ORAL HISTORY PROJECT

The Reminiscences of
James Joseph Lemmon

The University of Arizona
2018
The following oral history is the result of a recorded interview with James Joseph Lemmon conducted by Denise Moreno Ramírez on November 8, 2018. This interview is part of Moreno Ramírez’s dissertation research at the University of Arizona.

Readers are asked to bear in mind that they are reading a transcript of the spoken word, rather than written prose. The interview focuses on Lemmon’s recollections about his life in Arizona and his experience in relation to the Tucson International Airport Area Superfund site located in Tucson, Arizona.
Q: Hi Jim, how are you doing?

Lemmon: Good evening Denise I'm doing fine.

Q: That's good. So, I'm very happy to finally meet you in person.

Lemmon: That's a, well, it's a pleasure to meet you. I'm glad you're doing research in this area.

Q: Yeah [Laughs]. And so, my first question, we're gonna start in the beginning.

Lemmon: Okay.

Q: I want to know where you were born.

Lemmon: I was born in Highland Park, Illinois. My family moved out to the west into New Mexico in the 1960s uh in Santa Rosa, New Mexico on the Pecos River. And, that's when I really became interested in rocks and geology and hydrology. When I was a young boy and, and fishing and swimming in the sinkholes and in the rivers uh of eastern New Mexico.

Q: And, what did you do for fun then as a kid there?

Lemmon: Um well, we played in quarries, we played in the sinkholes, you know, in the water the springs were coming up and we could see the fish swimming and all those sort of things. And so, I was a uh, uh teenager, just entering my teens and my family moved to Colorado. And, uh short time in Moab, Utah and I became more interested in rocks and the outdoors. And, uh eventually I went to college in Grant Junction Colorado and uh studied forestry. And, later on I graduated with a degree in environmental geology.

Q: And, was that in Colorado also?

Lemmon: Yes, that was in Colorado.

Q: And, from Colorado where did you go next?

Lemmon: Well, um went into the army and came back out of the army, I got married. After I had my undergraduate degree we looked around for work and we came back down here to Arizona and the Phoenix area where my
wife is from. And, I found work with the state land department doing water rights and field investigations.

*Q:* And, how was that, working in water rights during that time?

*Lemmon:* To me it was fascinating because I went all over the state. I traveled over 45,000 miles in one year. Going around looking at stock ponds, looking at wells, measuring wells, groundwater, surface water resources uh and, it was predated a lot of the agencies we see today. So, it was very small community and water with hydrologists both surface and groundwater hydrologists.

*Q:* And so, were you the person that kind of sees how people are allo- using their water?

*Lemmon:* Well, yeah, that water rights program, this is before the Department of Water Resources was created, yes. I mean, you had to have permission to use the water, surface water, and the allocations for whether it was for agricultural or mining or for municipal use. Uh the groundwater was just starting to be regulated then and the groundwater management act of 1980. And so, people were registering their wells, recording how much they pumped, both down in the Tucson area and here in, in Maricopa County and in Pinal County, the active management areas.

And, in all three of those areas the groundwater was being withdrawn at a faster rate than it was being replenished so we had active subsidence of the land surface. And, that later created fissures and sinkholes and things of that nature that create problems for highways and for pipelines and that sort of thing. But that regulated the permission to draw the water and basically you co- the water was still a property of the state, the groundwater as well as the surface water. You didn't own it you only had a right to use it. And, nobody had a right to pollute it.

*Q:* And so, from that work that you did, how did you then enter the Arizona Department of Health Services? Or, was there anything in between that you want to talk about?

*Lemmon:* No, no, I was recruited by the Health Department to come work on a program, Safe Drinking Water Program, in the department of health services. And, they had limited funding it was from the federal Safe Drinking Water Act to look at the potential impact to uh drinking water supplies from surface impoundments used to store, treat, or dispose of liquid waste. And so, the program was for uh about two years and so, we didn't have a lot of people that were willing to do that, but I was working on my graduate degree part time at that time, so it sounded interesting. So, I went to work for the Department of Health Services as a hydrologist.
Q: And Jim, can you tell me what exactly you were responsible then for at, when you were recruited to the Arizona Department of Health Services?

