacilities.

Robinson: Some of these structures for NASA,,of course, were engineering monuments. What were some of the structures?

Clarke: Well, of course, we always think of the vertical assembly building at the Kennedy Space Center as the big one. It is 500 and some odd feet tall, something like 480 feet clear height inside, and has a tremendous volume. Essentially, we built all the launching platforms at Cape Kennedy, the assembly buildings, and all the support facilities. We built the test facilities at Huntsville, the Mississippi test facilities, some out at Edwards Air Force Base. We built the complex at Houston; then there was the work at Port Michoud outside New Orleans. It was a pretty

hefty part of our program, running several hundred million dollars a year; I guess we were doing $300-$400 million worth of work a year for the Air Force.

Robinson: Was the Air Force work principally the construction of missile bases?

Clarke: That was the biggest item. The Air Force had done their own design on those, and we were the construction agents for the ICBMs. Of course, when I came aboard, we were just finishing up the old Atlas facilities. But the biggest job that we had was putting the ICBMs across the northern part of the United States. We were winding up some of the airfields that had been started in the 1950s.

But when I look at our big projects... for the Army, our facilities were largely new barracks, family housing, and this type of thing. For the Air Force, it was the ICBM; then the NASA program. Our work in Saudi Arabia, at that time, we thought was mammoth. I guess we were doing $75 million a year for Saudi Arabia.. Compared to today, you sort of do that off the back of your hand.

Robinson: What were the facilities in Saudi Arabia?

Clarke: We started the cantonment at Khamis Mushayt which was a $75 million project. We were doing work at Taif, a little bit of work at Jidda, and some at

Riyadh -- we started building some headquarters buildings there. I think we had some work at Dhahran at the time.

Robinson: Just briefly, could you tell me how you would organize such a massive construction program yourself, in terms of maintaining the lines of communication and oversight that you needed to?

Clarke: I guess the one thing that we tried to do -- and I think the Corps (boasting a little bit) does it better than any other federal agency -- was to decentralize as much as we could. Then we organized to provide supervisory headquarters generally on a regional basis but gave them a review function. All that Washington really did was the policy, the general programming, and the general criteria. It depended almost entirely on the actions in the field to carry the program.

Now, you say how would you organize to do this if you had another program? It would be difficult because the Corps organization has been in effect for a long time. Everyone pretty clearly understood his part in carrying out the program. We had developed some very fine people, who were fine professionals and who understood their parts and were willing to take responsibility. I think, when you have a program

that massive, you can only do it if you decentralize. You have to have faith in your people to execute it properly; and if you train them right, it comes out all right. Now if you start a new organization, it's a little more difficult until you get your people shaken down. But for whatever success the Corps has had, I think it comes from building over the years an esprit and an organization that understands how the system works. Then in essence you turn those people loose to get the job done.

Robinson: One of the special programs you may have had was responding to the Alaska earthquake in 1964. What sort of construction was involved in response to the damage done?

Clarke: The main thing we got involved in was the relocation of some cities that had been wiped out -- Seward and others down in that area -- and letting contracts for rebuilding roads and bridges. And in Anchorage itself, putting in an earth dam to stop further mud slides in the downtown area, clearing the area, and assisting the city in zoning to keep the residents out of the most susceptible areas. Then, of course, there was a lot of repair and rehabilitation on the military facilities in the area.

I don't think we had to take down any of the military buildings. I think it was mainly a matter of repair. Here again is an example of the decentralized nature. General (Kenneth T.) Sawyer, who is-now working for the Federal Railway Organization, was the district engineer up there, and our main guidance to him was: you do what's necessary; tell us how much help you need; and we'll send the help from the States. But basically, you have to give the credit for the work of the Corps to the people who were in Alaska carrying out the program. About all you can do from a central headquarters is give moral support, or send money, or ship things that they need. We did buttress Sawyer with additional people to help him carry out his responsibilities. This is another strength of an organization as large as the Corps, where everybody sort of understands how they fit into it. If you have a crisis -- and there have been many many cases of this -- you can mobilize people from all over the country and put them into an area to take care of the crisis. And they fit into an organization because they know how it works. They just can get in and take hold.

Robinson: Was the Corps involved in many AID projects for foreign governments?

Clarke: Let's see if I can tick them off. I'm not sure I can name all of them. In Iran, we had a combination of working for AID and the Iranian government on building some schools and facilities. I'm not sure of the exact mixture on those. We were in Somali building a harbor with a breakwater, dredging it, and building the wharf facilities. Actually, that was sort of a multi-national project. It always amazed me. The Italians were in there with a banana subsidy; the West Germans were in on a road building program; the Red Chinese were in on agricultural assistance; and the Russians were in there building a cannery. The Americans were putting in a water system and the wharf facilities.

Robinson: Did you ever find yourself coordinating these various interests, like providing water to the cannery?

Clarke: Well, I'm sure that we did. But if it was done, it was done by the local man out there and the contractor that we had working out arrangements locally. Certainly he would have had the flexibility to do it.

Robinson: In 1965 you were assigned to Fort Belvoir as Commandant of the Engineer School and Commanding General of the U.S. Army Engineer Center. Are these generally concurrent assignments?

Clarke: The commandant of the school has always been the commanding general of the center. He is assisted by an assistant commandant who generally does most of the day-to-day running of the Engineer School. There are other activities at Belvoir besides the Engineer School. There are certain troop units there that are being trained, and there are a multiplicity of agencies that occupy space on the post. So I was sort of a mayor of the post -- responsible for training the units that were there and responsible for running the school, helped largely on the school operation by the deputy commandant. Belvoir is in a vulnerable location. It's close to Washington, and every time a military installation is moved out of Washington, they move it to Belvoir. It's not too far out but what you can contact it. I think we had twenty-one different military agencies occupying space at Belvoir, so it was a matter of coordinating them. You've got all the problems of a normal post commander -- the housing, the allocation of space throughout the post, the relationships with the surrounding community. But when I think of the job at Belvoir, I really think that the two main activities are the handling of the troop units that are there

and the running of the Engineer School, which is a pretty good sized operation.

Robinson: What type of schooling does the Engineer School provide?

Clarke: It provides schooling at several levels. Starting at the top level, it takes engineer officers who have been in the service for three to six years and runs them through a ten-month course, preparing them to become batallion commanders or to work with the staffs of divisions on military problems. That's their most advanced course. They also, in the officer field, have a basic course where they take the ROTC graduate who is coming on active duty - or in some cases who will just be coming on for schooling purposes -- and run him through a ten-week course. It's basic officer training with an engineer emphasis on simple military engineering. That is to prepare him to be a platoon leader, to go out and join a unit, and to take over.

While I was at Belvoir, we reactivated the officer candidate school. This was to take promising people from the enlisted ranks and prepare them to be platoon leaders. Largely for Vietnam. It was one of our major activities at the time. There had been an officer candidate school at Belvoir during World

War II and during Korea; and as the military cut back, the school had stopped. We started that in 1965 while I was there.

For the enlisted side, where the largest number of students are, there are courses in topography (it's the main school for topography and mapping for the military, and it trains not only Army but Air Force and a few Navy people). The school trains equipment supervisors, mechanic supervisors, and repair supervisors. We had special training for high speed, 400 cycle electrical equipment -- training mechanics for it. We had the operators' training course for the nuclear plants. And we actually had one reactor at Belvoir, a very small reactor (about ten megawatts) producing power; we were using it as a training vehicle. And Belvoir was the support base for the very limited number of nuclear reactors that the military had around the world -- one at McMurdo Sound, and we had had one up in Greenland, and one that the Air Force had out west. So we took care of that operation.

Of course, I was there when Vietnam started. I had just arrived there in June; and in August of 1965, we had thought the President was going to call up the reserves, and he made the decision not to call up

the reserves. So the expansion of the military to support Vietnam came through the training system and the school system. And this hit heavily at Belvoir during the time I was there. We started instruction twenty-four hours a day. We had limited facilities, and it was easier to get the people in than it was to expand the facilities. We had problems of bedding people down, finding enough space for them. The combination of opening the officer candidate school and increasing the capacity of all the courses was probably the major problem there at that time.

Robinson: Were these all military personnel that you were training, or did you also train some civilians there -- civilian employees of the Corps?

Clarke: We may have had a very limited number of civilians, but you could have counted them on one or two hands, if we had that many. I don't recall a civilian aspect. There may have been a few swept in because they had been sent by a station to take a particular course. But the accent was military all the way through.

Robinson: Were there any foreign nationals trained there?

Clarke: Oh, yes. We had quite a few in our officers' courses, particularly the advanced course, the highest course. We probably ran ten or twelve, or up to

twenty at times, officers from allied nations. The same way in the basic training; people were coming to go through it. We were also training mechanics for the Hawk system.

Robinson: What was the Hawk system?

