ORAL HISTORY PROGRAM

Dale Elifrits: My Passionate and Rewarding Career in Mining and Education

2025

PREFACE

The following oral history is the result of recorded interviews with Dale Elifrits conducted by Steve Gardner on March 27th, 2023. This interview is part of the AIME Oral History Program.

ABSTRACT

Growing up on a Missouri farm, Dale Elifrits had an early pull towards soil conservation and geological engineering. After earning his PhD in geological engineering, Elifrits quickly moved toward mining and began his tenure as faculty at the University of Missouri, Rolla. Elifrits began his passionate career in education as an earth science public school teacher, then went on to become a geological engineering professor. Serving SME, AIME, and ABET accreditation, Elifrits and his wife Kathy devoted themselves to mining outreach and education. The Dale and Kathy Elifrits Outreach Award was established in honor of the Elifrits' commitment to education and their community by SME. Elifrits notes the most rewarding part of his career is seeing the successes of his many thousands of students over the years. Through his research, professorship, and work as a corps of engineers' consultant, Elifrits has had an enjoyable career contributing to the history of mining engineering and SME.

Readers are asked to bear in mind that they are reading a transcript of the spoken word rather than written prose. The following transcript has been reviewed, edited, and approved by the narrator.

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00:12 Introduction

Gardner:

Today is March 27th, 2023. This is an interview with Dr. C. Dale Elifrits, who is a retired professor from the University of Missouri-Rolla, now known as Missouri University of Science and Technology. I'm Steve Gardner, and this interview is being conducted as part of the American Institute of Mining, Metallurgical and Petroleum Engineers Oral History program in cooperation with the Society for Mining, Metallurgy & Exploration. I served as the 2015 president of SME, and I serve as a trustee for AIME and will be the 2025 president. We are here on the Northern Kentucky University campus, and we are going to discuss Dr. Elifrits' experiences in the mining profession as a professor and his contributions to the field.

Welcome, Dale.

Elifrits:

Well, thank you, Steve.

Gardner:

So, everyone knows Dale and I know each other from our long association as colleagues and members of SME, and we've been trying to recollect when we first met, but it was probably many years ago at conferences in Lexington, Kentucky, on mining and environmental issues.

Elifrits:

Correct. Probably in the early '80s.

Gardner:

Yes, and Dale, you've been a good friend and, I feel, a mentor for me over the years in SME.

Elifrits:

Thank you. You're embarrassing me.

01:10 An Early Appreciation for Soil Conservation – Growing Up on a Missouri Farm

Gardner:

Well, first, tell me about where you grew up, Dale.

Elifrits:

I was born in Saint Joe, Missouri, and shortly thereafter, we moved to the little town of Ridgeway, which is halfway between Des Moines and Kansas City. I grew up on a farm there—as a farm boy, high school FFA and that sort of thing, I learned about soil conservation that way. So that's where I came from. My mother was an elementary school teacher, and my father was a road maintenance manager for a road

district, which he had done for many, many years and had actually started in that kind of work in the 1930s. Really the 1920s, but fully in the 1930s.

Gardner:

Very good. We share that farm background because I grew up on a farm as well, and my first degree was in agricultural engineering. So, who or what influenced you to become an engineer?

Elifrits:

Probably the work that my father did. He had no formal education, but he turned out to be a really excellent machine operator and built lots of terraces and farm ponds for the Soil Conservation Service, and I was involved in some of that at the end of his career of doing that. Then he got into road maintenance and heavy machinery maintenance, and that got me involved with what he was doing as a kid. I had quite an interest in science and math, so it seemed appropriate to look at something like that, although I didn't initially get a degree in engineering.

03:19 Pursuing a PhD in Geological Engineering and the Pull Towards Mining

Gardner:

So, what school did you actually go to?

Elifrits:

My bachelor's degree is from Northwest Missouri State with a double major in math and chemistry and secondary education tacked on to the end of it. And then, I went to graduate school a few years later at the University of—Northern Iowa University, got a master's in applied geology, and then matriculated to what was then the UMR [University of Missouri - Rolla] in geological engineering and basically did not leave there. I retired as a professor emeritus.

Gardner:

Why did you choose that school?

Elifrits:

I had looked at that school while I was in high school and actually had thought about going to Missouri School of Mines then. But it was a seven or 8-hour drive from home, and I was not willing to drive that far on two-lane roads to get to college. So, I wound up going closer to home, where it was not a long drive.

Gardner:

Then, what led you to choose geological engineering for the graduate level?

