



AMERICAN INSTITUTE OF MINING,  
METALLURGICAL, AND PETROLEUM ENGINEERS

## ORAL HISTORY PROGRAM

**Raymond Lowrie: A Miner, An Author, An Influencer**

**Raymond Lowrie**

## **PREFACE**

The following oral history is the result of a recorded interview with Raymond Lowrie conducted by Barbara Filas on February 24<sup>th</sup>, 2020. This interview is part of the AIME and Its Member Societies: AIST, SME, SPE, and TMS Oral History Project.

## **ABSTRACT**

Leaving the Navy in 1956, Raymond Lowrie began his lifelong mining career studying at the University of Texas-El Paso and working as an underground miner with Climax Molybdenum Company. After working in low coal mining, Lowrie started his career with the US Bureau of Mines and his marriage of over 50 years in Denver, CO. During his time with the US Bureau of Mines, Lowrie served as supervisor of the wilderness program and worked to implement and regulate the Federal Surface Mining Control and Reclamation Act of 1977. Lowrie's proudest work is his published Engineering Handbook which reflects his commitment to serving the needs of engineering students and closing educational gaps. Lowrie continued his commitment to education as SME Professional Registration Coordinator where he evaluated the professional engineer (PE) exam and shaped its current structure. A lifetime Distinguished Member of SME and recipient of a SME President's Citation, Lowrie has dedicated his life's work to the mining industry where his influence will remain.

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.

## TABLE OF CONTENTS

### PART 1

- 00:52 A Family Transition – Moving from Southern Appalachia to El Paso Texas
- 03:12 Uranium Wealth and Fortune – Drawing Me into Mining and the University of Texas-El Paso
- 08:07 Low Coal Mining – A Young Man’s Job and A Group of Men Doing Anything for One Another
- 09:43 From a Honeymoon in Denver to A Career with the US Bureau of Mines
- 14:10 Supervisor of the Denver Office of the Bureau of Mines Wilderness Program
- 18:44 Second to Earn a Master’s Degree in Mineral Economics from the Colorado School of Mines
- 22:38 An Eventful Two Years in Ohio – Implementing Strip Mining Laws and the Reclamation Board of Review
- 27:01 Bureau of Mines Serves the Mining Industry
- 31:26 The Federal Surface Mining Control and Reclamation Act of 1977
- 36:04 Kansas City Regional Director – Regulating State’s Reclamation Programs
- 38:32 The Reagan Administration’s Impact and Becoming Assistant Director of OSM
- 41:41 Differences Working in the East and West Mining Regions

## **00:52 A Family Transition – Moving from Southern Appalachia to El Paso Texas**

Filas:

Today is Monday, February 24th, 2020. This is an interview with Raymond L. Lowrie, who is a mining engineer and former Assistant Director and Regional Director of the Office of Surface Mining. He was also the Chief of the Intermountain Field Operations Center for the US Bureau of Mines. I'm Barbara Filas, and I've known Ray for many years; and I'm honored to get to tap into Ray's professional background as part of the American Institute for Mining, Metallurgical, and Petroleum Engineers Oral History Project. We're here in downtown Phoenix, Arizona, attending the SME Annual Meeting and Exhibit. Now we'll be discussing Ray's mining sector experiences and his impressive contributions to the industry. Let's take a big step back, Ray, and let's talk a little bit about where you're from and how you grew up and that sort of thing.

Lowrie:

I was actually born in Alcoa, Tennessee, back during the depression days. My dad worked at the Aluminum Company of America plant in Alcoa, Tennessee. He made \$8 a week. This was depression days. We moved around a little bit as a young person, but my dad ended up with a job in Texas, first in Dallas. So, we moved to Dallas, and my early grade school years mostly was in Dallas. Then, he got transferred to El Paso, Texas, West Texas, which was quite a move for my parents because both of them were from southern Appalachian states. My mother, Elizabeth Buckner Lowrie, from Western North Carolina, she was raised on a tobacco farm. And my dad, Carl Henry Lowrie, from East Tennessee, here they are in West Texas. We didn't know for how long, but it turns out we were there for quite a long time. I grew up in El Paso, Texas.

