GENE VISCO: Hello, my name is Gene Visco This is Friday the 4th of December, 2015. We are here at The Chamberlin location on Fort Monroe in Hampton Virginia. Fort Monroe is a historical US Army fort. It's now been converted to civilian use. We're here to interview Walter Edward Cushen, PhD, on behalf of the Institute for Operations Research and Management Science. Doctor Cushen is a fellow at the Institute, and Cushen is more fondly known as Ed. We are here in Ed's apartment in The Chamberlin. And I note in passing that I am the same age as The Chamberlin. We were both born in 1927, but The Chamberlin is aging much more nicely than I am.

Before we start abiding by the principle of truth in advertising, I must tell you that I've known Ed Cushen for over 55 years, and he was my boss on a major Army pioneering operations research project in the late 1950s. He still greets me on occasion with a shout of "My Boy". So let's get on with the interview. Ed, you want to start out by telling a little bit about the early days? Where were your parents living when you were born? What was your early schooling like? And so on.

ED CUSHEN: Well, my boy. [LAUGHS].

GENE VISCO: [LAUGHS]. Thank you.

ED CUSHEN: I was born in 1925. I look different today, because in January, I fell down and broke my hip. And I've been going through all kinds of recovery processes ever since then.

GENE VISCO: I can imagine.

ED CUSHEN: On Monday, my dentist decided he didn't have enough teeth, so he took six of mine. So my strange configuration here, we owe to that. The others are just all my fault. The picture of my mother and father over there sitting in the backyard of our home in Hagerstown, Maryland. My father, whose name is Cushen, came from Ireland. He didn't, but my great great great great grandfather Robert Cushen, genealogically spelled C-U-S-S-E-N, came from either Cork, Limerick, or some other place in Ireland. I've been trying to find out where, and I've written to about a half a dozen genealogical societies in Ireland. And they tell me that since I say he was born in 1765, I may as well give up, unless I can tell which parish he was in.

Now, I don't know what religion he belonged to, but when he came to the United States on a

ship, Anne, which landed in Philadelphia, I understand he was a redemptionist. Which meant he didn't pay for his fare, but he had indebted himself for four years to a guy named Zantzinger up in Lancaster, Pennsylvania. I've been trying to track this family down ever since that time, and have started assembling materials, one piece of which is--

GENE VISCO: Wow.

ED CUSHEN: Our coat of arms. It's from Yorkshire in England. So we don't belong to the proper British family to begin with. But I have been able to track them down after they landed in the United States. My great great great grandfather bought himself a farm in Weverton, Maryland in 1830, and I've been able to track the family since that time. It's a barrel full of fun. I've been writing all kinds of books on that subject. But these are pictures of the front and the backs, but also explored the cemetaries. In back of the house, about 50 feet in back of the house, there used to be cows that walked around back there, and they've already smashed up Robert's tombstone. So I've written to the families up there and said, can I come up and gather the tombstones together, reconnect, and so on?

But what I've really got to say is that I'm really proud of my wife, Helen, last name Lingenfelter. When we went to Edinburgh, Scotland to get my PhD, she came along, and that was our honeymoon trip, and so on. And here are pictures of Helen on that trip down the Rhine River. Actually, we cycled all the way from Edinburgh down to southern England, and caught the ferry across. She was sick - very.... sad But we had all kind of good times up there.

GENE VISCO: Did you start school up in Maryland?

ED CUSHEN: My home address was 1519 Virginia Avenue in Hagerstown, Maryland. And I went to Hagerstown High School, graduated from there. I wanted to go to St. John's College in Annapolis because they had a classical program. First year, you would study Greek. Second year, you would study Latin, and so on. And you do all kind of things like that. I did manage to get myself what was called a state senatorial scholarship, where the county senator could select one person each year to send to a college of their choice. I couldn't go to St. John's because I was on the list for being drafted. But if I go to Western Maryland College, and major in chemistry, I can get a state deferment so I signed up. But sure enough, after a year and a half, I got drafted. I went to Camp Wolters in Texas, infantry of course.