Lemmon: Sure. I was recruited because uh number one, I knew uh a lot of the areas around the state because I'd worked for the State Land Department looking at surface and groundwater resources. And, the department was also interested at that time in finding a safe disposal site for hazardous waste and I'd done a lot of field work with another hydrologist in one of the areas in western Maricopa county, Harquahala Valley.

And so, the Health Department was interested in that site and so, I had some more knowledge that would be applicable if they chose that as a disposal site. So, they were a couple reasons, but the primary reason was to do the surface impoundment assessment uh using the federal uh evaluation method and then write a report.

Q: And so, that's very interesting when I learn what you did. Especially, it's out of the Arizona Department of Health Services.

Lemmon: Well, it's a drinking water program. And, even today uh millions of people die from waterborne illnesses. And, in the United States we have very few people that ever die from waterborne illnesses, uh at least in the, in the US. So, we tend to forget but it is a serious health issue around the world and particularly uh drinking water sources. We've always thought the groundwater was perfect and the land would filter it. But, that's simply not the case with all contaminants and with all uh methods of withdrawing the groundwater and putting it into the drinking water systems.

Q: And so, can you talk a little bit about what you did then when it came to the surface impoundment work all over the state of Arizona and then maybe focusing into the Tucson area?

Lemmon: Sure. Uh. What we did with, with the surface impoundment assessment was first send out some sort of survey form all over to all sorts of people using standard industrial classification to all the manufacturing people. You know, whether they packaged eggs, whether they were dairy farmers, whether they're mining industry, electronics industry to the cities, towns, counties, with the wastewater treatment plants. Just, everybody.

We sent out literally hundreds if not thousands of questionnaires and asked people to fill out this questionnaire that asked about what sort of waste it was and how big their impoundments were if they had any, those sort of things. And, we got a pretty good response from some areas and then other areas we didn't.

And then, we went ahead and took that information, did a desktop uh
survey uh evaluation. You know, how deep was the groundwater in, in that area and what was the condition of their surface impoundment and what type of liquid waste did they put in these surface impoundments?

Q: And so, you went into every individual, like you said it didn't matter if it was a dairy farm to the industrial, just looking specifically at these impoundment areas whether –

Lemmon: Yes. But it was an office survey at that time. And so, uh no, we may have done – it's been a while that was 1978. And so, that's, you know, over, over 40 years ago. So, I don't remember if we did a lot of field checking, sampling whether it was a dairy impoundment or wastewater treatment plant or, or a sludge disposal facility for a wastewater plant. Um but we looked at the higher potential sites based upon the types of waste products that they were disposing of and then we looked at the depth to groundwater.

And, many of the sites, they scored in the medium range. A couple of them were higher because we knew the groundwater was fairly shallow and susceptible. And, we also knew, based on a few studies, that the groundwater was contaminated. Whether it was from mining waste or from other uh situations.

Q: And, what was your next step after that as you started learning?

Lemmon: Well, we started looking at um groundwater quality, uh laboratory, laboratory quality testing through the safe drinking water program people had turned in. And, we realized that, that at those days under the safe drinking water program in Arizona uh they would test the well once or twice and then very infrequently after that. And, we looked at that and said, "That probably not sufficient, let's ask some more questions." And so, we really started going into the information and asking other hydrologists that we knew in the state and uh drinking water uh people in the program, "Do you know of any contamination or do you know of any elevated levels of these sort of contaminants?" And, in those days we were focused, in the very beginning we were just focused on inorganic materials. We hadn't started to focus on the other 119 uh priority EPA pollutants at that time. And, our laboratories couldn't even sample for many of those uh chlorinated uh organic compounds.

Q: And so, the technology has changed quite a bit.