Filas:

Did you have siblings?

Lowrie:

I do. I have a brother, Ernest Benson Lowrie; he's still living. He was a professor at Penn State. I had two sisters: older sister, Mildred Cornelison Meder, she's passed away, and a younger sister, Carlene Kennedy Lowrie, also passed away. So, that's my siblings. My older sister was also born in Alcoa, Tennessee, my brother in North Carolina, and my younger sister in El Paso.

## **03:12 Uranium Wealth and Fortune – Drawing Me into Mining and the University of Texas-El Paso**

Filas:

So, I'm going to ask you what influenced you to become an engineer. But, before I ask you that, because I think you mentioned that you were in the Navy and that might've had something to do with your decisions on your career path.

Lowrie:

Correct. I graduated from high school in May of 1950. One month later, the Korean war broke out. I went down and tried to join the Marine Corps. I was only 17 years old, and you have to have parental consent. My Dad wanted me to go to college. So, I started college, turned 18, and then joined the Navy instead of the Marine Corps. I did four years in the Navy. One of the significant things, I spent a year in Yokosuka, Japan. One of the officers that I was under, I was a second-class aerographer's mate. Aerology is the science for weathermen. This officer I was under was a graduate of New Mexico School of Mines. He knew I was about to get out of the Navy, so he put a rush on me to go to Socorro, New Mexico, to be at New Mexico School of Mines.

I gave it serious consideration, but El Paso at that time had the remnant of Texas College of Mines and Metallurgy, which has become the University of Texas-El Paso. They still had a mining program then, and this was during the fifties, during the uranium boom, and uranium fortunes were being made in uranium all the time. Charlie Steen, the great uranium owner at Moab, Utah, was actually from the school there in El Paso. And, he was an extremely wealthy, multimillionaire. At that time, and I'm not sure this is the best of reasons for going into a profession, but there was an awful lot of money being made, and it was being publicized. That drew me into the mining profession. But, I decided to stay there at El Paso because after having been gone for four years, I was kind of homesick, and it seemed prudent to go there to what was then called Texas Western College, now UTEP, University of Texas-El Paso. That's how I got into the mining industry, not into the industry; I was just into the school. When you get ready to graduate in most of the mining schools, companies come and interview some of the students who are about to graduate. I was interviewed by Lone Star Steel, which is a steel company that made pipe in East Texas. They hired me for the coal division, which is in Eastern Oklahoma. Eastern Oklahoma has very good met coal, metallurgical grade coal. And, I went to work for the Lone Star Steel company. One of the mines was outside of McAlester, Oklahoma and their other mine was outside of Bokoshe, Oklahoma. So, I went to work for them as an engineer for two underground coal mines. It's low coal; so, if you ever know anything about working in low coal, it's quite an experience.

### **08:07 Low Coal Mining – A Young Man's Job and A Group of Men Doing Anything for One Another**

Filas:

I've always thought about low coal as being very claustrophobic. Did you find it that way? A lot of people that work in low coal prefer it because they feel a safer feeling.

Lowrie:

It is claustrophobic, and you have to get used to it; Or, once you do, it's kind of like a group of men all loving each other. They would die for each other. They would do anything for each other. It's a cult almost, the low coal miners, and it's a good thing. It's a good, good relationship. It's hard to work under low coal because you're either stooping all the time, or working sitting down, or on your knees. And, of course, you wear knee pads; your knees just go to mush after a few years of working in low coal mines.

Filas:

It sounds like a young man's job.