GENE VISCO: What year was this?

ED CUSHEN: It must have been 1944.

GENE VISCO: OK.

ED CUSHEN: Yeah, '44 I went to Camp Wolters in Texas, and lucked out because the Army then shipped me off to Texas Aggieland to study electrical engineering. And after about nine months of electrical engineering, and getting tired of it, I got shipped off to the Aleutian Islands, where I was with the Alaska Communication System, and enjoyed that. It was a small organization, the Alaska Communication System, and we ended up with communications out through the Aleutians because the Japanese had just finally decided there was no point in staying around there. So I stayed two years in the Army.

GENE VISCO: And you were about 21 when you got out? 20 or 21?

ED CUSHEN: I was born in 1925.

GENE VISCO: Right.

ED CUSHEN: So I left in 1946. So I would be 21. I went back to Western Maryland College. They kept the scholarship open for me. And I switched my major from chemistry to math and philosophy, a dual major.

GENE VISCO: I'm sorry, let me interrupt you. Had your parents gone to college? Or were you the first one to go to college? Or was it some motivation there?

ED CUSHEN: You know, I just wanted to go to college. My mother was a school teacher, and she went to the University of Maryland summer school. So I decided I'll do that. She went to a part-time college, and I went to a full-time college. My senior year I decided to go where there was real philosophy, and it was Boston University, BU.

GENE VISCO: What year was that?

ED CUSHEN: I graduated from Western Maryland in '48.

GENE VISCO: OK. So that would be maybe '49?

ED CUSHEN: That would be '46, '47, something like that. I studied under Edgar Brightman, Edgar S. Brightman, and decided that philosophy was what I really wanted to do. Although in my earlier years, I wanted, first of all, to be a veterinarian.

GENE VISCO: [LAUGHS]. Really?

ED CUSHEN: And then an Egyptologist.

GENE VISCO: Wow.

ED CUSHEN: And, finally, then I go to Western Maryland.

GENE VISCO: Quick interruption. I went to summer school at Boston University in the summer of '49, and I took a couple of math classes up there. I was going to school down in Florida, but in the summer time, they didn't have any summer classes, so I went to Boston and went to BU. And it turns out that I actually took a class with Saul Gass. Remember Saul?

ED CUSHEN: Yeah. Oh yeah.

GENE VISCO: Of course, we didn't know each other at the time. But I think it was theory of equations that we took. And years later, when I was talking to Saul about this, we reminisced on the fact, and Saul said that he got an A in that class. And I went back and I checked, and I got an A minus. I'm sorry, go ahead.

ED CUSHEN: Saul was great-- my boy. In any event, having gone through Western Maryland, graduating in math, I got a job at Aberdeen Proving Ground, where, first of all, I worked on a hand calculator, and trajectories for weapons, and so on. Then I got graduated into what they called the Bell Relay Computer, where you did your computer programming by going back in the room where the relays are and squeezing different contacts together to make sure. I was fascinated by computers, and ended up working on the ORDVAC, the EDVAC, and a little bit on the ENIAC. And I decided then to follow Joe Harrison, who was a mathematician at Aberdeen, to follow him to Philadelphia, where I joined RemRand, the Eckert- Mauchley Computer Corporation. And I began programming things like can't you play chess on the computer, and speculated on how you respond when your opponent does this, and things of that sort. So I began playing games on computers back then.

GENE VISCO: Was this before you went for your doctorate? Or was this afterwards?

ED CUSHEN: Umm. This would be before I went to Philadelphia. This would be in Aberdeen.

GENE VISCO: This would be before you went to Philadelphia?

ED CUSHEN: Yes. Then I decided it's time to go get a PhD. I decided I want to get a PhD from overseas, not

from the United States.

GENE VISCO: And why did you decide that?