Clarke: The Hawk is an anti-aircraft system. We were doing the training for the engineer support of it. This was primarily on generators to support the missile system. We had one Japanese group sent to train on it. We had one Spanish group, I recall in particular. Each came with their own interpreters to take their -instruction at Belvoir. And in the normal enlisted courses, there were some foreign nationals. But by and large, most of the courses were 100 percent American: The emphasis was on getting people out and trained for Vietnam. There were also quite a few Vietnamese officers in training during this particular time.

Robinson: Is there anything else particularly significant about the Engineer School that you would like to comment on?

Clarke: No. I think so much of our emphasis then was in support of the Vietnam effort. We were turning out troop units too, training troop units and sending those off to Vietnam. We sent several batallions and

port repair outfits out of our training program. The main emphasis was to try to put out a quality product in a substantial quantity -- to send them to Vietnam.

Robinson: Were members of any construction forms or any contractors ever brought in to acquaint them with new information or construction techniques?

Clarke: Not particularly, no. I think our concern would have been more the other way -- to be sure that we were keeping up with the construction techniques that were prevalent in commercial industry. Now there were at Belvoir, not under my command, laboratories doing a great deal of work. And, of course, the whole engineer laboratory system was working on problems of Vietnam and trying to develop new items of equipment for military use. Now these people were in close contact with the equipment developers -- Caterpillar, International Harvester, Clark, and all the others. I mentioned the tenants we had on the posts; they were one of the tenants in the laboratory. I wasn't watching their day-to-day work. I was generally aware of what they were doing, but it was outside my particular responsibilities.

Robinson: General Clarke, you served as deputy chief of engineers from 1966 to 1969, and then in 1969 you were made chief of engineers. Is this the usual

progression, to serve first as deputy chief and then as chief?

Clarke: No, I wouldn't say it's usual, nor is it unusual. Going back to those who preceded me, I don't remember any of them who served as deputy chief, who later served as chief of engineers. Since I've retired, General Morris, who is the current chief, was deputy chief under General (William C.) Gribble.[14] I don't

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14. LTG William C. Gribble, Jr. (1917 - 1979). U.S. Military Academy, 1941. Corps of Engineers. Service with 340th Engineer Regiment, Alaska, United States, and Southwest Pacific Theater of Operations, 1942 - 45. Commanding Officer, 118th Engineer Combat Battalion, Southwest Pacific Theater and Japan, 1945. Service with 38th Engineer Battalion, Armed Forces Special Weapons Project, 1948. Los Alamos Scientific Laboratory, Armed Forces Special Weapons Project, 1948 - 52. Oak Ridge School of Reactor Technology, 1952 - 53. Reactor Development Division, Atomic Energy Commission, 1954 - 56. District Engineer, Alaska Engineer District, 1958 - 60. National War College, 1960 - 61. Director, Army Nuclear Power Program and Commanding Officer, U.S. Army Engineer Reactor Group, 1961 - 62. Deputy Director, Military Construction, OCE, 1962 - 64. Director of Research and Development, HQ, Department of the Army 1966 - 67 Deputy Assistant Chief of Staff for Force Development, HQ, Department of the Army, 1967 - 69. Commanding General U.S. Army Engineer Center and Ft. Belvoir and Commandant, U.S. Army Engineer School, Ft. Belvoir, 1969 - 70. 'Deputy Chief of Research and Development, HQ, Department of the Army, 1970. Chief of Research and Development, HQ, Department of the Army, 1971 - 73. Chief of Engineers, 1973 - 76.

know whether I started a precedent.. I haven't gone back that far in thinking about it; but at least going back to World War II, the various chiefs had been in different jobs other than deputy chief.

Robinson: Did your appointment as chief come as somewhat of a surprise, or did you know for some time that you were being considered?

Clarke: I guess it came as a surprise. I was really surprised. Now, I was notified six months in advance of actually taking over, but that was what the practice was and has been since, to name the chief in advance. But I must say it did come as a complete surprise. . Obviously, I knew I was in a zone with four or five others; but when I got called one day by Bill Cassidy who was my predecessor -- and I was about to leave on a trip for Panama the next day -- there was no question that I was surprised. I guess I hadn't really worried too much about it one way or the other. And the fact that it was six months before General Cassidy was retiring, I hadn't really expected that it would come quite that soon. In retrospect, for at least General Cassidy's nomination and perhaps General (Walter K.) Wilson's before him, they had made the

announcement substantially in advance.[15] I think one of the reasons for it was that in early days there had been great political interest in who would be the chief; and the early announcement sort of took all that out of the consideration.

The chief of engineers gets appointed as a result of a special board that is set up. It is required to submit three names to the President, and the board submits them in priority, but the President has the option under the law of picking any one of the three and submitting the name to the Senate.

Robinson: Did you have to appear before the Senate?

Clarke: I did. I went and appeared before the Senate Public Works Committee. Senator (John) Stennis was in the chair. I went through a very pleasant hearing with him. There were a few questions; I think there were more speeches than there were questions, though,

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15 LTG Walter K. Wilson, Jr. (1906 -). U.S. Miiitary Academy, 1929. Corps of Engineers. Engineer Amphibious Corps, Atlantic Fleet, 1942. Deputy Engineer, South East Asia Command, 1943 - 45. District Engineer, St. Paul, 1946 - 49. District Engineer, Mobile, 1949 - 52. Division Engineer, Southeastern Division, 1952 - 53. Division Engineer, Mediterranean Division, 1953 - 55. Commanding General, the Engineer Center and Ft. Belvoir, 1960 - 61. Chief of Engineers, 1961 - 65. Retired, 1965.

by the members of Congress. They said some very kind things about the Corps of Engineers. But, as I may have mentioned in the last interview, I was sort of unusual in that I had not had any civil works experience. I'm sorry -- I appeared before the Senate Armed Services Committee, it wasn't the Public Works Committee. But since Senator Stennis had such a strong interest in public works and civil works, it was really a composite hearing of the two committees. I enjoyed the appearance before them.

Robinson: Had you ever thought earlier in your career that you might become chief of engineers? Was it in some respects a goal that was perhaps in the forefront of your thinking as you progressed up through the ranks?

Clarke: In all honesty, I don't think I had really thought much about it until the time I was deputy chief of engineers. I always said I was very fortunate in my assignments. I always liked whatever job I was doing; and with possibly one exception, I enjoyed working for every boss that I had. It had been a very pleasant career, and they kept shifting me around to interesting jobs. I guess when you're a young officer, the chief of engineers sounds awfully remote. It's more an institution to you at that time than it is a matter of personal awareness

of the individual. So I guess, in all honesty, I can't say that this was a real career goal.

Robinson: Who was the chief of engineers when you were deputy?

Clarke: Cassidy. William F. Cassidy.

Robinson: What kind of man was he?

Clarke: He was an outstanding individual. He is one of, the people that I had always admired as I went through the service. I really became aware of him when I first joined the service, and I continued to admire him and the approach he took to things. I was exposed to him a little bit during World War II when he was in the planning office of the chief of engineers and I was working in General Somervell's planning office, and I got to know him a little better at that time. I guess in all the intervening years, up until I became commissioner, I had not run into him. I knew him better while I was commissioner. He was commanding Fort Belvoir at the time, so that threw us together a little bit. From then on, it became a very close personal relationship -- then successively a closer, and closer official relationship.

Robinson: What qualities tend to make for a good chief engineer? What kind of qualities does this type of individual exhibit?

Clarke: That's an interesting question. I don't know. Of course, my pride in the Corps shows through in almost everything I've ever said. The ones that I've known, and known closely, have had a very strong view of decentralizing their operations, choosing people that they trusted to carry out the various functions and field jobs, and trying to operate with a minimum of what I'd call interference or direct supervision. This was certainly true of General Wilson, who was the first chief that I knew well, and General Cassidy, and I think it followed through my time, and I believe my successors have.

Again, I go back to the Corps as an institution. It's been in existence for a long time. If you grow up in the system, you pretty well understand how it works; and you need a minimum of direction for the Corps to operate. I think the chiefs of engineers have generally followed that practice. So I think this is one of the traits, a willingness to decentralize and also a confidence that if you've got good people, they'll do what's right.

Robinson: Why do you think that decentralization is one of the principal strengths of the Corps? Why does it make its program more effective in implementing policy?

Clarke: I don't say that you don't need general guidance in the way you want the Corps to go. But the-problems that the Corps deals with, when you boil them down, are all local problems. You can talk about program goals and carrying out major programs for the country; but when you start trying to execute those programs, they're very localized problems, and they have to be solved locally. You solve them in accordance with the laws and the general guidelines that come down. The chief puts his stamp of the guidelines and orients them in a certain way; but if you tried to do it centrally, there are just too many projects to try to control in detail from any central location. There are a lot of other government programs which I see sort of floundering, because of an attempt to bring every decision back into Washington to be resolved. If the Corps has had any success, I think it's because we trusted'the people to do the right thing out in the field.

Robinson: We'll get into this more later, but do you feel by decentralizing the organization that the Corps is in a better position to understand the needs and attitudes of the people served-by their projects and therefore can better serve those needs?

Clarke: Obviously yes. There is no doubt in my mind. Everyone that I have known, starting with division engineers, say that the district engineer, who is on the spot, has got a sense of what's right and what's wrong and what the attitudes are; and we'd better accept his recommendation.