Lowrie:

It is a young man's job. I had to quit because I was hurt in an accident, not a mine accident, it was a car accident. I had two broken vertebrae in the small of my back. And, I had a crushed heel bone. Your heel bone is a very small bone. Mine was crushed, had seven breaks in it. So, I was very uncomfortable with a broken back and that broken heel bone. You are just kind of dragging it, working in low coal. So, I got out of there.

#### **09:43 From a Honeymoon in Denver to A Career with the US Bureau of Mines**

Lowrie:

I decided I would become a lawyer. I went back for my convalescent period, back to El Paso with my parents. I had made an application to the University of Texas Law School. They wrote me back and said that I needed to have speech and accounting. And so, I took those two classes in summer school at UTEP, getting ready to go to law school at the University of Texas. Backing up a little bit, I met this girl in McAlester, Oklahoma. She was a teacher in California, but we'd met when she had come home to McAlester to spend Christmas holidays. We dated every night. So, I called her up and asked her to come down to El Paso to see me. She did, she came over to El Paso, and we decided to get married. So, there went the law school idea. On a honeymoon, we went from McAlester, Oklahoma, to Denver, Colorado. I knew the USGS hired mining engineers in their conservation division because we had some federal coal in Oklahoma. USGS regulated what kind of percentage you would get in the federal coal that you mined. So, I knew some of the people in the conservation division of the USGS. I went to their office in Denver, which is in the Denver Federal Center on the West side of town. I walked in, told them I was looking for a job. They said, "We don't have any openings right now, but the Bureau of Mines is hiring somebody that's got your background." So, I went over there to the Bureau of Mines at the Denver Federal Center, and they seemed very happy.

They'd been looking for somebody with my background, underground coal mining, for quite some time. They said, "If you can pass the physical, we'll hire you on the spot." And, I said, "Well, good." So, my wife and I went back down to El Paso, and I got our old family doctor to agree that I can pass a physical and did all the paperwork, and we went back to Denver. That's when I started with the government, with the Bureau of Mines, which does not exist anymore. But, I worked for the Bureau of Mines for quite some time. I stayed there for a while, and I did a lot of interesting Bureau of Mines work there. But, I was transferred to DC, worked in DC headquarters, and the division I went to was bituminous coal. Worked in DC, stayed there for a while, came back in a promotion to Denver, and stayed there for quite some time.

#### **14:10 Supervisor of the Denver Office of the Bureau of Mines Wilderness Program**

Lowrie:

I was a supervisor of the Bureau of Mines Wilderness Program. The 1964 Wilderness Act required that the USGS and the Bureau of Mines evaluate all of the primitive and wilderness areas in the United States. Out of Denver, we covered quite a few of the Rocky Mountain States: New Mexico, Arizona, Utah, Colorado, Wyoming. So, there was quite a few wilderness areas in there that I was involved in evaluating for the Bureau of Mines, the mineral potential of those areas, along with the USGS. All that work is completed now. It was published in USGS series of publications of the mineral potential of each of those wilderness areas. Of course, they've been expanded and additional ones have been added.

What they're doing on the mineral potential there since then, I don't know. But, the 1964 Wilderness Act required the USGS and the Bureau of Mines to evaluate the wilderness areas at that time.

Filas:

A lot of the USGS and Bureau of Mines publications ended up on the OneMine[.org] website. Have you ever Googled your name on that to see how many of those publications come up?

Lowrie:

I do have a couple of our other Bureau of Mines' publications, but I haven't Googled for the USGS because, as a supervisor, I ran the program, where we had people that were mining engineers, subordinate to me, actually doing the work. So, their names are the ones on the ones with USGS. Sometimes they would give credit to me, but when you're running a unit and professionals are working in the unit under you, they get the credit, and they should get the credit.

Filas:

Totally agree, totally agree. So what was the most interesting project that you worked on with the Bureau of Mines?