ED CUSHEN: Well I did want to go to Harvard because there was a professor there, Alfred North Whitehead.

GENE VISCO: Oh yes.

ED CUSHEN: OK. He gave the Turner lectures at the University of Edinburgh. And his concentration was on process and reality. His heaviness was in the axioms of geometry. And he worked with Bertie Russell, so I got copies of the Principia Mathematica. I worked my way through about the first third of volume one and was fascinated by it. So, in any event, I decided that I wanted to go overseas. So I wrote to a number of different universities. And typically they responded, OK, send us your money. Among the universities I wrote to was the University of Edinburgh, and they wrote back and said, well what are you going to study? I said, oh, philosophy of science. They wrote back and said, that's not good enough. What's the title of your doctoral dissertation? I said I don't know. They said, pick a subject that you're going to write a dissertation on. Otherwise, forget it.

So I wrote back. And I said, I'm going to write a dissertation on the physical cosmology of Alfred North Whitehead. They wrote back and said it's a done deal. Your principal advisor will be Sir Edmund Whittaker, the retired head of the Math department, and Arthur D. Ritchie, the head of the Logic and Metaphysics department. I went and did my dissertation. And here it is.

GENE VISCO: That's your dissertation! [LAUGHS].

ED CUSHEN: Yeah. Two volumes.

GENE VISCO: Oh my goodness.

ED CUSHEN: I typed it myself.

GENE VISCO: Oh wow.

ED CUSHEN: Sir Edmund wanted me to publish it. And I said, I can't afford to. I'm here on a GI bill, which is $100 a month, and I need that to live. And he said, you'll make it, just give it a try. I didn't. But I did go back and work once again at Aberdeen Proving Ground but then up to Eckert Mauchley in Philadelphia with UNIVAC. So I tinkered with that. Then, I guess, while we were at the University of Edinburgh, that's when Helen and I got the bicycles with our two best friends from

Edinburgh all the way down to Switzerland. I went from there to other kinds of computer work, which took me to the Army's operations research office. And I began doing tactical wargaming then, beginning with Dick Zimmerman's Carmon tank battle, where the basic ingredients were move and shoot. And the computation then ends up being who won the battle, that kind of thing. And I thought, well, what this doesn't have in it is tactical decision routine. It doesn't have communications so I'll tack those things on top of Carmon to call it Carmonette. And that's when you came. And I thought, what am I going to do with chemical warfare? [LAUGHS].

GENE VISCO: [LAUGHS]. So you joined ORO in '52? '53? Somewhere in that period, right?

ED CUSHEN: '53, 54?

GENE VISCO: Somewhere in there, because I know when I came in '56 you were already in Germany.

ED CUSHEN: I was deeply impressed with the boss man there, Ellis Johnson. And at first I thought, I don't really like you. But then I watched what this man was doing, and to my mind, he was doing exactly what he should have been doing. He was getting people to solve all different kinds of Army-type problems. And spreading out to include a theater of war as well as theater-strategic type things, and so on. So with ORO then, I had a field experience here in 1952-53 at Fortress Monroe, with Bill Whitson our director, saying we're going to start doing tactical war gaming map exercises. And so I fell in love with that, and kept saying, we've got to expand the borders, we've got to do additional things.

And so what I got involved with was getting shipped over to USAEUR headquarters, where I had teamed up with the G2, G3 people and went on our field exercises to say, is it possible to destroy a Soviet advance in Western Europe through the use of what, at that time, was a very limited arsenal of nuclear weapons. That just grew into more and more war gaming.

GENE VISCO: And that was at the Heidelberg?