Elifrits:

Well, there's an interesting little bit of background about that. While I was at the University of Northern Iowa. The Johns Lecture, which is a GSA lecture, traveled the country in the person of O.T. Hayward, a geology professor from Baylor University. And he had this lecture program about how geology influences civil engineers' work, but they don't understand that. He told a lot of stories in this lecture. As we went home that night, I told my wife, I think that's where I want to go once we get this master's finished here, and I have all the requisite courses that I need to make up to get into engineering school. So that's what got me started on this, plus my activities there with landfills and how they influence groundwater and some things with soil conservation that I had done as a youth. So, it all kind of ran together or came together, I guess I should say, to go to the geological engineering program and get a master's, ostensibly to work in the landfill business. But I got pulled into the mining business somewhat by a sideline.

Gardner:

So, did any professors mentor you in a particular way?

Elifrits:

Indeed, they did. Even before I got into the doctoral program, I had a really neat relationship with a couple of the professors that were kind of in the bridge between geological engineering and mining engineering. They pushed me to do things that I wanted to do, and I had opportunities to do things that they presented to me, so away we went. With a little research help—money, that's how I got here.

Gardner:

How about any classmates that you were with?

Elifrits:

As I got into the graduate program in geological engineering, there were two or three guys that were mining engineers that were in classes with me, and they had lots of interesting things to talk about. And there were other things going on, that happened, that got me interested in mining. One of the most important things was, as I worked on my master's, the Surface Mine Reclamation Act, Public Law 9587 was passed, and that provided funding for a lot of us that were interested in erosion control and land use problems and that sort of thing. That helped push me further into it, which was really beneficial. And I think that's where you and I first met, was in that kind of activity.

06:47 How My PhD Research Assistantship Turned into a Faculty Position in Geological Engineering

Gardner:

So, how did you get your first professional job in higher education?

Elifrits:

It was an interesting sequence of events. I was offered a graduate teaching assistantship in geological engineering, which I took, and I got a master's. When I finished the master's and took my oral exams, the chairman of my master's committee wrote me a card saying, “In the wisdom of the Geological

Engineering program [faculty], you're qualified for your PhD. How soon will you enroll?" I wasn't sure what Tom Beveridge was talking about, so I called him, and he said, "Well, we need more help. We need you back here." So, I went back to UMR and entered into the PhD program, which evolved into a tenure track research position, which then evolved into a faculty position, and the rest is history—the next 20 some years in the faculty.

Gardner:

So, what all did you do in that position? Job duties, research, etc.?

Elifrits:

The first research work was, as I mentioned before, funded by the Land Reclamation Act, the Congress Act. It was measuring the area of revegetated surface on abandoned surface coal mines in southern Illinois and northern Missouri, and north central Missouri. That's where it all started. Then, when we got that fairly well done and away from it, we were contacted by NASA, who wanted to step out their digital processing of Landsat data and see it applied to other industries besides just agronomy, which was about all was being done with it then. So, we got involved in setting up a computer processing lab to handle the Landsat data as a base for a database that you could file other information into, like soils, rocks, rock properties, soil properties, and that sort of thing. So that funded my PhD work, and that also got me out into the industry, continuing other things for the industry. Here's some things that are free from the federal government that you can get in the way of photography and imagery, and you can use that to help yourself figure out what you're doing and restoring the surface. And that's what moved me over into mining, such as it was in my time.

Gardner:

Was it difficult to transition into the profession?

Elifrits:

No, it really wasn't, as I look back on it. I'm surprised at how easily that change took place without me really knowing it. I mean, I'm working on this research project for my PhD, and the dean decides he's going to put me on a research assistantship instead of a teaching assistantship. Then, eventually, when I got ready to finish the PhD, comes this offer to go on the faculty, and away we went.

09:49 My Mentors in the Geological Engineering PhD Program – A Thanks to My Lifelong Friends

Gardner:

So, did you have any influencers or mentors throughout that period?

Elifrits:

Ted Plange, who was our dean for a long while and who actually wrote the part of the Surface Mine Control Act that had the state mine institutes in it. He actually wrote that for Congress, was a mentor and telling and pushing me to get with the program—get finished so I can be on his faculty and this sort of stuff. Plus, my PhD committee as a whole served as mentors, and we remain close friends to this day.

The ones that are still alive, most of them have passed away, but we're still close friends throughout our careers. So, they were mentors, and a couple of their graduate students, actually a graduate student from the Mid-East somewhere who went through the mining PhD program at the same time, was a mentor to a certain extent because he had probably 20 years of industry experience. He could talk about things in industry that I had never seen. And so yeah, there were a lot of mentors, and I look back on those people with a lot of thankfulness because they really helped me.

11:00 Corps of Engineers Consultant – Beginning of Tenure at the University of Missouri, Rolla

Gardner:

You've done work as a consultant. How did you get your first professional assignment with industry?