Robinson: Did you feel that the training and experience you received under General Cassidy helped to prepare you for your position as chief?

Clarke: Oh yes. I don't know whether the chief's office is like other federal offices, but when General Cassidy was chief, he spent a great deal of time on the road. And when I became chief I did too. So it was left to the deputy to be, in many cases, de facto the chief of engineers in Washington, dealing with the many types of problems that do come up. It's a wonderful experience. If you go through that apprenticeship as deputy chief, you've got a pretty good feel for all the problems you would face as the chief. So serving under him, in that respect, was certainly the best training one could get to take on the job. I recall when I first went into the chief's office as director of military construction, I went in to see General Wilson, who was then the chief. I said, "What do you want me to do in this job?" He said,

"You do whatever you think is right. If you get in trouble, come and tell me, and I'll meet with you and help you resolve it."

Robinson: What were some of the major problems or issues that the Corps was dealing with during the period that you were deputy chief? What were some of your major concerns when you were administrating your office?

Clarke: Obviously, the principal concern -- this was the period from 1966 to 1969 -- was Vietnam. Vietnam had to be our number one problem -- engineer support for Vietnam, working with the Army staff and the field commander in Vietnam. The chief of engineers, I think, enjoyed a fine relationship in advising them on what he thought were their engineer needs and assisting throughout the entire Army system in providing those needs. The heavy emphasis during those years was on lines of communication in Vietnam, which are engineer tasks: opening up highways and the cleared zones close to the highways to reduce the number of ambushes people were suffering; continuing development of ports and rapid airfields; making provisions for the use of helicopters; training in establishment of fire bases; and this sort of thing. This was obviously the heavy emphasis.

During that time, General Cassidy made several trips to the Pacific and Vietnam, and I guess I made one trip as deputy -- I may have made two. (I can't be certain. They sort of go together in my mind, the trips that I made out there.) He was very heavily occupied with that. At the same time, the environmental problems were becoming more serious. They didn't start with the NEPA (National Environmental Policy Act). In fact, they predated it, and I think we were ready for NEPA when it came along; you could see it coming. We were expanding our environmental considerations during the time of General Cassidy. We had the continuing problems of the civil works program.. It was growing. And actually, it was in the very last days of General Cassidy's time as chief when we embarked on the postal program. I got involved in that because this was in that six-month period when he knew he was leaving, and he asked me to set up the arrangements with them.

Robinson: Why did the Corps get involved in the postal program?

Clarke: There are a variety of circumstances. You may recall the postal service had been reorganized from the one set up to this corporate group under Red (Winton M.) Blount, who had been a very successful

construction contractor -- still is. He came aboard; and in the modernization of the postal system, they wanted to set up modern postal facilities, making use of computers and conveyors in distribution centers. And he established a program which approached $2 billion of major facilities to be built. There was a fixed period for it, and he felt that he didn't have the staff to do it. And since it was a one-shot affair (extending over several years), he was considering various ways. Now, apparently Blount was a very close friend of General Wilson%. I've learned this from General Wilson. He was in a meeting with Red Blount, and they were talking about his problems. I suppose General Wilson was the one who suggested, "Well, why don't you try to have the Corps do it; the Corps could do it with its organization." That was the genesis of it. Then it went on through a series of meetings that I had with Mr. Blount and his staff. I guess it was actually about the time I became chief that we signed the agreement to construct these major facilities.

Robinson: Was there any attempt by Public Buildings Service (GSA) to become involved in this effort?

Clarke: I can't measure exactly how much of an attempt it made. It obviously was concerned about the contract.

And I know in my conversations with Red Blount, I said, "I'm not going to get into a political fight over this. We're perfectly happy to do it, but you've got to carry whatever the political fight is." Because GSA was obviously one of the contenders, I said, "I'm not going to get in a fight with GSA as to whether we do it or they do it." I guess he had more confidence in the Corps' capability to do it. He carried the fight out.

Robinson: Did Congress endorse the Corps' involvement?

Clarke: Well, Congress, I guess, wasn't in a position to endorse or deny it. There were some hearings held in Congress at which Mr. Blount and his people appeared. There was considerable discussion of the Corps' role in doing this. The other options were to let the postal service expand its activities and do it itself, to have GSA do it (and GSA had been the traditional builder for the postal service), or to hire consultant management to come in and do it -- which is what they did after the Corps withdrew from the program. They brought aboard consultants to help them continue the program. There was also some concern in OMB (Office of Management and the Budget). It had not really been consulted by Mr. Blount when he brought the Corps aboard. It was concerned with shifting this

responsibility over to the Corps. But after a series of discussions -- and I participated in some of these -- OMB agreed to leave the major program to the Corps and not give the Corps some of what I call the minor programs of the Postal Service. The Postal Service then began to build up its own staff to handle some of that. But the majority of it was put, out on contract to private consultants.

Robinson: You mentioned, of course, the Corps' major involvement in the Vietnam effort. Could you just characterize the type of construction that was involved both in Vietnam and in the United States to help support our effort over there?

Clarke: Well, let's start in the United States. The various training centers -- not just engineers, the training centers in general -- embarked on a very substantial program: (I guess this really began in 1965) adding classrooms and barracks facilities at the various training centers; and expanding the field training facilities at the same time. That was sort of a crash program. Again, decentralized as far as the Corps was concerned. We turned our district engineers loose to work with the station commanders. The object of the exercise was to put things up quickly. We weren't trying to throw money away. Temporary type

buildings, pre-fab buildings, generally were constructed around the country to house troops and to provide them with the facilities that they needed.

The type of construction that we were putting up in Vietnam was what we characterized as theater-of-operations construction. That which was done by the troops was the simplest type of frame structures. There was, of course, the very substantial program which the Navy was administering in Vietnam; facilities of a more durable and perhaps more permanent type.

Robinson: Such as ports?

Clarke: The Navy was doing the overall basic infrastructure planning. Their designers and their constructors did as much as possible. If one were to look at the figures, one would say, "It's a very expensive thing to bring American labor and supervision in to build these things rather than using troops." But the fact of the matter is that an engineer-soldier or Seabee was a very expensive item by the time you trained him and sent him to Vietnam. So the general rule was that as much as possible of the really heavy construction, in the "safe" areas (and this was a rather vague determination), would have to be done by the Navy's construction force -- the contract

construction force. And the troops would do those things that were more directly in support of the combat operations.

Now these things got all intermixed, and there were many areas where troops were working side by side with civilian construction contractors. The combat zone wasn't that clearly defined. There was no place in Vietnam where you were completely protected. But I guess if one could characterize it, most of the work in the more hazardous areas was done by troops, and most of the work in the more peaceful areas was done by the civilian contractors. Yet, as I said, this got all intermixed, and they were being shot at times. And occasionally you'd find a troop unit in an area that looked relatively safe. I was going to say that generally the inland work was done by troops, but that wasn't always true either. You found a great number of contractors working in these areas. Then to complicate it further, they had a civilian contractor bringing in supervision and working with the Vietnamese and doing all the post engineer type work, the facilities maintenance work.

Robinson: Were Vietnamese ever involved in the actual construction?

Clarke: Oh yes. I think the general rule was, to the extent possible, to try to use Vietnamese labor rather than bringing in American laborers -- not necessarily American; there were a lot of Koreans and other nationalities. But the rule was to try to use the Vietnamese rather than importing labor. While I was chief, we embarked on a pretty substantial program -- this was not too long before we withdrew our forces -- of trying to withdraw more and more of our troop effort and substituting the local Vietnamese effort, recognizing that there would be certain inefficiencies. But we felt, particularly on some of the road programs, that it would be in our best interest and theirs to have them take over and carry on the construction and some of the maintenance activities that American troops had been providing.

There were other complications. The various budget pictures -- the piaster budget, and the dollar budget, and the way in which money was made available had some influence on how jobs were done. The personnel ceilings that were imposed on the commander in Vietnam -- he was always faced with the problem of which troops does he need to carry out his mission and which ones can he get along without. I recall one conference with General (Creighton) Abrams when we

were proposing to him that we cut back on the American engineer-troop effort and substitute Vietnamese effort. I think one of the sales points as far as he was concerned was that this afforded him an opportunity to come within a reduced troop ceiling. He bought it on the general merits of the case, but it was an opportunity for him to come within certain ceilings that he had to reach. It allowed us to pull out perhaps 5,000 or 10,000 troops. The program was moving along pretty well in the early 1970s, but we finally reached the point where we withdrew all our forces. I hope we left them a legacy of some capability to build their own roads to good standards.

Robinson: How would you characterize the civil works programs in the late 1960s? What kind of activities was the Corps principally involved in then?

Clarke: We had some very substantial programs underway. Actually, during Vietnam, even with the guns or butter approach, the civil works program kept growing all the time. It was growing at least in dollar value. And if you discounted inflation, it was probably holding its own. There were major projects all over the country still being carried out. I don't know of any cutbacks that you could say were directly traceable to Vietnam. There are several major programs that

stand out in my mind: the completion of Dworshak and Libby Dams; the Snettisham project up in Alaska -- a power project up there; continued work on the Ohio; the windup of the Arkansas River Navigation project.