ED CUSHEN: I wanted to see whether we could use the Dick Zimmerman Carmon with their modifications to Carmon act. And said, at that time, all we're doing is comparing different kinds of US weapons, and we have not allowed for similar improvements on our enemy. And so I said, we've got to call it project Possum-- Possible US and Soviet satellite material. And so we ran through that with you, my boy. Thank you very much for everything you did. As a matter of fact, when I was in Europe with a tactical exercise in the UK, we were playing against Soviets. I came back from the UK, and discovered that there was a mandatory meeting down at the Pentagon which I

was supposed to go to. So I went to that meeting at the Pentagon. The featured speaker was an assistant secretary of the Army who said, now here's what we're going to do with the Research Analysis Corporation. Now, what is that? It turns out that the Army had decided that they were going to cancel the Johns Hopkins contract, which featured Ellis Johnson, and they claimed that he just wasn't up to it, and he had to go.

Since I was new boy, just imported, when they came to the inevitable "does anybody have any questions?", I couldn't contain myself. I just popped up and said, yeah, why are you doing this? You should change your mind. What you need to do is promote Ellis, make him part of the decision making strategies, promote him down in the Pentagon, give him almost unprecedented advancement. The speaker turned to somebody and wanted to know who I was. And he was told. And he said, OK, meetings ended. I got back to ORO, and I said, I quit. And I did. But I felt that I had to finish this cost benefit analysis with Possum. So my boy here took over that particular project, and made a success out of it.

GENE VISCO: Can we just go back one quick step though? Do you remember, at one point-- I think this was through Ellis-- you were asked to go to the Pentagon and brief Charlie Hitch. Do you remember Charlie Hitch? He was the controller of the Defense Department. And do you remember that briefing that you gave him on Possum? If you don't, I'll try to jog your memory.

ED CUSHEN: I did that briefing, and this was followed by an invasion by the Rand Corporation, who said, that stuff about shooting, and firing, and stuff like that, that don't make any sense. So they did their form of cost benefit analysis. And we were ignored from that time on.

GENE VISCO: Well, I'm going to have to jog your memory a little bit here. You may recall that this is well before we had PowerPoint and those kinds of things. So the art department had to make up these huge cardboard displays.

ED CUSHEN: Yes.

GENE VISCO: And you and I would do it. I went to the Pentagon with you because I was carrying the bag with all those big posters in it. And you started to brief Charlie Hitch. And his office was right next door to McNamara's. And in the middle of your briefing, the phone rang, and Charlie Hitch had to excuse himself. He said, Mac wants me. And he had to go next door to talk to the Secretary of Defense. Then he came back in, and you continued the briefing. And, again, the phone rang. And, again, he had to interrupt. And when he came back this time, he said to you, as best I remember, you're going to have to kind of speed it up a little bit because we got some

kind of a crisis, and I got to get back with Mac. And you went through that briefing fleeing those cards off of the easel. Every time you finished talking about one of them, you threw it onto the floor, and I was scuttling around picking them all up to put them back in the bag again.

ED CUSHEN: Yeah, I remember that.

GENE VISCO: You remember that?

ED CUSHEN: Oh yeah.

GENE VISCO: It was a magnificent display that you put on at that point.

ED CUSHEN: Well, he's supposed to be paying attention to what I had to say.

GENE VISCO: Yeah. That was a great event, I thought. So you left ORO before it became RAC.

ED CUSHEN: Yeah. I left ORO and switched over to a sequence of DOD-type affiliations, almost always associated with what you call tabletop exercises, where you do it at the strategic level to include what they now call a whole of government type strategy. Instead of just doing DOD weapons, you also included the State Department-type activities, AID activities, the Intel community, and so on. So you end up really seeing, from a total US point of view, that these are the things that you ought to do. Now, this includes what later came to be known as Flexible Deterrent Options, which is, can you stop a war before it starts with different things in there? And so that became my favored form of tabletop exercising. When I ended up, finally, with the National Defense University, whose neck tie I am wearing right now, I began to introduce the notion that it's not whole of government that you want to consider, you need to consider the private sector. Because there are things that the private sector can do that the government could never hope to do. And, furthermore, you ought to do it in such a way that you can involve other nations. And you end up with a coalition-type type activity. So those are the thoughts that go through my mind now.