Lemmon: Oh, dramatically, dramatically [Laughs]. You know, we didn't have many of the things like we have today, you know, where we would locate these wells we would have to, kind of, figure it out and draw it on the map and, kind of guess, is this the registration for this well? And, you know, so we
could look at the well drillers logs and figure out where the formations, where's the water, and these sort of things. And so, today I know within five or ten feet of, you know, when I go to a well site using my GPS, actually, just using my phone I can figure out what it is. And so, the technology's dramatically different than what it was 40 years ago and so.

Q: Yeah. And, so then, after you did this how did you come upon the Tucson site?

Lemon: Ah. Well, we got some information either through the drinking water program or from a hydrologist that one of the wells in the Tucson Airport area had some elevated chromium in it. And, that's unusual here in the alluvial basins and so, we don't tend to see that. We do see it in some mining areas where there's minerals and things, so it was kind of a questionable sort of thing.

South of Tucson at the copper mines, yeah, we might see some of those inorganic metals that would show up, but chromium was typically not found in the other drinking water wells in the, in the Tucson area. And so, we thought, you know, "Is there an issue here?" And, looking at the types of waste and looking at how the wastes were being disposed of at the Hughes Aircraft facility, Air Force Plant 44, we um started asking more questions and sampling more.

Q: And so, did you directly approach them at the plant or the Hughes or, how did that go?

Lemon: Yes. In fact, we did. We said, you know, "We think that the groundwater may be being impacted by your waste management practices." And, you know, that's part of our grant that we had to write about contamination or potential contamination. And so, we talked to Hughes aircraft and they said, "Well, first off it's Air Force Plant 44. We just operate it for the Air Force." And so, you know, we had sent them the first draft of that little section, a couple paragraphs and so we changed it we met with the folks and they said, "Why do you think it's us?" And we said, "Well, that's the nature of waste, it percolates through the ground and there's a large volume that you disposed of over the years." From what we understood.

But they were fairly concerned that they were being singled out. And, we said, "Look, we're doing and industrial site, we're doing a mining site, we're doing an agricultural site, you know, we need examples and unfortunately, this looks pretty suspicious to us." And so, we continued on and, despite their complaints, you know, to our management our management was good, they backed us up because it was drinking water. And, you know, that's we're the Health Department so, I was very pleased with that. Um but it was hard because my training, my experience working
with groundwater and working with geology was it was fairly apparent to me that something was going on as a result of man's activity and, it wasn't naturally occurring.

So, when I started relating this to the US EPA, EPA became more interested. And, they said, “Well, is there something we can help you with?” So, they did help us with the laboratory testing of the water. And, in the beginning it was just the water. And, we would collect samples from the wells in the Tucson Airport Area and we put them on ice and send them, ship them out of the state. And, for many years, you know, I collected a lot of samples of water around the state, so I had done more groundwater contamination removal than anybody else until they got the big systems in place. But our labs couldn't do it here and so we'd just pump gallons and gallons and send it out of state to the labs. And, EPA, you know, thought that was humorous but they put more money into their program in the technology and the laboratory, the detection levels for chlorinated solvents and other contaminants.

Q: So, that's very interesting because it seems that then they focused the advancements of certain technologies because of this?

Lemmon: They did. Two things, one was getting qualified laboratories to test for the types of contaminants they were starting to find all over the country in different places. And so, to develop that local technology, number one, and number two, well if we see this in the groundwater, what's in the soil? And so, that started, kind of, the next phase of the EPA involvement in the Tucson Airport Area after we completed our draft report in 1979 in fact it was December 7th, 1979, Pearl Harbor Day. But we never went beyond the draft stages in the report, we were out of money, we had to move on. But EPA then became interested in sampling soils.

Then we sampled soils um, um in the Tucson Airport Area in the drainages, um downstream from the industrial areas um in the fire pits, um in the training pits right on the airport property itself. I remember drilling and sampling there. And, on the active flight line and that was exciting and um dangerous. And we would never do that today, but we did it then wearing full gear, um respirators and suits and things. And so, that's a little different than how we investigate today. And so, we were – but, we didn't have any standards, we didn't have any knowledge of how to do these things. So, we were, we were kind of at the forefront of developing this technology to sample.