Lowrie:

Oh, I evaluated a coal mine in Utah that had made an application for some financing with SBA, Small Business Association. So, I evaluated the mine and the market and determined that he couldn't sell the coal. The coal was to go to a particular power plant. I talked to the power plant, and they were not interested in this particular mine's coal for technical reasons; the coal didn't quite meet their needs. So, I reported that, and it really caused an uproar from this coal operator because the government turned him down on his application for financing. With all the shouting going on there, that was interesting.

#### **18:44 Second to Earn a Master's Degree in Mineral Economics from the Colorado School of Mines**

Filas:

Yeah, sure. I see that you have a master's degree in mineral economics, tell me a little bit about that.

Lowrie:

Yes, the start of the Bureau of Mines was because of coal mine disasters, and the Bureau of Mines started in 1910. For a long time after that, the mission was to stop these disasters, truly disastrous accidents in coal mines. Coal mines evolved over the years, and the Bureau of Mines still researched coal dust and gas suppression techniques but got quite a bit into metallurgy and rock mechanics. [They] became the world's greatest experts in rock mechanics and economics of producing minerals from lots of different deposits. And so, economic and environmental aspects became a large focus of the Bureau of Mines. For economics, we had a new assistant director that pushed economics. His name was Bill Vogely. I was considered one of the up-and-coming engineers at the time, and they sent me back to school. Colorado School of Mines had started a program teaching mineral economics. I was the second person to go through that program, and, of course, this was while I was working for the Bureau of

Mines. I went there and got an MS in mineral economics from Colorado School of Mines because it seemed so applicable to what we were doing at the Bureau of Mines. I was the second person to get a master's degree in that program.

Filas:

Yeah, it was a master's. I wanted to confirm that because I thought it was a master's, not a bachelor's, I think. So, during your academic years, did any professors at either Texas or at Mine's, any people stand out in your education?

Lowrie:

In my undergraduate years, I had a mining professor whose name was Guy Ingersoll. He was out of Minnesota, the Iron Range, and he kind of took me under his wing. There was another professor in the geology department named Bill Strain. He was just an outstanding professor. You have a lot of different professors, and you learned a lot from them. But, every now and then, an outstanding one pops up and sort of gets through to you. And, this is such a man. He's retired now.

### **22:38 An Eventful Two Years in Ohio – Implementing Strip Mining Laws and the Reclamation Board of Review**

Filas:

As you were working with the Bureau of Mines, I think you mentioned to me before we started this interview, that you were moved over into Ohio for a position.

Lowrie:

The state of Ohio, in 1972, passed a very strong strip-mining law that pertained to coal strip miners. This state didn't really have in-house technical expertise in that topic. So, the Department of Interior, the Bureau of Mines was part of the Department of Interior, had little expertise either because there was no federal law at that time, so it needed to have some expertise. The Bureau of Mines sent me through what's called the Intergovernmental Personnel Act, to Ohio to assist in the implementation of this strong strip-mining law. I was to be the assistant chief, assistant under the guy that ran the program, to help him from a technical aspect. After I got there, this person became ill. So they asked me if would I do the program. So, I did, I became the chief, and I was there two years.

That was the most amazing two years I think I ever had because, in state government, in a politically controversial position, I had to do it all. Not being experienced in politics, not being experienced in that topic at all, but all of a sudden, I was in, and I mean I was really in. I got sued where I had to make an appearance in front of what was called the reclamation board of review. That's for lawsuits. During the two years I was there, I was in front of that board 14 times. I was in front of the state legislature committees House and Senate. I lost count of how many times. But, it was almost always on short notice that a call would come up, come in, Ray, we need you down here in front of a House committee. So, it was a couple of miles drive down there. Without preparation, you make a statement. The chairman of the committee asks, what do you have to say about some issue and so you say what you have to say. It was two years, a very good experience, but it was a heavy experience. Then after the two years were up, I went back to the Bureau of Mines. And, shortly after that, they promoted me to be the

head; I was the Chief of the Intermountain Field Operations Center, which is quite a significant position in the Bureau of Mines.