Robinson: That's to Tulsa?

Clarke: To Tulsa. That was dedicated while I was chief. All these programs were going along. If you went back and plotted the civil works type activities, certainly the dollar value has gone up each year; and there is no dip in there, 'associated with Vietnam. We had a couple of other military programs that were growing at that time. We had the anti-ballistic missile program. It was one of the biggest programs we were carrying out. That went on all the time I was deputy, and then while I was chief, and it continued on after that. Our work in Saudi Arabia started to build during the 1960s, and now has-reached this unbelievable figure of either $8 or $10 billion. I guess in dollar value, the biggest program the Corps has today is in Saudi Arabia.

Robinson: When you became chief, what do you feel were the most serious problems facing the Corps at that time?

Clarke: Well, of course, we still had Vietnam. This was number one. And the National Environmental Policy Act was enacted right after I became chief. But as I

said before, we could see it coming, so the actual enactment of it-really didn't make that much difference. It did tie down pretty clearly what our responsibilities were with respect to the environment. It really called for increased effort to be sure that everyone in the Corps was in tune with the new act. This was one of the very first problems that we faced.

Robinson: What kind of environmental challenges was the Corps facing say after 1965 or 1966?

Clarke: We're talking about the period when the country was becoming more conscious of environmental problems, and we had had Earth Day and many other things that had brought it to the national consciousness. It finally resulted in the environmental act. And more and more we were being challenged on some of our projects, that the environmental aspects of them were sufficiently serious that we should take another look at them.

Robinson: Do you feel the Corps adopted a defensive posture during this period about its policies and programs that were being challenged?

Clarke: I think we had somewhat of a defensive posture. I felt we had to get out of that posture. We ought to be sure we were doing what the law said. It had to be done.

Robinson: How long had the Corps' projects really been under attack to a great extent by various environmental groups?

Clarke: Well, it's a little hard to define.

Robinson: I know it could actually go way back.

Clarke: We could go back to the 1930s, I suppose. And many of the Corps projects on which we were working were projects that had been authorized in the 1930s or 1940s; in fact, the preponderance of them had been authorized at that time -- those that were under construction. I guess the problems had been building up. But this new law put into effect somewhat formal procedures on which to evaluate those projects. It really meant going back and taking a look at all the old projects and seeing whether or not they met the mood of the country currently. Every project that the the Corps had ever been engaged in had had some objection to it, either by the landowners involved or by environmental groups. I think it really started to build up in the early 1960s. And it finally culminated in the environmental policy act.

Robinson: What were some of the groups in the forefront in terms of opposition to some of the environmental impacts of Corps projects? What were some of the more strident groups?

Clarke: Well, the traditional groups -- the Sierra Club. I don't think the Environmental Defense Fund had been formed at that time. The League of Women Voters was fairly critical. The Audubon Society. Then, you would find local groups organized throughout the country. And I suppose these local groups were the ones that finally culminated in the Environmental Defense Fund. But I think we looked mostly at groups such as the Sierra Club and the Audubon Society, and to some extent the League of Women Voters. The National Wildlife Society was one of those. The National Parks Association. There were a tremendous number of them; most of them local in character, though.

Robinson: What were some of the specific objections that they were raising at this time to Corps civil works projects?

Clarke: The main objections, I believe, were that most of the Corps projects -- when you think of reservoirs -- took land, which was valuable, and put it out of one use and put it into another use. The drainage projects were in for considerable criticism -- and the destruction of wildlife habitatthat went along with that. The drainage projects largely involved the landowners in certain areas who had swampland and

wanted to put it into farmland, probably mostly into soybeans, for a bigger economic return to the landowner. I suppose that we and the Soil Conservation Service got more attacks on the drainage projects than we did on most of the others. I think people were concerned, too, that when the Corps projects came in, not only did you change the ecological environmental aspects of an area, but you really brought about a change in the socio-economic aspects. You encouraged development in certain areas.

It may sound a little strange, but I think we actually welcomed the environmental policy act. It forced us to put down a lot of things that I'm sure were in the minds of the planners as we developed our projects. It forced us to put them down clearly, so that everyone could see what the aspects were that we were considering. And the Corps tried to be as honest as it could in its environmental assessments. Really, the Corps program, up until at least very recently, didn't suffer in magnitude certainly. And I think we ended up with some better projects than we would have had otherwise.

Robinson: Do you feel that sometimes the opponents of water resource and other types of civil works projects have

motives other than those they espouse directly in the press, other than environmental degradation?

Clarke: Oh, I think this is true. It's because the environmental legislation gives them something they can hang their hat on -- something which they didn't have before. By attacking some of the projects on what I call a purely ecological basis, they have a vehicle they did not have before. I think a lot of the problems in many areas of the country are more of a social nature than they are of an environmental nature. But there is no vehicle for expressing those concerns, so people get behind the environmental act. There is a trend now that federal agencies -- and again thinking mostly of the Corps -- are baring their souls on all the environmental aspects. There is a relatively new law out, the Endangered Species Act, and people are now hanging onto it to express their concerns. It's not true of everyone, but when there are interests involved, and they search for a vehicle to stop a project, they'll look for whatever legislation is on the books which will allow them to do it.

Robinson: What are some of these other motives that these people have in opposing some of these civil works projects?

Clarke: Well, the one that constantly comes to my mind is still the social problem, the racial problem. Or perhaps even more broad than that, it's something of an elitist approach. One could never prove this, but I've always had the concern that certain projects -- such as the reservoir projects on the Potomac basin, the Rappahannock basin, and the Delaware basin -- are concerned as much with keeping people out of areas as they are with preserving the natural landscape in the areas.

Robinson: You feel, you say, that this could be racially motivated in some respects?

Clarke: I think part of it is racially motivated and part of it is just sort of elitism. Not in all cases. But this is one of the things that obviously can't rise to the surface; you can't take it to court, but you can go to court on a purely environmental aspect of a program. There are many groups which have a very genuine concern, on a very broad basis, for retaining as much of the natural landscape as possible and trying to preserve it in its "natural" state, not encouraging development or people moving into areas. Usually working with groups such as these, where that's their motive, is easy. It's very difficult to work with a group that won't tell you what the real

problem is. I do think that groups like the Audubon Society and the Sierra Club do have these very genuine concerns. Now, the problem as I saw it is: we are still an expanding nation, and we are headed toward a continually improved standard of living, greater commerce, all the things that we think of as a better life that we'd like for the future; and the needs to support the improved standard of living, an increased population, and a better economic situation do sometimes require the use of land that people would like to leave in the state it's in. We still have not worked out a very nice system whereby you can plan the entire development of the country as a whole and allocate people to certain areas. That is not the kind of a system we have, and I don't think it's the kind of system that we want in this country. So the problem is going to continue. The energy problem will really accent some of the problems we've had with the environment in the past. I don't know. I guess we'll work it out the same way we always have in the past: discussion, and finally you take it to -- at least in the case of the Corps programs -- Congress and the elected representatives to decide what they want to do.

Robinson: When the Corps came under attack by environmental groups -- let's say the intensity of this attack became greater in the 1960s -- what was the effect on the morale within the Corps?

Clarke: I think we had two different reactions. One was expressed by some unnamed individual within the Corps who said, "I didn't join the Corps of Engineers to come up with non-structural solutions." But I think by and large;' the people in the Corps realized that our job was.to do what we always had done: do what the people of the country wanted. And if the people of the country were changing what they wanted, we'd better get in step and find a way to do it. Thank God that was the dominant feeling that I ran into. I think the Corps had an easier time of accommodating the environmental movement than some of the other agencies, maybe because the civil works side has still something of the military in it, that people do what they're told to do. Once we got the message through that this is what had to be done, they fell into line pretty quickly on it. Russ (Russell E.) Train, second head of EPA (Environmental Protection Agency), really had some very kind things to say about the way the Corps approached problems and the quality of its environmental analysis. We really suffered from a

minimum of criticism from the knowledgeable environmental leaders, when we reoriented our thinking.

Robinson: In my work on the Bureau of Reclamation, I found that in the early to mid-1960s, the commissioner of reclamation as well as other individuals who supported the agency tended to try to take the environmentalists head-on, and it was only in a later period when this accommodation and adjustment occurred. But you seem to suggest that the Corps tended to be more responsive and open the lines of communication at an earlier date.

Clarke: After I became chief, the act had just been passed, and we had seen this coming and were beginning to accommodate. One of the first things I did was to appoint an environmental advisory board of some pretty stern critics of the Corps -- by and large they were what I would call constructive critics. We went at it very seriously, working withthem, looking at all of our policies and programs, and trying to improve the quality of what we were doing to be sure we were in step with the act. That was a very interesting association. There were many people in our organization who thought I was completely crazy -- sort of inviting the enemy into the camp. It took about a year of meetings with those people -- and we had some very fine people in the group -- before my people realized

that these individuals were equally concerned about what happened to our country even though they may have taken a different approach to it. And it also took about a year before this group of advisors realized that we were honest in our approach to things. Once that had been accomplished, I think we had a very constructive relationship with them which still continues.