Elifrits:

During the work on my PhD research, I was involved with subsidence events from underground coal mines in Southern Illinois. The Corps had a lake that was being undermined. In the course of about the time I finished my PhD dissertation, they suffered a long wall—caused subsidence event that lost a $3 million beach underwater, and that got me started there. Prior to that, I had been involved in some landfill planning stuff, and so that just sort of came to me. I don't know that I really went out and looked for it, but for a long time, a colleague and I were Corps of Engineers consultants to know what was going on around Rend Lake and Southern Illinois with respect to mining. So that's how I got involved with a lot of the consulting that I did. Then the landfill thing just sort of grew as the rules changed in the ‘90s for landfills.

Gardner:

Was there any difficulty in transitioning in the profession?

Elifrits:

Not really, because at the time, I was going through the process of tenure and promotion at UMR. We were expected to be consulting somewhere, so there were opportunities brought to us. If you didn't have something going on consulting-wise, you really had a kind of a hole in your tenure and promotion dossier. So, I had help getting in, and then once I got there, I had myself established so I could find the work that I wanted and do what I wanted to do with it.

Gardner:

Well, throughout that process. Did you have any other influencers or mentors?

Elifrits:

Yes, a couple of the civil engineers whom I consulted as they had problems with the geology of a site wound up being mentors, and I derived a lot of benefit from working with one of those gentlemen in particular. He had been a former Corps employee and owned his own consulting firm. And so, he had a lot of experience that was very valuable and was willing to share it.

13:16 A Passionate Career in Education – Earth Science Public School Teacher and Geological Engineering Professor

Gardner:

Dale, what other positions have you held, and what other research and work focus have you had in your career?

Elifrits:

Well, let's start from the beginning. When I graduated with my BS degree, I took a public school teaching job. Interestingly enough, I had math and chemistry as majors, but I taught eighth-grade Earth Science because that's where the demand was. There were not enough; we would call it today, middle school teachers. So, I wound up in a junior high, as it was known then, teaching eighth-grade Earth Science, and I taught chemistry in the high school associated with that. Then that rolled over into eventually going to graduate school. After being at UMR for 27 years, including graduate school and on the faculty as a tenure track person, I took an early retirement. The curators wanted to buy all of us old guys out, and they found out that worked for everything with engineers because it cost them more to replace us than they were paying us. But beside the point, we retired anyway, and I took a full-time job here at Northern Kentucky University.

It was a little change of pace because it was running a pre-engineering program, which was a two-year program that prepared students to go on to somewhere like UK [University of Kentucky] or Purdue or wherever to get a BS in engineering. Also, half of that job was outreach to K-12 science teachers, which was an interesting series of events and workshops in the summers. Field trips for science teachers in the summer all focused pretty much on the mining industry, even though that wasn't what I was told to do. But I thought, that's what I know, and that's what they're going to learn about. And the teachers appreciated that. Then, of course, I worked as part of a consulting firm for a while before we moved here from Rolla, Missouri, to Northern Kentucky. So that's kind of a quick summary of what I've done. Nine years in public schools, two of that chemistry high school level, and seven of it in middle school Earth Science, basically.

Gardner:

So, the vast majority of your career has been in the education field.

Elifrits:

Absolutely.

Gardner:

I know you're very passionate about education.

15:31 ABET Program Evaluation – Helping Accredit Geological Engineering Programs Worldwide

Elifrits:

And that spun off into my work with ABET through SME for the last 30 years. So, boots on the ground in a mine site a few times as a consultant, the research work that I did, and also the continuing ED I did to mining companies about how to use aerial photography and satellite imagery to monitor their revegetation efforts and things like that. So, that's been the show.

Gardner:

Let's talk about the importance of ABET.

Elifrits:

For those who don't know what ABET is— Well, the AIME societies were four of the 11 professional societies that got together in the ‘30s to set up some means by which engineering education could be standardized across university campuses. So, when someone like GE aircraft engines hired from different campuses, they'd get the same kind of background in the engineers they hired. So that's what that amounts to, and SME has responsibility for keeping track of and evaluating geological engineering programs, geophysical engineering, mining engineering, extractive metallurgy, and now we have geology. So, we have a science program that we help accredit, and I've been involved in that. I got my arm twisted sometime in the late ‘80s, I think ‘87, but I'm not sure, to be a geological engineering program evaluator, and I've been in that activity ever since.

I've been a facilitator for a number of ABET training events for [faculty] members and new program evaluators. I just checked over the weekend— I made in my course of being a program evaluator, I made nine program visits, eight of them engineering. I visited the first geology program to be accredited by SME and ABET, and I shared ten campus visits of program evaluators while I was on the Engineering Accreditation Commission. It's been a fun experience. I've traveled worldwide for ABET at their expense. I've been to Saudi Arabia and Turkey for ABET activities and Qatar, and I've been all over this country on program evaluation visits, too. So, it's been a fun thing, and I've been involved now with the program evaluator training in SME since the early ‘90s. Well, that's a quick summary.