So, I used backhoes, we used a lot of augurs, hollow stem augurs where the augur is, bores the hole and on the inside, you can take a sample of the soil and bring it back up to the surface. And so, we bored some pretty deep holes for hollow stem augurs in these small soil rigs that typically don't go
much deeper than 25 feet or so and we were down 125 feet in some of those areas and still didn't find groundwater. And which, is good because the deeper um the groundwater elevations are, or the distance to groundwater, the more chance of the soil and the alluvial material grabbing on to the contaminants and holding it. Um, but, chlorinated solvents behave a lot differently. They're designed to move and take and wash off uh basically grease from the manufacturing process.

And, in the Tucson Airport Area um, e- we came to find out that after um World War II and um airplanes were put in mothballs and they were covered in a material to protect the metal and those sort of things. But, when the Korean started um Korean War started ub in the early 50s, they were taken out of storage, they were washed off with chlorinated solvents on cement pads um and something happened with that wash water. The wash water and the solvents, it went somewhere, and we started finding, um in the soils, we started finding chlorinated solvents that we knew couldn't just be from Air Force Plant 44.

Q: And, um when we were talking when we first um met you mentioned that you had partners that you worked with. I don't know if you want to talk a lot, a bit about who you worked with in the project, your field partners and the agencies that you've collaborated with.

Lemmon: Sure. Um, um In the surface impoundment assessment report James Angel was the, had just graduated from the U of A and he was a young hydrologist and from the Tucson area. And uh so, he and I worked together, and I did most of my work in the northern part of Arizona and he did most of his work in the southern part of Arizona because he's more familiar with it. And um. But we did a lot of field work together particularly after uh Air Force Plant 44, Hughes Aircraft, we wrote that part of the report together.

And so, I wrote it about another site up here in Maricopa county, the Motorola Plant here and the North Indian Ben Wash Superfund site, similar sorts of things. And so. But, what's interesting about the Tucson Airport Area, there were a number of other industries and aircraft manufacturing and electronics plants all around the Tucson Airport area and they all used chlorinated solvents. Some of them did plating work and so, there were a variety of these chemicals that we're starting to see turning up in the drinking water um at the various wells in Tucson.

And, in those days the only source of drinking water in Tucson was, was the aquifer. You know, it was classified as a sole source aquifer meaning there was no other um place for drinking water, so it deserved higher protection. So, we got more support, the Health Department got more support from the US Environmental Protection Agency, um the Drinking
Water Program as well as their beginning of their um RCRA Program and the Superfund Program. And, we also got support from, um uh what was it, the Department of Water Resources that came about. Their hydrologists helped on giving us some information on the wells. They weren't really into water quality it was water quantity. And, those were um interesting days they didn't have a lot of resources, so we all collaborated. And also, the hydrologists and the technical people working with um, in Tucson at Tucson Water saying, we sampled this, we changed our sampling schedule in these sort of areas.

And we started also here with in the Phoenix area with the water departments we saw a lot more collaboration in those days. And, later on when it became apparent that they had served contaminated water to their customers we didn't get as much cooperation. And so, I don't know if that's changed but I think they're much more um vigilant in what they, what they do, what they pump, and how they serve it.

Q: And, um can you talk about the scoring matrix that you um used in order when you're looking at all the different surface impoundments? Uh, can you just talk a little bit about how you scored them? And then, in addition how the Tucson site fared.

Lemmon: Well, I wish I could remember. One of, one of the scoring matrix was how deep is it to groundwater? And, of course, most of our sites here in the basin range province with, you know, hundreds of feet to depth to groundwater. So, that part of the scoring matrix always scored poorly. The part where we looked at the impoundments, all the impoundments didn't have liners in them. So, there wasn't anything to prevent the disappearance of all that waste down into the earth. But we also had a very high evapo-evapotranspiration rate, evaporation rate and so, a lot of the water and the things that were the driving forces were not there.