Robinson: Who were some of the original members of the board?

Clarke: We had Roland Clement, Vice President of the Audubon Society, who was elected by the members to be chairman of the board. We had Hal Gilliam, who was the environmental writer for the San Francisco Chronicle; Dick Pough, who was with Wildlife International; Lois Sharp, who was the head of the conservation committee of the League of Women Voters; a chap from the University of Indiana who was very much interested in public programs and communication with the public; Hank Foster, who had been active in the environmental movement and later became the director of conservation in the state of Massachusetts; and one other chap from Minnesota, whose name escapes me at the moment, who had been active in the environmental movement.

It was very interesting at first. Some of these people came aboard and said, "We want to be a review group of individual Corps projects." That was one of the initial approaches. We discussed this at some length, and I said, "No, I don't think this will work. I want you to have a broader perspective on the problem. Because if you review a project and you approve it, you'll lose your credibility among your environmental constituents. And if you review a project and disapprove it, and I decide to go ahead with it, we're going to part company. So let's stay out of the individual projects. You can use those as examples for policy, but I don't want you to get into saying yea or nay on individual projects." They finally accepted that, and I think we had the right approach.

We did go all over the country with them and discuss many many projects -- the pros and cons in our approach, the bringing in of different viewpoints, and what all the various considerations were in the projects. One in particular, I know, was the Atchafalaya basin and considerations of what should be done on it for the future. I think they forced us -- our division engineers and our field people -- to become much more aware of the concern of the country

for the environmental problems. It was sensitizing in a way. And I guess there was a benefit to the Corps on the one side because these people, when they became convinced that we were trying to do the right thing, were in essence messengers to their environmental constituents that yes, the Corps is trying to do what is required. We never stopped any of them from saying whatever they wanted to, inside or outside. Obviously, it was a group of pretty strong individuals, and we were not about to dominate them. So I think it had two real benefits to the Corps, having that group.

Now, as a result of that, we did form, out in the field in the various divisions and some of our districts, comparable groups of critics and worked with them. It took about three to four years of constant work in this area to establish the Corps' credibility in the environmental movement.

Robinson: How were the findings and views of the board promulgated to people in the Corps and to the general public?

Clarke: Generally, the views were incorporated in the policy guidance that we were putting out to the field -- revisions of Corps planning documents and planning procedures, for example. You couldn't see it directly in those, but these people were commenting on our

various regulations and all that we put out to the people. So it was reflected in the written word and in a lot of oral words going out to people in field.

Robinson: Did the members of the board have a great deal of one-on-one contact with people in the field?

Clarke: Not too much one-on-one, no. As I said earlier, we took them around to various spots in the country to discuss some of the local problems that we had. I am reminded particularly of work on the Atchafalaya and some work in the Vicksburg area, discussions on the Great Lakes (although I guess those were held in Washington). In that type of a discussion, it was one-on-one. They were talking to the low level planners of the Corps as to what considerations these people were giving to various problems, and getting a sense of how thoroughly we were looking at environmental problems. And, of course, I'm sure they had an impact on the attitudes of these planners. I don't know that I would describe it as extensive one-on-one, but I guess you could call it fairly substantial.

Robinson: Were new written guidelines developed for the field as a result of this board% activities and the re-thinking of the Corps about its mission and role at this time?

Clarke: I guess the main thing that we came up with, in the way of new guidelines with respect to new projects, was sort of a three-phase approach to our planning, whereas before the public might have only seen one. I think we probably had the three-phase approach, but it wasn't documented and wasn't exposed. This is the approach we took when a problem occurred and Congress told us to study it; we would go out and work with the public in two ways. There was the open meeting, which is probably essential but is not necessarily the most productive way, to find out what the problem was and what the concepts were as to how to resolve it. And, at the same time, we sat down with smaller groups and worked in conferences. I don't mean that these were closed sessions or anything, but this was an attempt to get more of the one-on-one approach to what really was bothering people and what their views might be. Then we'd take that back and form advisory committees of the various interests -- this was all promulgated in a series of regulations -- and then come up with a series of alternative concepts and the development of the impacts of these concepts. Take it back to the public and see what the reaction was in more of these smaller meetings. And finally, the Corps would distill from

all of this what it felt was the recommended solution, and then take that back to be discussed.

As I said, Pm not sure we did more than we had done in our minds before, but now it was done more openly. And the public felt they had participated in the development of the project. Finally, we would send it on up through the channels with the environmental impact statement. And I guess we had done what the law said -- considered the alternatives and exposed them. So this type of guidance came out of the regulations, and it was to a substantial extent the impact of this group on our approach to it.

Robinson: How were these new regulations and guidelines received by the people in the field?

Clarke: Probably with some mixed emotions. I think most people rationalized that this was the only way that they could go, considering the temper of the times. But I think there were some people who felt that Congress just added two more years to the planning process. They said they weren't learning any more than they did before. And the same people came to meetings that came before. They complained that the public never shows any interest until you come up with a final solution, then you get criticized for it. And this is somewhat true. But I guess the

dominant feeling was that this is the way, in today's world, you have to go about approaching a project.

One of our district engineers, I recall, out in Seattle went farther than most in this public awareness type thing; he had all the meetings, and he kept issuing bulletins of what everyone said about concepts and alternatives and published it all. He said it was remarkable how the far-out views on both sides -- the developmental versus the environmental -- when they were put down in print, began to come closer and closer together in meetings. Some things looked absolutely ridiculous, and people recognized that. It was an interesting technique. He just published everything that people had to say of any substance on projects.

Robinson: Getting back to the environmental advisory board, did any of the board members feel that they weren't having the impact that they felt they should on the way the Corps was doing things?

Clarke: One particular individual, the man I mentioned from Minnesota, felt very strongly about one or two particular projects. This goes back to the point I made before of having them review projects. He felt he should have a more direct impact on what happened on particular projects in his area of the country. And as a result of our not acceding to that, he quit

the board. He had suggested to me that I appoint an arbiter to arbitrate between the district engineer and the local public interest groups. And I said, "Well that just won't work. If I'm going to appoint an arbiter to go down and resolve a question between the district and the public interest groups, I might as well fire the district engineer because he's not going to be making the final decisions. His job is not to push for the development of any one thing, but to look at the total broad public interest and come up with the recommendation. He's the arbiter among all the various interests already in the field." The rest of the advisory board pretty well accepted that, but this particular individual did not. This was one of the factors in his resigning from the board. But that was the only loss that we had of a member of the board during that time.

Robinson: What were the environmental reconnaissance inventories that were undertaken while you were chief?

Clarke: Well, this grew out of the environmental movement. We were finding that every time we approached a project we had to start with an environmental base. Yet, there wasn't any ready access to what were the principal concerns of the people in the areas. They were of all types -- historical, archeological, areas which had

great social merit, and the pure ecological considerations. So as we were beginning to look at projects to think about alternatives, we realized that it would be very convenient if we could in some way document what the concerns of the people were so we'd know that before we embarked on detailed project studies. We came up with a plan to more or less publish in atlas form what were the important things in an area which should be treated with tender care.

We started this as a pilot program and picked four areas of the country to embark on the program. We worked with the states in the areas and various public interest groups. They were all enthusiastic about it, so we were able to develop these environmental inventories. We had South Carolina, Vermont, and the state of Washington; then we did a special study on the Atchafalaya. I think they proved very useful -- when you have overlays on top of overlays with the ecological aspects on top of the historical aspects and all. These inventories were all concentrated along the river valleys, because this is where the environmental concerns were. This is where the history of the country developed, and the archaeological developments were all along the river basins. You could pretty well document, just by looking through

the dots on the river basins, what were the areas where there were going to be real concerns. And you could plot the hardwoods and the agricultural areas. It just gave you, at a glance and recorded with some fidelity, what I used to say were the areas that needed tender loving care as you approached them.

I'm not sure how that program has finally developed. I know we published the initial inventories in atlas form and they were received enthusiastically; there were some beautiful documents. I'm not sure whether they have continued the program. I have some doubts. It was moderately expensive, but I think it is a good way of establishing the base line so that you then have a common base against which you can measure and try to predict impacts in the future.

Robinson: What groups were involved in compiling these inventories?

Clarke: Number one, of course, the Corps. We did work with other federal agencies -- the Fish and Wildlife Service. We worked with the state agencies which had similar concerns and state historical societies. Many public interest agencies contributed. And we even got down to the towns and counties and their historical societies. We found a great willingness to participate. It was really a matter of collation.

We weren't doing any original research in the sense of trying to find these areas; we were just trying to find out what people thought was important in these areas. Fortunately, we had within the Corps a group that we called the Engineer Agency for Resources Inventory, which had been doing this type of work for AID in various Latin American countries and in southeast Asia. And they had the techniques down for collecting and recording these types of information. They were of considerable help in the mechanics of going about this work. We found it was the kind of work where graduate students -- history majors, for example, or environmental majors -- could be brought aboard for fairly modest sums and were enthusiastic in participating. I hope they were of value. I think, for the particular districts that were involved, they were of substantial value.