### **27:01 Bureau of Mines Serves the Mining Industry**

Lowrie:

At a later date, the Federal Surface Mining Control and Reclamation Act of 1977 passed. I became one of the regional directors at Kansas City, Missouri. Basically, because of my experience in doing regulation of coal strip mines in Ohio. [Filas: From the Ohio position] Yes, of course, you knew I had a lot of mining industry experience.

Filas:

But, there wasn't a lot of regulatory experience in—

Lowrie:

Oh no, it was regulatory in Ohio, but not in the Bureau of Mines. The Bureau of Mines is the only agency in the federal government that had the mining industry as its mission to make sure it was successful. It started out with mining disasters and not much regulatory responsibility. After a while, it was in the 1970s, there was a reorganization in the Department of Interior that put the minimal regulatory function the Bureau of Mines had over in a new agency - MESA, Mining Enforcement Safety Administration. It was in MESA for quite some time. Then, at some point after that, Congress decided to take MESA and put it over into the Department of Labor and changed its name to MSHA, Mine Safety and Health Administration. The regulatory function went from, which was weak when it was in the Bureau of Mines, to MESA. It was much stronger. And then, over into MSHA, which was even much more stronger. The Bureau of Mines was left with the purpose of defending and helping and promoting the mining industry. Much to my chagrin, much later in the nineties, about 1994 or 5, Newt Gingrich wanted to eliminate a federal agency. At first, they said the purpose was to get some federal agency, and they had in mind the Fish and Wildlife service. But, it turns out there are too many fishermen, and there are too many hunters. So, the Fish and Wildlife service has a powerful constituency. It was too powerful to eliminate. The Bureau of Mines constituency was the mining industry, and the mining industry didn't make a big enough stink to save the Bureau of Mines. It was not funded; they just didn't fund it. So, with no money, you're out.

Filas:

And, I think many of us in the mining industry have regretted that day for a long time.

Lowrie:

Because it's a sad day, 1994, 95, one of those. That was a really, really bad day for the mining industry.

### **31:26 The Federal Surface Mining Control and Reclamation Act of 1977**

Filas:

Let's go back to the seventies. You were in the Interior Department in various positions, whether it was the reclamation in Ohio or whether it was the Bureau of Mines, and you ultimately ended up at the OSM. So, what was your role during the development of the surface mining control and reclamation act and the promulgation of those laws and regulations?

Lowrie:

Well, I started out as a regional director in Kansas City. And, the early days of the implementation were kind of a rough time because the coal industry had to do a lot of things that they hadn't had to do before. Many of the underground coal industry didn't realize that they were even under the surface mining control and reclamation act. Suddenly, inspectors showed up at these underground mines; Where's your permit? Where is your reclamation plan? What are you talking about? They didn't realize. That's one of the reasons, I think, that the surface mining control and reclamation act passed was the underground coal industry didn't oppose it that much. They thought it would be advantageous for them in competition with surface mining. That's not all of the underground mines, some are much more in tune, but a lot of the operators, especially the small ones, didn't realize. So, politically, there was something else to be, an agency where you're enforcing laws and regulations that they don't like. There's a lot of screaming; but, as it turns out, the most, it's like 99.9% of the coal operators today, realize, and they even compete with each other on doing reclamation. We do a better job than you do. I can show you any number of places that you can't even tell a mine ever existed there because it's so well reclaimed. Natural vegetation is on it—lots of animals, deer. You can't tell it was mined, so what's to complain about that? Nothing. A lot of my job was working with the states because, at the beginning, it was called the interim program. Each state that wanted to put together a permanent program submitted a very detailed, very comprehensive proposal to us, and we went through it with a fine-toothed comb and required some changes. For the most part, things were acceptable, and we then recommended approval, and they were approved by the Secretary of Interior. So much of my work was involved in dealing with the various states that submitted programs.