18:06 Forming a Consulting Company, Genesis – Geologic Characterization and Landfill Development

Gardner:

We've [talked] mostly in the academic, but you also have done some consulting work in private areas.

Elifrits:

Yes. Three of us that were involved individually in different kinds of solid waste management issues in South Central Missouri formed a small company called Genesis in the late ‘80s and early ‘90s. I think in '91, we actually incorporated, and we consulted to the landfill owners and landfill property owners who thought they wanted to develop a landfill because they had a property that might work. It turned out I did a lot of the geologic characterization for those permit apps to get them started, but in the end, I turned out to be more of a mediator than anything else among regulatory bodies, lawyers, property owners, and engineers that were doing the landfill work, which was really interesting. It was a part-time thing, kind of as needed, and I also worked for the Corps of Engineers, Saint Louis District, as needed.

One interesting project I had with the Corps was when Reagan proposed the MX missile business. The

Air Force was going to build the sites and load them with missiles in the Western US, but they didn't speed along with their work. The Corps was designated by Congress to be the construction agency. [The Corps said that they were not] getting the information we need from the Air Force, so we want our own consultants. So, two of us from UMR were hired to do the geologic characterization of the ten basing sites in the Western US, which was a really interesting job. We worked directly under a two-star general in the Army Corps of Engineers. It was really a fun experience, and it paid pretty well, too.

19:50 Challenges and Contributions – Transferring NASA Technology to Mining and Restoring Landscapes

Gardner:

Very interesting. So, what are some of the biggest technical challenges that you've experienced in your career?

Elifrits:

I think the single most interesting one was when we started trying to transfer technology from NASA to the mining industry. This was in the late '70s and early '80s, getting the mining industry decision-makers to believe that we could really tell them where there was green vegetation on the site. We could actually measure it, and they could do that with their own engineers. So, we taught a number of short courses for mining companies in the Illinois Basin and, to a lesser extent, in Missouri. I think really the most challenging thing was, as I say, to get those mining people who had never looked at an aerial photograph or a satellite image to believe that, well, you know, that does show us where the grass is growing and where it's not growing. And then the other big challenge in the consulting business was when I got into Genesis. And we got into this business of disputes about landfills and the contractors involved trying to get the lawyers to all calm down and listen to reason. And that was a series of interesting events. Those were probably the two biggest challenges.

Gardner:

What are some of your contributions that you feel you've made to the mining industry?

Elifrits:

Well, one of the things that we did in my research work was working on this business of how can you create a reclaimed surface that will be effectively erosion-free and not contribute to the sediment pond downstream. This was reported in the conferences that I talked about earlier that the UK hosted in the late '70s and '80s. We came up with this process of looking carefully at the drainage network and the undisturbed terrain to then have the mining company cut that kind of a drainage network into the reclaimed terrain as they went through the reclamation process. We didn't have water running any farther than it could run without cutting a gully. Then, by stabilizing those drainage features, they could accept the water and help. And that has spun off—the Texas Railroad Commission got to where they used that. A lot of the mining companies in the Western US use a form of that now. So, I feel like that was a contribution.

And in concert with Ivan Jansen, who was an agronomist at the University of Illinois interested in how to get crops to grow in Illinois [on reclaimed land] as they grew before the mine changed the landscape. His

research students and my students did some things about the compaction of replaced soil horizons and the resulting density that prevented plant roots from penetrating [the soil and kept water from infiltrating the soil]. And one of the changes that occurred in Missouri was that Missouri had a magic date of 12th May, that miners had to have everything reseeded. And we all know sometimes April and May are pretty rainy. So, the mining companies, to meet the deadline, were out there putting stuff down in the mud, and of course, nothing good happened. And Ivan's seeing the same thing in Illinois. And while we didn't go talk to the regulators, our work wound up being the foundation of both Illinois and Missouri changing and just saying get it done in the growing season instead of by giving a calendar date. So, I think that was a contribution.

23:08 Rewarding Experiences – Building a Landsat Data Lab to Advance Public Use of Satellite Images

Gardner:

Very good. Let's talk about experiences that you've had with colleagues that you can share.

Elifrits:

Well, I have to think a little bit about that, but I've had some interesting experiences with colleagues. Two of us really worked on this whole business of building up a laboratory to process Landsat data, and that went on in my activities at UMR for the whole decade of the '80s. And then, when desktop computers came out, that all went out the window. But it was really an interesting thing for the two of us, my PhD advisor and I, to work on building that lab and advancing NASA's goal of getting the satellite imagery use out into the public. That was a really fun thing to do with colleagues. The MX missile basing thing that I mentioned was— one of my colleagues and I did all of that, and that was a very enjoyable experience. A lot of reward from it when you've got a two-star general patting you on the back, which General Paladino did. So, that was a rewarding experience with colleagues.

Gardner:

Dale, I know that you've received a number of honors and awards throughout your career. Let's go through a few of those, if you would, please.