There was some reluctance. I think we approached quite a few states with the idea of working on this. We finally worked with states which already had quite a collection of information and were fairly enthusiastic about participating.

Robinson: Did you work much with consultants in compiling these inventories, or did Corps personnel tend to do the collation and so on?

Clarke: I think mostly it was done by Corps personnel. I don't recall that we had any substantial number of consultants on board for it. In a sense, these people from the Engineer Agency for Resources Inventory were consultants to the various districts on the techniques of doing it. This is the kind of thing where you draft it and send it out to people and ask them to put in things that they feel are important. Then, finally, some decisions obviously had to be made between what is important to a lot of people and what might be important to one individual.

Robinson: Does this material find its way into the actual environmental impact statements?

Clarke: I hope so. Now these were completed about the time I left. I hope they established a broad base for the beginnings of environmental impact statements. Obviously, they were not done in detail, and there would have to be sort of micro-studies of particular sites as they are selected. But at least in the broad planning, I think it does give a common base to everyone which they might use and go from there to predict what the consequences would be.

Robinson: Was there any opposition within the Corps or from development-minded people that it was simply giving the environmentalists ammunition to use against us?

Clarke: I heard that comment, but I don't think it was a very serious comment. I think by the time we got to developing these inventories, people realized they could be a good tool.

Robinson: In other words, they could be an important planning tool for the agency?

Clarke: I think there was a feeling, generally, in the areas where we did work these programs that the inventories were a good planning tool. The only district that I talked to in any detail about this was New Orleans in connection with the Atchafalaya study. They were pretty enthusiastic about it, at least the district engineer, his chief planner, and some of his staff. They felt it would really be helpful. Now, whether we could really get wall--to-wall covering with these types of inventories across the country, I don't know. Of course, then there is always the problem of the continual updating of them. It's not a static situation, it's dynamic. The expense of updating them would be great. I'm not sure in the long run that the Corps necessarily should do this. But no one else was doing it, so we tackled it, and we felt the inventories were a tool to help us. At least I did, and I think many of our Corps people felt that way.

Robinson: Looking back over the Corps history, even before the 1960s, do you feel the Corps has been more environmentally sensitive than some of the critics give it credit for?

Clarke: Oh, I'm sure the answer is yes. You can go back and document approaches to some of the environmental problems around the country in which the Corps was involved, and you can prove a case that yes, the Corps had been sensitive, more so than it was given credit for. But I don't think you could ever prove the degree. If you go back through history, you can cite things like its role in the development of the national parks, which goes back a century, as well as its work with the wildlife people-on the flyways on the Mississippiand trying to accommodate them. You can also talk about the salmon runs on the Columbia and this type of thing to prove at least an environmental awareness. But I suppose the critics would argue that the degree of it was not sufficient.

My philosophy always was that the Corps did at the time whatever the people of the country wanted. I was -talking to somebody the other day. I said, "The one thing about the Corps among the federal agencies so far as I'm concerned, with all my parochialism, is that the Corps does what it's told to do. And it gets

told to do things by the people. Maybe the wrong people were speaking in the past, but they were the ones who were speaking, and it is reflected in the legislation and the approach of Congress."

Robinson: Part of the NEPA process, of course, is public involvement in the planning process. Did the Corps undertake other means of increasing the amount of communication between local groups and individuals in the planning of water resource projects and other types of civil works?

Clarke: Well, I cited, for example, the open planning in Seattle. But the Corps did really expand a lot of its information devices: flyers, summaries of statements to various groups, mailing lists, and this sort of thing. I think what also increased were the number of public meetings with interested groups. The Corps made a conscious effort to involve the public, whoever the public may be. But we suffered from a problem; it's not unique to the Corps, you see it in every other program. Several factors are involved. One, we've got a fairly mobile population. Second, the population generally has short memories; and third, the length of time it takes for Corps projects to move. And to some extent, there is an apathy on the part of the population, which is

probably a belief that generally their elected leaders will do what's right for them. So, despite the best informational programs, you finally arrive at a situation that I have described as the "bulldozer in .the bedroom.'* And suddenly people say, "No one talked to me." And they object to a particular project. It's a combination of many things that allows that situation to arise. So you have late objections, and people who haven't been heard. Their views may have been considered, but they didn't express the views.

We did run a study where we brought in the University of Michigan 'on the Susquehanna River basin planning to try to outline three broad planning alternatives for the use of the Susquehanna basin. One was very development or economically oriented, one environmentally oriented, and one in between. We brought them in because they were experts in public communication, and we followed their program fairly religiously. I know our district engineer was very discouraged. He said despite all the public meetings, he ran into the same people as he had run into before without this extensive program; and he wasn't sure he was getting the message across to the broad public in the area. He was very discouraged about it.

But this is not unique to the Corps' programs. There are a few people who take a very direct interest and participate. The public at large doesn't participate actively -- they may participate in the polling booth in the leaders that they elect. It's a difficult problem. I don't know. I think everyone is seeking new ways to communicate. And this communication concern is expressed in many pieces of legislation dealing with special programs. They all have the same problems. I saw this in the water quality business. The difficulty of involving the public so that it understands all of the impacts. Some of them are pretty technical.

Robinson: This environmental concern, has it changed significantly the traditional cost-benefit ratio approach to the justification and authorization of water resource projects?

Clarke: I think the answer is a little bit of yes and no. You still have to go through a cost-benefit analysis. The OMB insists on it, and Congress insists on it. Projects that don't pass at least the one-to-one ratio rarely get considered. I think it had resulted in projects being accepted with a slightly smaller b/c ratio than they have had in the past. The water resource council, of course, is trying to establish

the various accounts, but the problem is that only a few items can be quantified, and others have to be treated in words and thoughts. But it does allow additional consideration of environmental aspects and reduced b/c ratios.

Actually, consideration of the environment doesn't always result in a reduced b/c ratio. I think one could find cases where actually it's been improved. Again, speaking of the Corps, it certainly has expanded the horizons of what might be done to make things aesthetically more pleasing. There was sort of a rule of thumb, that I don't think was ever written down, that you could spend up to 3 percent beautifying a project. I'm talking about in the 1950s and the early 1960s. That concept got abandoned very quickly in the 1960s. And you began to find, oh, just simple things: instead of building concrete walls on drainage projects, you went in with curved sod-covered channels 'and tried to make things look a lot better aesthetically.

I guess one of the first examples of that was a very short flood control project, Tamalpias Creek in California.. Because of the objections to the way we were going to treat the particular stretch, we went to great lengths -- not much additional cost -- and

still came out with a good b/c ratio on it and made it a much more aesthetic development than we had had before. I had to agree with the residents in the area that a straight concrete ditch through the area was destructive of property values and good sense. I think what we came up with was very attractive. There were still some groups that weren't very happy with it. I could prove to my own satisfaction that it looked better after than it did before, and it helped solve some of the flood control problems.

Robinson: While you were chief, how did the Corps' role in wastewater management change?

Clarke: At just about the time I became chief, the environmental act was passed, and we were looking actively for ways in which we could use some of the Corps' capability to help solve these problems. And with encouragement from the secretary's office, we started looking at the possibility of the Corps trying to spell out on a regional basis the alternatives for wastewater management and other uses of water in the area. The EPA had just begun its work, and it wasn't necessarily enthusiastic about the Corps getting into this work. But there was considerable push on the

part of the secretary% office. The congressional committee also seemed to think there was merit to it.

We really embarked on a pilot program of studies of major metropolitan areas to see what the alternatives would be. There was great enthusiasm in some parts of the environmental movement for putting the wastewater back on the land. There's still a great deal of enthusiasm for it. And this is one of the alternatives that we looked at in our studies around the country. A perfectly fine alternative, but politically, it's like backing into a buzzsaw. Just the consideration of it aroused all kinds of reaction among the public at large. Our concept was that we would develop the alternatives, spell out the pros and cons both on the dollar side and on the environmental side, and make these plans available to the regional authorities for their use. The regional authorities weren't too sure whether they wanted the Corps in there -- there were many institutional interests in these areas which were afraid that the Corps was going to come in and take over.

So we had a difficult time in this area, reactions to the various plans and institutional fears. But we did proceed with the studies and finally developed them. We did not come up with specific

recommendations in any of these areas. At one time, we had thought perhaps we might be able to do it. We developed the plans, and I think they are good base plans for the areas concerned. In many cases, it looked as if the idea of putting the wastewater on the land should get more serious consideration by the people who were responsible; but I think they, too, found that the political aspects of it were almost impossible to overcome.

Now, the program has expanded. The Corps, under agreement with EPA, has moved into other metropolitan areas of the country; and I think generally it has only gone into areas where it has been invited. The first pilot case, of course, sort of forced its way in. But in those areas where it has been invited, I think it's meeting with substantial success. I always said that the Corps' field organization could take a pretty complex problem and develop a series of alternatives, and generally it could arrive at a consensus as to what should be done. I think it is accomplishing that now in places like Omaha and other parts of the country.