#### **36:04 Kansas City Regional Director – Overseeing State's Reclamation Programs**

Filas:

So, you dealt with approving the programs. Were there some states that had coal mines that were under your jurisdiction that you had to regulate directly?

Lowrie:

We regulated directly until the permanent programs were approved. The first one in the United States that was approved was Texas. I got some kudos; essentially it was in my region. The second state to be approved was Montana. Montana had existing; when the federal act passed, they had existing, a pretty decent program. Before the federal act passed, so it wasn't a big deal for them to change over. Montana was under the jurisdiction of the Denver office. As you know, when you're head of the whatever program, whatever office, you have a lot of people under you that are doing the work, and you're overseeing it, and you're worried, and you get blamed, but you have other people that are doing the actual work.

Filas:

I can see that you must've had a lot of people who liked working with you because you were giving credit to your subordinates rather than taking credit.

Lowrie:

OSM and the Bureau of Mines, too, have a lot of idealistic people that come in and work. And, many of them, you have to slap down a little bit; they're overboard. But, yes, I had a lot of good people, and I had good relations. I never had to terminate many people. I have had to terminate a few.

Filas:

It's always hard. Isn't it?

Lowrie:

Yes.

### **38:32 The Reagan Administration's Impact and Becoming Assistant Director of OSM**

Filas:

So, as assistant director of OSM, I see that you spent some time in Pittsburgh and in Kansas City.

Lowrie:

Yes, at the end of my tour in Kansas City, it was because of the change – this was a huge change for the United States, not just for our lives. Jimmy Carter was President of the United States, and then it went to Ronald Reagan. Ronald Reagan brought in James Watt as Interior Secretary. James Watt had his own ideas on how things— Reagan ended up having to fire James Watt. Watt blew the agency apart, and the whole idea was to transfer everybody, allow them to quit because they might not transfer, and this happened. I was transferred to Pittsburgh. It was either transfer or out the door. I wasn't old enough to retire, So, I went to Pittsburgh. I headed up what was called a technical center, Eastern Technical Center. And, we provided the technical support for all the inspections east of the Mississippi River, all of Appalachia, which was a good experience for me because I hadn't really worked that much in Appalachia.

When you're in the coal business, that's good to get more knowledge on the coal industry in Appalachia. That went on for several years, and a new director came in. He needed somebody back in Colorado, and I leaped at the chance. I went back to Denver, and they changed the names of the titles of the positions from regional directors to assistant directors. Why? I don't know. It's basically the same job even though you have a little bit different title. So, I became assistant director of OSM for the area west of the Mississippi, including Alaska. I went up to the Usibelli mine in Alaska, several times. In fact, I was all over Alaska during that time.

### **41:41 Differences Working in the East and West Mining Regions**

Filas:

As you know, I started my career in coal, and I worked both in the West and the East, or at least as far as Illinois goes. But, there was a very strong cultural difference between coal miners in Illinois, and I did some work in West Virginia, and those in Colorado and Utah. Did you see that from the regulatory side?

Lowrie:

From a regulatory side, I think it's really hard to say. I know Ohio is really a part of Appalachia. The coal part of Ohio borders Pennsylvania, West Virginia, Kentucky, so it's Appalachia. Some of those coal miners would do the best work you could possibly imagine. There are always a few select, 1/10th or 1% East or West, that will fight you on everything. So, even though culturally, in other ways, I can see many differences, but not really so much in coal mining.

Filas:

Did you ever see any influence from the regulatory side when a mine was a union mine versus a non-union mine? Difference in performance, a union mine versus a non-union mine?

Lowrie:

That was not a factor unless you just happened to know that this a union mine. The mines that I worked at when I was in Oklahoma, actually in mines, they were both union mines. That was a shock to me because I never knew that there was such a difference between union and management until you get there. Then you get there, and you realize there's a real, real difference. That was not an issue any of the time when I was with the Bureau of Mines or OSM. The union, non-union thing was not a factor.