Elifrits:

From SME— My first award from SME was the Ivan B. Rahn Award, which is awarded to people that have done significant things in the business of education. It's named for a personnel chief from Consul who helped all of us Educators teach our students what to do in the industry. When Ivan was getting up in ages, SME established that award to recognize educators. So that's one award that I'm quite pleased with, to have been given many, many years ago, in fact, and some other things.

The old GEM annual award, which, as you may or may not know, GEM and MII were merged to create what is now MEC, Minerals Education Coalition, and so the GEM award was for people that had done outreach-type work out into the science education community. So, I'm pleased to have gotten that. I was made a Fellow of SME a few years ago, quite surprisingly to me, but that's one.

25:40 Dale and Kathy Elifrits Outreach Award – Honoring Our Devotion to Education, Community, and SME

Elifrits:

And there's some volunteer things that I've done that are sort of precious to me. Having started out teaching science in Missouri in the ‘60s, I became very active in the Science Teachers of Missouri [STOM] and was very active in that from ‘65 to 2002 until we moved to Kentucky. At some point, I don't remember the year, and it doesn't say on the award that I was given the President's Award for Service to Science Teachers of Missouri. So that's kind of a precious award because it dates back to my [junior/senior] high school days, and I was able to continue that activity while I was at UMR with the blessing of the university. So that's kind of neat.

While we lived in Rolla, I don't know how much people who watch this might know about South Central Missouri, but it's a kind of a tinderbox in the summer when the leaves dry out in the end of the summer and into the fall. So, we had a rural fire protection district, a member-owned fire protection district that protected us around—who lived outside the city of Rolla. I was elected secretary of that board for 16 years before we moved to Northern Kentucky, which was an interesting service experience. Unrelated completely to the mining industry, but a whole different world of buying fire trucks, keeping firemen safe, happy, volunteers. We had no paid people. So that was an interesting thing, and at some point, I was recognized by the fire department for that service as we were preparing to move to Kentucky.

Then, the others in there, SME Trustee of the Year Award; I was just awarded this past meeting, which was a surprise to me. I was awarded a Presidential Citation a few years ago by one of our presidents. Probably the biggest thing is, quite to our surprise, during the pandemic, I was hoodwinked into this, being told there was going to be an “emergency” MEC meeting online that Kathy and I, Kathy, being my wife, should attend. We get all geared up with my computer, and we go in at the specified time. And Steve knows the other side of this much better than I do. We had no idea that they were renaming the MEC outreach award to C. Dale and Kathy Elifrits Outreach Award. And here I go on the screen, and there are 70 some people when I go into what was supposed to be an EMC meeting of 6 or 8, and it grew up to 80, Steve, something like that to announce that this award was being renamed for Kathy and me. I sat there completely flabbergasted. I don't remember the comment I made to Kathy when I realized there were 70 – 80 people on there, but it was probably not a printable comment. That's probably the award that I am most humbled by in terms of recognition for what we've done. And I'm really pleased that Kathy's name is on it because we've been a team, and without her, I would not have been able to do a lot of the things I do.

Gardner:

I was proud to be part of that, and you and I worked through the old GEM Committee, the Government Education and Mining, and then the Minerals Information Institute when those merged, and then leading into rebranding everything as the Minerals Education Coalition. That is the MEC Leadership Award that was named in your and Kathy's honor.

Gardner:

An impressive group of awards. And I think I'm reminded by seeing one of your lapel pins that you were also named an AIME Honorary Member.

Elifrits:

That's correct. That happened this last year at SME, this past SME. So now I'm a part of AIME, and I'm humbled to be that way because I'm in tall timber with people like Steve Gardner and George Luxbacher and a few other luminaries in the mining engineering business. So, I'm humbled by that.

29:48 My Wife, Kathy, and SME – My Number One Supporter and Proofreader Over the Years

Gardner:

But we were talking about your wife, Kathy, and the two of you being a fixture at SME meetings over the years. But something else that has been a fixture has been your signature bow ties.

Elifrits:

Yes. I enjoy wearing bow ties, and I chose this one because I thought people that watch this video are probably going to be technical folks. And so I've got a bow tie with all the accouterments of technology in some form, a little antiquated, but there and this would be a good bow tie to wear today. But yes, I've worn bow ties for probably 40 years now, something like that.

Gardner:

Everybody recognizes Dale and his bow ties.

Elifrits:

Yes. It seems to be a signature thing that tips people off.

Gardner:

And, you know, mentioning Kathy. Let's just talk about her a little bit because you all have been a team, and she's been a fixture at SME meetings along with you over the years.