The Corps has something like thirty-five of these studies going on at the present time. And out of that, hopefully, will come a program which the local

agencies or the "208" agencies can use as a basis for their future programs -- on the allocation of tasks to local sewer districts, on how much of it might evolve into Corps-type activities, and on flood control aspects. I think we'll have to wait and see what emerges directly from it. But in essence, what the Corps is doing is using its planning capability to try to assist the local people. And I think they are getting a better reception than those first five studies. I almost lost some personal friends over the very fact that we were looking at some of the alternatives, not necessarily developing them, but just looking at them.

Robinson: What changes occurred in the Corps' permit program with regard to discharges?

Clarke: The big change, of course, has come out of the interpretations of Public Law 92-500, the water pollution control act amendments, where the role of the Corps has been expanded far beyond what the traditional concepts had been under the 1899 act. Here again, a highly controversial subject as to how far the Corps should go in its role, and differing interpretations of what that law means with respect to the Corps. Finally it went to the courts, and the courts mandated that the Corps' authority was

considerable, far beyond what it had contemplated. This is still being sorted out, as you know -- in Congress with a difference in views between the House and the Senate as to how far the Corps' authority should go, and what authority should be given to the states, and the division of responsibility, really, between the federal government and the state governments.

If the Corps goes as far as some would have it go, it will be a very extensive program and require additional personnel to carry it out. My personal feeling is that we would be better off as a country if we got the states more involved in permit actions and left the Corps to what I would consider its more traditional role under the old 1899 act, where it was preserving navigation more than the quality of water. But, as you know, there has been an evolution under a series of court decisions, preceding Public Law 92-500, which keeps broadening the authority of the Corps with respect to water quality and use of streams. I'm not sure what the final outcome of this will be. I've always had a feeling that the federal government is getting more involved in the activities of the individual and that this is better left to the state and local governments. I have hopes that

someday the "208" agencies will be effective and will do what all these dreams in the law says they should do, and that ultimately they will take control and put the Corps back on the mainstreams with its concerns about silting, navigation, and obstructions to navigation.

Robinson: What are your feelings regarding the current administration's attitudes toward water resource projects?

Clarke: I guess my initial feeling was that the first group of projects should have merited a little more consideration before they announced them.

Robinson: Are you referring to the "hit lists"?

Clarke: The first hit list, yes. Then, of course, there are the political aftermaths of that -- the reactions of the Congress to the particular hit list. My own feeling is that the second step that they took was a very rational step.. They came up with criteria and said we want to evaluate on-going programs in accordance with these criteria. And they greatly expanded the list. I think they looked at 300 Corps projects rather than the original limited number. And they went through a rather stern evaluation of them. Of course, here you get into the politics of the situation -- when the administration wants

to change the criteria by which projects are evaluated. I think its role might have been eased, although I'm not sure it could have ever gotten agreement, but it might have been eased by a little more consultation with the people in Congress on the use of the new criteria for evaluation. Personally, I can find no fault with the concept that if a project doesn't meet today% standards, it should be considered for modification or possible elimination.

Robinson: Would you please continue?

Clarke: It's very difficult to justify to the public at large the use of.a 3 1/8 percent discount rate when the government is borrowing money at 6 7/8 percent. So philosophically, I find no fault with that. I think the real problem that the administration ran into on this was that they were overly enthusiastic in their initial announcement of the projects. They might have saved some of the problems had they had a little discussion with some of the leaders in Congress. Their criteria for evaluation, I think, is reasonable.

I know, in my conversations with the Corps right now, its attitude is still what it always has been: you tell us how to judge things, and we'll judge our projects that way. That is the approach General Morris

is taking. I go back in memory to the day I woke up and found that President Nixon had stopped the cross-Florida barge canal. My first feeling was, I guess, a natural reaction of trying to defend the project. Then I started thinking, what difference does it make to me? If the people of this country decide they don't want that project, I'm not going to push for it. Now, I lost some friends in Florida, because we wouldn't go out and take the stump on the cross-Florida project. But I don't consider that the Corps' role; these are political decisions.

I go back in memory to 1940 to a story told to me about Eugene Reybold, who was chief of engineers. He recommended a project to the secretary of the Army. The secretary of the Army said, "You haven't told me the most important thing: should we go ahead and build this project now?" And the chief of engineers said, "That's not my decision. The country has got so many resources. I'm telling you this would be a good investment, but whether this is a better investment than something in public health or elsewhere, the chief of engineers can't decide. That has to be a political decision." And I felt the same way about the cross-Florida canal and about the so-called "hit list." If it doesn't measure up to the criteria that

the political leaders want, it shouldn't be built. I think the real problem is the lack of agreement among the political leaders in the administration and the Congress as to what criteria should be used. But the Corps can work with any set of criteria.

Robinson: You retired from the Corps in 1973 and then became executive director of the National Commission on Water Quality. Why do you feel you were chosen for this position?

Clarke: Obviously, I was vulnerable. I had just retired, and the timing worked out right. The commission had just begun to organize. They had very little in the way of a staff, and I think they gave the choice of picking the executive director to the chairman. He was looking for someone who had credibility throughout the nation and an appreciation of what the problems might be. I suspect -- in fact I've been told -- that members of the House staff on the Public Works Committee put my name in the hopper as one of the people to be considered. I think it was a combination of timing and background, and I think I did have some credibility around the country among both the people who built things and the environmental groups. so I I think this led to Mr. (Nelson) Rockefeller considering me. I'm not sure how many others he may

have considered in his hunt for the executive director.

Robinson: Why was this commission established, and what were its purposes?

Clarke: It was established because the House and the Senate couldn't agree on what the requirements for the water pollution abatement program should be in the long-range future. They were pretty well agreed on the short-range requirements, but there was a difference of view as to how far it should go and what the impacts might be. One of the compromises that was worked out to allow the legislation to go through in 1972 was the establishment of a commission to consider a mid-course direction. The charter 'of the commission, in about one sentence, said: take a look at the economic, social, and environmental aspects of carrying out the program or not carrying it out. That was, of course, the job of the commission. I might say that, having completed our report, and as it collects dust in Congress, I can't see any difference in the attitudes in the congressional committees from the days in 1972.

Robinson: Who were some of the individuals on the commission? I understand that at that time it was

Governor Rockefeller who was chairman. Who were some of the other members, what were their backgrounds?

Clarke: There were the five Senators and the five House members who had been part of the conference committee. The other members were so-called public members. I think Governor Rockefeller was picked be cause New York State had been foremost in its programs of cleaning up water. He had raised considerable money through a bond issue and had New York State embarked on a program long before 92-500 came along. They chose an industrial member, Dr. Ed Gee from DuPont, one of the senior vice presidents, who was concerned with the environmental problems of the DuPont Company but who was also concerned with the environmental problems of industry as a whole. They selected one man who was interested in problems on a municipal level. That was Ray Kudukis of Cleveland, who was in charge of the Cleveland utilities district. They picked one man who had been concerned with the problems at a state level. This was, initially, Carl Wright from Arkansas; and later his successor from Arkansas after, unfortunately, Carl died. And they chose one man from the West who had a pretty good knowledge of agricultural problems and western problems, Bill Gianelli, who had just retired as the

director of water resources of the state of California. They had a pretty broad group. S. Ladd Davies was the replacement from Arkansas.

Robinson: As executive director for this commission, did you find it was a special challenge to work with both political people and people from the private sector?

Clarke: No, not particularly. When I came aboard, they had given me two very fine individuals as the senior people on the staff: Joe Moore, who had been previously director of the Federal Water Quality Administration; and Jim Smith, who had come from the Conservation Foundation and had done extensive work with the Department of Interior. Joe, of course, knew a great deal about the mechanics of the water pollution program. And Jim Smith had a real feel for the environmental concerns. I guess there were problems, but we developed a plan of study which was endorsed by the commission after considerable discussion. I think it took about four months to get a plan of study approved. But once that was approved, the commission allowed us to pretty much proceed according to the plan.

I think one of our real problems, of working with a congressional commission with so many

congressional members, was in trying to get enough of their time to keep them continually up to date on what was going on. They had a device where each one of those people had a special assistant whose job it was to follow this day by day. I don't know how often these various people met with their principals, but their main role in the commission was to be sure that their member was informed of what was going on and, to some extent, that the views of their member were transmitted back to the staff, and where possible, incorporated in the studies that we were preparing.

The commission actually went along for -- let's see, we were in existence from September 1973 to March 1976 -- about two and a half years. The first four months were involved in developing a plan of study and getting our staff collected. Then we embarked on a series of contract studies. And although we kept the commission briefed as to what was going on, I think it was only in perhaps the last six months of the commission -- as the report of the staff began to take shape and as our report of the commission (a short document) began to be formulated -- that it finally began to focus on what the final recommendations were going to be. It was difficult

to get the members' time, because it was a busy period in Congress. I'm not sure how one should handle this with a congressional commission. They did allow us, as a staff, as long as we followed the study plan, to work along. And I think they had a lot of faith that the staff would come out with an objective report. But when we began to focus on the recommendations, and in particular about the last six weeks before the report came out, then I think we really caught the attention of the majority of the members.