Last year, my daughter and I spent two weeks in Jerusalem working with the North Carolina University-Charlotte campus excavating what they call they call the digs at Mount Zion. This is just outside of the Southwest wall of Jerusalem where they for about half a dozen years have been systematically unearthing stuff on the downgrade that was destroyed by the Romans in 70 a.d. And as you dig through the different layers of Byzantine, Muslim, and so on, down to

the Roman times, they have now excavated what they think was a mansion belonging to one of the Jewish families who was a big wheel in the Sanhedrin. So Donna and I went over there to do our hand at unearthing this stuff. It turned out that the only thing that we were qualified to do was to wash the stuff that other people dug up. And that was a barrel full of fun.

This year, in October, I went to a conference that was called the Parliament of the World's Religions in Salt Lake City. The meeting was held at what they call the Salt Palace. And since you've been to Salt Lake City, you know that the streets are extremely broad. And the story is, you can take a team of horses with the wagons, make a U-turn without backing up, and so on. So the Salt Palace is on a huge square, which is where I went. It wasn't easy hobbling along with my cane. But the newspaper said there were 7,000 people there. This was spectacular. Obviously, most of them were Americans. The religious groups, because it was Salt Lake City, were led by the Indian tribes who were there. They pitched their tents outside of the Salt Palace, and it was very nice.

But the first of these world conferences, since 1893 in Chicago, not many have been held in the United States. And they typically happen every five years or so, something like that. They're hoping to start doing it every other year now, probably not in the United States. But the motif that went through all of these things-- and I sat in a good dozen or so religious services for Hindus, Sikhs, Jewish, Tao, things of that sort-- the thing that was common to all is they all find something that is worth worshipping. Most of them call it God. But the Pagans, and so on, say, the earth was here. You should worship the earth. So what they all have in common is, they find something that they call the equivalent of a God.

The other thing they have in common is what Jesus said. And that is, first you worship God and then you help your neighbor. And this help your neighbor motif ran through the whole shebang. And there were interesting examples that were cited. To The neighborhoods inside of Jerusalem, where they have unpleasantness happening on the Temple Mount as well as between the different groups, there are groups of people who say, we are from Muslim, Jewish, Orthodox Christian, or Roman Catholic, and so on, and we are going to work together to try to avoid future upheavals. So there is a cult, the cult of Isis, (the Egyptian goddess) who is trying to fight the ISIS jihad type people, and so on. So one of the things I've got to do before I kick the bucket is I've got to see whether I can't find some-- as Plato said in his Republic, what is the least change that you can introduce that will have as its consequence that the wars will stop?

So that's project number three that I have. Project number one is to see if I can't finish a book that Carol Powell and I started back in 2007. We jointly wrote a book featuring the 29 stained glass windows at Chevy Chase United Methodist Church. And we had more fun digging into the history of, what did they do? And why did they do this kind of thing here? So we are now writing a book which we call The Genesis of Our Windows. This is printed in 600 copies. We gave a copy to each church family and have some left over. My intent is to print 500 copies of The Genesis of Our Windows. Unfortunately, Carol succumbed to a heart operation and she died. So now I have got to incorporate whatever her thoughts were in this. I've got a 78 page manuscript. I'm trying to get in touch with her children, and see if I can pull stuff out of there.

GENE VISCO: It's not going to be as big as your dissertation though.

ED CUSHEN: Yeah. Well, project number one is Genesis Of Our Windows. Number two is find Robert. And number three is find that event which nobody expected, but somehow or another gets translated into something which would be honored by nations. So that means that as I do my gaming in the future, I've got to consider the fact that there are n plus 1 points of view. There's the United States' point of view, which is really about the only point of view that I've had. But we've got all of the other things to be concerned about. What makes sense from a United Nations point of view? Is there any hope of recycling once again through all the historic events where two nations are at each other's throats and swore to kill everybody, like all those Canaanites, and so on? Josiah said, go get all the Canaanites. Don't let any of them survive. And then his successors, the Judges, said, nah. We're getting along OK.