Elifrits:

Yes. In fact, I got into some trouble last year when she couldn't go to this immediate past meeting. She couldn't go, having had a knee joint replaced a few weeks before, and I had to answer a lot of questions. Where is your wife? Where is Kathy? But yeah, we have been a team. She is a retired high school math and Latin teacher. Then, she got into the ministry as a licensed local Methodist pastor and is fixing to retire from that this June. Right now, she serves a little church about 50 miles from where we live, down a highway through Northern Kentucky that's known to be a dangerous highway: the AA Highway.

But she taught. She's also been my proofreader. She has a degree in Latin and a degree in math. So, she is quite well versed in the English language and the origin of 85% of the words in the English language. So, when it comes to looking at something I've written, she can straighten out my grammar, clean up my word usage, and set the punctuation so that oftentimes, stuff that I send to SME goes through the editorial process relatively unmarked because it's gone through her. And if I don't have her at hand. Our oldest daughter is also a Latin teacher, and she lives about 30 minutes away from us. So, I get Amy to look at it, and this has been a great benefit to me, to be quite truthful, to have your own technical editor

right beside you.

32:11 The Proud Father of a Technical Editor, an Ordained Minister and a Teacher

Elifrits:

We have two other daughters just to expand the family. Identical twins, yes, one's left-handed and one's right-handed. The left-handed one is married and has two sons. She and her husband have two sons, both of whom are right-handed, which is greatly discouraging to her. The right-handed one is married and has three daughters, two of which are left-handed. So, the one with the two sons is an ordained Methodist minister who runs the Wesley Foundation program at Eastern Illinois University. The one with three girls is a high school math teacher and has just finished a master's in special ed to work with kids that have a learning disability or other problems with math. And she's really enjoying that new role of picking up some of these kids that have problems learning and trying to help them. So that's kind of our family background. For what it's worth, as I said earlier, [I'm] a native North Missourian. Kathy is a native of Cincinnati, right across the river, about 12 miles from where we're sitting today. So, coming here to NKU was coming back home for her, which we never anticipated. But it's been really nice to be back here among her family. So, this is really a comfortable situation.

Gardner:

So, how did your work impact your family life, and how did your family support your work?

Elifrits:

Well, I am blessed with a family that thinks Dad is doing things good and leaves me alone and supports me. We traveled as a family when the girls were small, when we could, to the things that I was involved in. The girls learned a lot more about landfills and surface coal mines than they probably ever wanted to know. But nevertheless, they learned, and they're still very supportive. They want to know where Dad's going and what are you doing now, and what's next with your consulting or research work, which at this point is nil. But they still ask about things, and they've been exposed to enough of that that as they travel, they make observations and call back or text back and say, we saw this; what is it? So, they've followed me along and been very, very supportive. I missed a lot of their events in high school, and they never complained. I was not happy to miss them, but sometimes, I had to put my job ahead of going to some school event. But they've been very supportive, and as I say, Amy works as the second technical editor, so that's been good.

34:43 Rotary Club Elevator Talk – Leadership and Landmark Events

Gardner:

Well, something else that I know you've been very active in is Rotary. And tell us a little bit about your rotary activities.

Elifrits:

I've actually been in Rotary longer than I've been in SME by about two years. I got involved in that in a very unusual fashion. I had no clue what Rotary was, and a colleague at UMR kept bringing me to the

Rolla Rotary Club meetings to talk about some of the things that my department was doing at UMR. After about the third interview, so to speak, by the club, one of the stalwart members of the club said to this colleague that had brought me, he said, okay, Larry, when are you going to nominate him for membership? So, this fellow nominated me, and unfortunately, he died of a heart attack before they got me inducted into the club. So, the state geologist of Missouri picked me up as my sponsor, and that got me started in Rotary. And that was in '82 or '83, somewhere along in there, and I was club president in 1991.

Some of the old timers in the district, if you know about Rotary—Rotary is divided into districts with 30 to 100 clubs in the district. Some of the old-timers in our district decided I ought to be a district governor, which I had no desire to do at all. But lo and behold, I was elected to the district governorship, so I was district governor in southeast Missouri in Rotary year '97-'98, in a district that no longer exists because the state of Missouri had four districts. The four districts concluded in the early 90s that there weren't enough people, enough economy around to have four districts. We ought to have three. I was appointed to the committee to figure out how to redraw the lines. The lawyer that was appointed to the committee said, "You know, Dale is from Rolla. He has access to maps, so we ought to make him chairman of this committee." Hence, I inherited the chairmanship of the committee, and we redrew the four districts into three. And this is the first time in the history of Rotary [worldwide] when districts had been consolidated. It was a landmark event for Rotary, and it was really a fun event.

If you think politics are shrewd, get into Rotary politics, and you get the good old boys that have been going to the same conferences for 30 years, and they don't want to be moved to another district to lose their friends. So, it was an interesting thing, and I've done a lot of other things in Rotary. I chaired a breakfast for Rotary Club members this central region of the country in Birmingham, England, at the international convention, which had about 350 people there eating bangers and eggs, as the British referred to in our menu. I've traveled some for Rotary. We've hosted some Rotary Youth Exchange daughters from Brazil that we still keep up with. We have gone to Brazil, where they were from, to visit their families. And I'm still active in my Rotary Club, having lots of fun.