Robinson: Was most of the research and legwork done through contractors?

Clarke: Almost entirely. We spent $12 million plus on contracts, about 100 contract studies. So they averaged $120,000 apiece. The job of our staff was to administer those contracts: to prepare the work to fit into the individual contracts, to select contractors and monitor their progress, to review their reports when they came in, to circulate the reports for review, and eventually to secure from them the final reports. Then the job of our staff, aided somewhat by contract assistance, was to take these 100 reports, which I used to describe as fifty-five feet of reports -- and that's about what it was when

the original double-spaced drafts came in -- and consolidate that into a meaningful analysis to answer the broad questions< what will be the economic, social, and environmental impacts of doing something or not doing something?

Robinson: Who did this distillation, taking all this mass of material and putting it into one document?

Clarke: The staff that we had brought aboard. We had, I thought, a very capable staff. And considering the fact that it was for a short period and they had not known each other before, I think they worked very well together. I give much of the credit to Joe Moore, who was what we called the study director -- I was the executive director, he was the study director. There were concerns initially that maybe we were layered too much, but I think we both agreed at the end that we needed Joe to devote his time exclusively to getting the study produced. I had to do more what I called the front running and setting up a lot of public meetings. My doing that allowed him to concentrate on the study. But it was this staff -- which at one time ran a total of about eighty people, of which about forty were professionals -- that did the distillation, drafting, sending out the drafts for comments and getting them back,

and finally preparing one basic staff document about two inches thick. That was backed up by four volumes in specialized areas of economics, environmental, and institutional problems. And finally, of course, all that was distilled into about a forty-page series of recommendations and discussion of recommendations.

Robinson: How was the staff's report received by the members of the commission?

Clarke: It was accepted by the members of the commission. Of course, the report was very broad. I guess it received general acceptance as a credible document. It was certainly the best compilation of the total picture of water pollution problems that had been put together. Since it was a rather broad document, one could almost read into it whatever one wanted to read into it. There were facts and figures to support perhaps a lot of different conclusions. The document was pretty well accepted. I think it was when we began to draw conclusions as a staff, to bring things into focus, that we began again to uncover the differences among the commission members. Of course, it finally came to a head when the recommendations were drafted. Then the commission

members had to act on the recommendation document, which was a rather short document.

Now, you asked how was the staff report accepted. There was no device by which it was formally accepted or rejected. It was acknowledged, anyway. To be honest, the very final draft of the staff report did not come out until after the recommendations had been acted on. But the earlier drafts, the real substance of it, were available.

Robinson: How much input actually, into the structure of the recommendations, was the direct result of the commission members rather than the study plan that you undertook?

Clarke: The way the recommendations were developed, in June 1975, Joe Moore and I, and Jim Smith, started drawing our conclusions from the study. And about that same time, I started drafting the recommendations. I had a whole series of recommendations; and I kept issuing these as a sort of shopping list of recommendations, trying to get comments back from the commission members as to what they felt might go into it. And the commission said, "We don't want to commit ourselves to recommendations until we've had all our public hearings." So it was agreed that Joe Moore and Jim Smith and I would continually work

on drafts of recommendations, but we would keep them under wraps, just the three of us, until after the 'public hearings. After the public hearings, we asked each of the commission members to suggest to us recommendations that they thought might go into the report. We got some; I don't think we got them from everyone. So we three sat down and took those recommendations that came in, plus our earlier drafts of recommendations, and tried to weave them together into what we thought was the consensus of the commission as to its recommendations. And finally, we presented our document to the full commission for their comment on the document. It went through several meetings where there were changes made in the recommendations.

Robinson: Were these changes very substantive?

Clarke: I don't think I would say they were very substantive. Perhaps to the commission members concerned with individual points they might have felt that they were; but I think in the broad context, no. The recommendations that finally emerged were substantially what the three of us had put together. Of course, these were not accepted by all the members of the commission. I always say we got somewhere around thirteen votes out of fifteen, depending on

which parts of it you were looking at. Certainly the majority of the commissioners endorsed the general recommendations. There were some specific objections which are recorded in forty pages of additional comments by the various members of the commission: some supporting in whole, some supporting generally, some making exception to a few of the points, and one report objecting to the basic document -- to the basic recommendations. I don't know whether that's good or bad for the course.

Robinson: Do you feel this document has had much impact on subsequent legislation?

Clarke: It hasn't yet had much impact on subsequent legislation because I don't think there has been any legislation passed.

Robinson: Or debate?

Clarke: I think it's had some impact on the debate, and I think it still has a chance to have substantial impact in consideration of revisions to the act. There are also other impacts that are not quite so visible. I think it's had an impact on the operations of EPA and its development of new regulations as well as on the approach of states and local bodies to some of the problems. So, whether it's worth the $17 million, I guess one could question. But you can

detect in the tenor of EPA regulations and state actions that yes, the document is being read. It' is being read pretty seriously by the people who are working in this field.

Robinson: Was the Corps referred to directly in that document, and were recommendations made regarding its mission and programs?

Clarke: We stayed away from section 404. We did not cover that in our report. The reason we didn't -- the reasons were twofold. One, we were to look at the goals and requirements of the act for 1983, then we backed off to 1977. We were not able to deal with the non-point sources; and that's one of the, I guess you could say, weaknesses of the report. But we felt that in the time that we had to make the study, we really couldn't deal with it very effectively. There were no regulations out on it, no standards, and this sort of thing. And the Corps program fell over into that non-point source problem. So we did not comment.

There were several other areas where the state of the art just would not permit us to come up with anything meaningful. We did come up with some generalities. The toxics area is one in particular that we could not deal with. We did spell out in here

someplace the areas that we did not study. One of the items was alternatives to the regulatory approach. There were many who felt that charging people for discharging would be the best approach, an economic approach. And we spelled out certain things in here that we just didn't have time to cover.

Robinson: What kind of professional activities have you been engaged in since the report was completed?

Clarke: Oh! I find myself chairman of the water policy committee of ASCE, working on broad water policies there, which again gets back to some extent to the water quality program. I guess that's the most active thing in professional societies that I'm involved in. I did go down to South America to be a non-governmental observer at the UN Water Conference* I'm a member of several other societies, but I think my most active participation is in ASCE. Actually, I've been involved more with the firm and some of its work.

Robinson: What is your role as a consultant to TAMS (Tippetts-Abbett-McCarthy-Stratton, Engineers and Architects)?

Clarke: It's not very clearly defined. I'm a consultant on anything they want to talk about. I spent

three months working on a proposal on the northeast corridor, which did not get. I've been a consultant on various other studies -- many of them related to water resources, energy programs in particular. Because I've had some experience in the Middle East, they consult with me on programs on the Middle East. One area I do not touch is anything having to do with the Department of Defense or the Corps of Engineers. I stay out of those areas, because of the conflict of interest aspects or just plain ethics. Besides, I don't feel comfortable going back to talk to people within organizations I've been associated with. When you ask what am I working on, I think my main interest for our firm is energy problems.

Robinson: What are some of the major resource problems facing the nation, and what will be the Corps' role in the future in dealing with these?

Clarke: The real problems facing the nation in which the Corps will have an interest, or should have an interest, I would say are still the water problems and water resources. I think the Corps will continue to play a major role in dealing with those problems. I see the Corps getting more into the water quality aspects than they have in the past. I think the Corps could be of tremendous assistance in working

on the energy problems. It already touches them in many ways. The ports that bring in fuels or export fuels; and on waterways, the Corps is involved in the transportation of fuels. But I think it could have a broader role in developing the coal facilities in the West. It still has its traditional hydroelectric role, pumped storage and this type of thing. I also think the Corps could perform well for the nation in the development of the strategic petroleum reserve. These are the types of programs that the Corps is pretty well suited to in assisting the nation.

Robinson: Do you think the Corps could have a role in other types of renewable energy, such as solar and wind energy resources?

Clarke: I think the answer is yes. As a matter of fact, I know it is already engaged to some extent in these programs, working cooperatively with the Federal Energy Administration and with ERDA (Energy Research and Development Administration). I guess most of its work is with ERDA. This is the type of program in which the Corps may not necessarily be the one to carry out the research and development but, if this develops into a large-scale program with a substantial federal input, I think the way the Corps'

organization is set up it could contribute significantly. I hope the Corps can find ways to assist the country in these programs. I know General Morris is trying to come up with concepts on how this organization which has tremendous potential can contribute.

Robinson: Are you pleased that you have devoted your life to serving in the Corps of Engineers?

Clarke: Oh, the obvious answer is yes. Not all my service, as you would say, was in the Corps. I've been pleased with thirty-six years of service in the Army and a substantial part of that in the Corps. I came out of it with a feeling that in some way we contributed to the country.