GENE VISCO: I'm going to ask you to go back a little bit now. Going back to the military analysis world. When you and Ellis left before the Research Analysis Corporation was created, which I think was, if I remember correctly, the end of August or something like that, in 1961, I think it was. You and Ellis went off to Case?

ED CUSHEN: Case. Yeah.

GENE VISCO: OK. Talk a little bit briefly about what you did there. And then I know that you came back to Washington after that.

ED CUSHEN: Yeah. Case Institute.

GENE VISCO: Yeah. And what did you do there?

ED CUSHEN: The outstanding feature there was Russell Ackoff, who with a couple other guys wrote the standard textbooks over and above what Philip Morse up at MIT had written. So I went out to Case, and I was made an associate prfoessor of operations research. And what a miserable time it was trying to learn the math that all the other operations researchers already knew. I'd been making speeches about linear programming, multi-dimensional programming, and stuff like that, not knowing what I was talking about.

GENE VISCO: [LAUGHS]. I'm with you there.

ED CUSHEN: I took this assignment and taught operations research, the mathematical portion, with Ackoff, Arnoff, and so on, textbooks. And I decided I am not a mathematical operations research person. So what do I do? I say to the students that we are going to engage in a semester-long student project. What shall we work on? And it turns out that there was a professor who had been working with the Federal Aviation Administration. The F.A.A, at that time, was going through the ordeal of, how are we going to reorganize? So my students and I agreed we were going to do a study of how should F.A.A. Organize itself for the future. And this class of 30 students split up into teams of two, three and four people, and they selected their own project. What piece do I want to study? Well, the most popular one was the team that decided to go out to the airport after midnight and talk with female help out there. But we ended up writing a report of how to improve F.A.A. And the students made a presentation to the F.A.A, and a couple of them were hired by the F.A.A, including me, to be a consultant, and so on.

So the second year, I joined up with a professor of organizational science because he liked the notion of a student project. So I took all of his students, as well as all of mine, and we decided to work on an international problem. And that was, what should we do about Cuba? And so the students broke up again into subjects that they chose, and we wrote a report, which I shipped off to the State Department. I had a thank you note from the Deputy Assistant Secretary of State saying, this is gorgeous and will you do a study for me next year? And I said, no, I can't stand this cold weather around here. So with that, I evacuated. I decided that you can do just about anything If you really want to.

I think about, why are we having this interview anyhow? And there's only one reason I can think of, and that is to try to tell students how to get into this crazy kind of thing. Which really is a lot more ethics. As Tom Cox said when he was President of INFORMS, operations research is the science of better. And I say, it's more than a science of better, it is the moral obligation to bring about the better situation that you have studied. If the boss doesn't buy it, it's because

you forgot to include a dominant feature in your analysis. So go back and include that dominant feature, and decide what it is that you should be doing.

So from my point of view, from being a math and philosophy major at Western Maryland College, the cultural center of the known universe, Hey they got me a GS-7 position. Well, I graduated summa cum laude, so I had all the A's, and so on. So I'm convinced that if a math major, or any other major for that matter, jumps into being able to do web searches on a computer, and asks the simple question of how do I make things better, your future's wide open. So my intent is to tell them this particular message here. Damn it, get out there. You can change the world. Even though each old thing that I did registered right then, it fostered another, even broader, picture after that.

GENE VISCO: When you left Case, you came you came back to Washington, if I remember correctly.

ED CUSHEN: Yes.

GENE VISCO: And, speaking of making things better, you did some work at what used to be the Bureau of Standards. It's got a different name now. Technology or something.

ED CUSHEN: Yeah. It was called the Technical Analysis Division. And there's a picture of the TAD first picnic up in there. think I joined the Bureau of Standards as a GS-17.

GENE VISCO: Super grade.