I just found out when I opened the mail from having been gone last week that I've now been scheduled into a presentation at our district conference at the end of April that I didn't even know was happening. So, I've got to, this week, find out what's going on there and what I'm supposed to talk about. But yes, we've provided a lot of support to polio, to get rid of polio in the world. Which Rotary, with the help of the CDC and World Health Organization and some other—mainly countries, the US, Nigeria, other African countries, and India. We're about to stamp out polio. We're down to a handful of cases a year. So that's my rotary elevator talk.

38:21 AIME and SME Membership – Building a Network and a Home

Gardner:

So, when did you first hear about AIME and SME?

Elifrits:

Well, SME, I sort of knew about it in high school because my first dream of going to college was to go to the Missouri School of Mines and major in either metallurgy or mining. At that time, geological engineering had not yet become a department on the campus. So, I didn't even have an opportunity to

look at that. As I explored opportunities for post-secondary education experience, I became aware of SME through the information on the catalog of the Missouri School of Mines website. But I don't know that I knew about AIME until I got well involved in SME and saw things going on at SME that were AIME related. So that's kind of the string of things, and once I got involved in SME, it seemed to be a home, and I've been there very comfortably since then.

Gardner:

So, how has SME membership benefited you in your career?

Elifrits:

Well, I think the biggest thing is the network that you have. I mean, you develop a network of people that are in the business all across the nation and now, to a lesser extent, all across the world. So, I think the networking is one thing. The technical papers were great when I was doing research work. Going to the technical sessions was very, very supportive of that. Being involved in education and SME, having an active education wing that I could find a home in, has been extremely rewarding to me and still is. I just returned from working a booth at the National Science Teachers' annual meeting. Six of us folks from MEC handed out at least 2000 rock boxes, which the teachers filled for their own rock kits to take home – rocks and minerals [from containers on the booth table that mining companies provided for us to give to the teachers]. That was just a really, really satisfying experience. Both from the standpoint of working with the teachers and from the standpoint of being with six of my close friends from SME and just being able to be with them for 3 or 4 days and enjoy their company and enjoy their technical competence in their fields. So yeah, I have derived great benefit from SME. There's no question of that.

40:44 The Importance of High School Outreach on the Future of Mining Engineering

Gardner:

Well, you've been involved in education, and you've been involved in trying to educate the public on mining. In your opinion, what else can we do to attract young people into the mining field?

Elifrits:

This is really, in my viewpoint, a difficult thing to deal with. Most of the time that I was at UMR, I was involved in recruiting in one form or another. So, I never made a regular route to high schools, but I went to lots of high school events where there were multiple high schools invited to a single career night. At the [16-year-long] time that I was in freshman engineering, which is where all the engineers started, I was the [faculty member] that admissions brought campus visitors to talk about getting into engineering. My sense of how to solve this problem is we've got to someway, as a profession and as a group of engineers—and this is true for all kinds of engineers, not just unique to SME. We, in some way, we've got to figure out a way to get to those kids and their parents while they're in high school because, at this point, the parents have about as much to do with where the kid goes as the kid has to do with it. And in mining, in particular, the world doesn't even know we exist as a profession, unfortunately. I mean, that's a sad fact, but it's true. And that was borne out by numerous conversations last week at the MEC booth in Atlanta.

The teachers would come up and look around. Well, this has got to do with mining. Is there really mining

going on? Yeah. Yeah, there really is. So we've got to figure out some way to get to those kids on a face-to-face basis, and that's a very difficult nut to crack. I don't know how we do that. I know how I did it when I was at UMR because admissions brought them to our office, and we had parent and child sitting in my office so we could talk about engineering in general. As I was available, I talked about geological and mining engineering, but I couldn't focus on those only; I had to talk about all 13 disciplines on campus. But if we don't get the parents involved, I don't think we're likely to see any big growth, and it's going to be very difficult to do that. What SME's doing with the careers of the future videos is going to open some doors; I think it'll open a lot of doors, in fact. But it is really a difficult thing to recruit students into engineering at this point in time.

43:22 Most Rewarding Part of My Career – Seeing the Successes of My Many Thousands of Students

Gardner:

Well, Dale, what has made working in the mining industry meaningful to you, and what's been your favorite part of working in this field?