ED CUSHEN: Yeah. The director designated me as being the chief of what he called a Technical Analysis Division. Which meant, bring whatever you do over here, and tell me what you're going to do. And I let it be known that my purpose in life was to copy Ellis Johnson, who from my point of view said, I'm going to do for the civil agencies of government what all of these military think tanks are doing for the military situation. So I just simply said this is what we're going to do, and I went out like a marketer and dug up money for what eventually became 200 people. This upset the private sector. I was called to order by people whose names I will not mention. But they said, why are you doing things that the private sector should be doing? And my snappy response was, well, if you had been doing it, you wouldn't have had to have me do it. And I just can't help myself.

GENE VISCO: Right. Try to make it better. Try to make it better. Yeah. Do you remember how long you stayed at the Bureau of Standards? I can't remember.

ED CUSHEN: I think eight or nine years. Eight or nine years. As usual, I got too big for my britches.

GENE VISCO: And after that, did you just go into retirement?

ED CUSHEN: I found myself in love with the POLMIL exercises, and worked with the government agencies that are involved. And then I had an opportunity to go participate as a player in a nuclear exercise in Lithuania with their nuclear power plant. The Ignalina power plant was an exercise of Lithuania and the Russian neighbor. So we played that. And their Russian counterparts were not very cooperative.

GENE VISCO: [LAUGHS]. To put it mildly.

ED CUSHEN: So we did that. Also, as part of an exercise when I was with National Defense University, that's when the Dayton agreement came up. So NDU said to the war gaming group, why don't you guys war game this thing? So I got the job of setting up the exercise of how you implement the Dayton agreement. The people that I invited to the exercise including people that I thought should always be participants in these, were the people who go to pick up the civilian functions of government, and so on. And so they took part of it. Our conclusion said, before you send any troops in there at all, send in the people who are going to run the electric switch, who are going to be police officers, and stuff like that. And mercifully, we guessed what obviously should be done.

After I left ORO, I had a brief period of time when I was a director of MathTech's Washington office. And this was my unsuccessful attempt at trying to make believe that I knew how to do commercial operations research. I lucked into being included in an AID project on improving the poultry sector in Egypt. There were trips over to Cairo, and Fayum, and so on, as well as the female heads of household who raised their own chickens in the backyard. So we did that.

GENE VISCO: I wanted to just tell you one story about how impressed I was with Ellis. When I was invited to come back for an interview, I was working out in Utah in the chemical business. And ORO flew me back to Washington, and then they put me through some interviews. And then I filled out this application form, which was a very detailed form back in that time, including asking what your religion was, by the way, which you can't do anymore. But one of the things on the application form said, what were your salary requirements? And I was a GS-12 at that time out at Dugway, and my salary was $8,500 a year. So I put down that I would come to Washington to work for ORO, if they invited me, for $8,500. When Ellis sent me the letter offering me the job, He paid me $9,600 a year. He gave me he gave me a 14% increase over what I had

asked for. And I thought to myself, wow, if this is the kind of action that this man does, I really want to go to work for him. Yeah I was very much impressed with Ellis.

ED CUSHEN: I must say, when I go to these TMCI meetings, and so on, with you, I'm very much impressed with the quality and the depth of the things that you have worked on, especially recently.

GENE VISCO: Yeah. I appreciate that.

ED CUSHEN: My boy.

GENE VISCO: But I've got to say that I'm following in your footsteps. Do you want to sum up at this point? Anything you want to say to the young folks that might be seeing this video about the interesting life that we spend in this practice? And the fact that we have an opportunity, perhaps, to do something good? You want to leave that message?

ED CUSHEN: That operations research is the science of better. That was a lucky hit. That was great. And to me, each person is obligated to become the best they can be, to do the best that they can do. And I'm glad that OR is one of those vehicles that can do it. I stay away from the distinction of analytics and operations research. From my point of view, they all need to be done. And to me, the motivation is to do the best you can for the best purpose you can. Period.