Elifrits:

Well, I think one thing is to know that in some small way, with some of my research work, I think I've made a contribution to erosion control in some places. I know we made a contribution to revegetation by changing the way topsoil and subsoil are replaced. The other overriding thing in the industry is the education side of it. All the students that I had in class who have gone out successfully in the industry. SME, every year, is a reunion of a lot of the students that I have had. For instance, the two women that ran the keynote session, I had both of those young ladies in class. One of them was in a senior design class that I taught, and they figured out for Missouri DNR how to decommission an old Barite tailings dam site over in the Washington County Barite district. The report that that young lady wrote as a senior in geological engineering is the basis for Missouri DNR rules now about how to close out and remove one of those dams. I had been told this all along, but I'd never really seen it, and I couldn't prove it. So, I said something to her about it at SME. "Do you know that I think your paper is what Missouri uses for their rules about barite dams, barite tailings dams?" And she said, "You know, I worked on a tailings dam about two years ago in Missouri, and I read those rules, and I thought this really sounds familiar; I wondered where this came from." I said, "Well, a good bit of it, I think, came from your report in design class." So those kinds of things from the education field are precious. And I know there are other people that I see every year at SME where I keep track.

The last year I taught eighth-grade science, I had a kid in class who built a model of an underground mine using a refrigerator shipping carton. He and his dad put this thing together, and he had all of the surface stuff up on top, and then he had the mine inside it. And he had actually had it from an erector set—he had a little toy hoist arrangement where the skip could be hauled up to the top on a string. He wanted to be a mining engineer. He wound up going to UMR in mining, and the year that I started teaching land reclamation for the mining engineers, he was in my class as a senior at UMR. So, I see Kurt on a regular basis, and that's one of the greatest parts of my career is having had the opportunity to make some small impact on those folks' minds that they remember, and I see them. And as I say, the research work, what we did on subsidence in Southern Illinois and helping people understand why their house goes down, and the one across the street doesn't, was a contribution. So, you know, and I can tell numerous stories like that. I don't think we need to belabor the storytelling. But that's the great thing about being a university prof. You get to see your people go out and excel in the world and do good. And

that's just—it's really, really heartwarming.

Gardner:

Any clue as to how many students you've taught over your career?

Elifrits:

You know, I had an old gentleman at church a few years ago ask me, how many kids have you had in class? I went home and thought about that, and Kathy and I talked about that. He had to realize that while the 14 years I was in freshman engineering, I taught half of the orientation classes, and every freshman engineer had to take an orientation class. So, I had a good many hundred students in those classes every year, at least, probably 300 or so. So if you add that in— I figured out from the class enrollments that I had, that I could remember, somewhere in the neighborhood of about 10,000 kids have sat in a seat in my class at some time. I think now, as I say, that includes that 14 years of 3 or 400 a year there. So that's a big chunk of that. But somewhere in the neighborhood of 10 or 11,000, Kathy and I finally calculated, and I probably have kept in contact with 40 or 50 of them pretty regularly. And I was actually invited back to Smithville, where I started teaching in [the fall of 1966]. One of the classes that had its 50th reunion a year or so ago that I had all those kids in class, they hunted me down and invited me to come to their 50th reunion. I had a conflict and couldn't go. But you know, those rewards, you can't put a price on. They're just really satisfying rewards that stay with you.

48:02 A Rewarding and Enjoyable Career – Contributions to the History of Mining Engineering

Gardner:

That's great, Dale. Do you have any regrets regarding your career choice and where it's taken you, or anything you wish you would have done differently?

Elifrits:

Absolutely none. I am just so blessed with the career I've had, and I'm still having. SME is still keeping me integrated into the system, and that's just a great blessing. And I don't regret a thing about it at all. It's just been a great career.

Gardner:

Well, how would you sum up your career in 2 or 3 words?

Elifrits:

Well, let's see. What did I write down about that? I think I would say rewarding and enjoyable are probably the two words I would use because teaching is a rewarding career, particularly when you get into it and something that you really love yourself. And it's enjoyable when you've got kids that are wanting to know what you are trying to help them learn and the feedback from them, and then to see them succeed. So rewarding and enjoyable, I think, would be my terms.

Gardner:

Well, Dale, is there anything else you would like to add to our discussion here today?

Elifrits:

I don't really think so. You know, this has been such a rewarding experience here this morning, and I really appreciate the opportunity to be interviewed and hopefully make a contribution to the history of the mining engineering career and careers in this country in one form or another. I don't think I have anything else I'd like to add. Unless you've got something else you'd like to quiz me about.

Gardner:

Dale, it's been my honor and privilege to do this interview, and I feel like I've been one of those 10,000 students of yours in the time that we've known each other. I appreciate the opportunity of having been associated, and I look forward to that continued relationship.

Elifrits:

I feel privileged to have you honoring me. I feel privileged to have SME and AIME choose me for this, and it's been a great experience. Thank you for all you've done, and thanks to the AIME folks for putting this together, too.

Gardner:

Well, thanks, Dale. We sure appreciate it.

Elifrits:

Great. Thank you.