So, there I can't remember all of the details and what scored higher and lower, but it was a humid hydrologic rating scheme and it was not designed for the arid southwest. And, that, we became apparent even after we'd gone to the national training and other folks said, "Yeah, we know. But, so much of the country, you know, they have these small drinking water systems and wells. And, you guys are different." And we said, “Yes, we are.” And, I think that's why we got more interest from Region Nine EPA. The west, there's so much of the west here in the basin range province that relies upon groundwater, you know, maybe we ought to look at this a little bit differently.

And so, I think that's why we had more interest from Fred Hoffman was a geologist– a geologist with US EPA in San Francisco. And, Fred and I became quite, quite good friends because we were pushing the technology
of sampling and, and looking at our geology and our hydrology and the man land treatments of what we were doing with this water and how we could do better. And so, whether we were investigating landfills, or we were investigating surface impoundments, you know, I worked quite closely with region nine and they're very supportive.

Q:
And, can you also describe some of the aerial work that you did?

Lemmon:
Well, one of the things that uh I did a lot of work with when I was at the State Land Department when we're doing water rights and looking at uh, uh how agriculture and min- mining folks were using their water, we would verify the irrigation non expansion areas we'd use aerial photography. And so, I was quite comfortable using aerial photography to look at what's happening and then using the, the pictures historically. And, Arizona is blessed with very open uh cloudless terrain and is fairly easy to fly so there's a lot of aerial photography that was taken historically. So, we could see whether it was uh Tucson Airport Area, Air Force Plant 44, we could see the expansion and those sort of things.

And, and of course today you can see that on Google Earth, and you can go back and look at that. But, at those times you had to go to the vaults and so, I spent a lot of time going to the US Department of Agriculture um here in the Phoenix area. And, Dr. Herman Bauer was the one that did tremendous amounts of work on groundwater contamination and groundwater movement. He wrote many textbooks, very professional papers uh on groundwater and uh did a very famous research project here in Phoenix called Flushing Meadows. And, it was down along the Salt River, Salt Gila River system. And, he was using sewage effluent and recharging and how, and then sampling at various depths, how deep did the alluvial material have to be to filter all this out?

And so, we, you know, we came up and had to be at least 10 meters, 30 feet deep to filter out these biological contaminants but not the other things that are in sewage effluent. And because those aren't treated at the biological treatment stations and we saw that problem uh here in the Indian Ben Wash Area. That there were small wastewater treatment plants outside Scottsdale and all it did was take out the biological sorts of things and the organic sludge, and really didn't treat that. And, then it was put into pond, impoundments that then drained into the aquifer and we started seeing groundwater contamination in the Indian Ben Wash Area in our drinking water wells. So, it became quite apparent to, to those of us that were working in this part of the science that we could not count on ten meters of, of soil and, and sand to filter out these industrial contaminants. It might work for the heavy metals which don- are not very mobile in the system but the organic solvents just zip on through.
Q: And so, were these all the techniques that you used uh in the Tucson site to, kind of, put together this puzzle that you were-

Lemmon: Yes. I mean Tucson was kind of, our field laboratory we were sampling. First, we sampled the soils in the drainages, the sediments that came off the properties looking for contaminants and going, and then sampling upstream and or starting upstream and then working downstream as the drainages went towards the San Pedro River and looking at those sort of things. Off the Tucson Airport Area and further downstream toward the uh Tohono O’odham reservation I believe. Uh and so, we sampled ditches and we looked at sludge and slimy stuff and then some folks at the University of Arizona got interested.

Dr. Grey Wilson was a hydrologist and so, but he found out some folks that were interested in soils and contaminants in soils. And so, they came out to the field and we were drilling, and they would take a sample and they actually brought with them a gas chromatograph in the back of a-a van. And, they put the samples in, and they were testing them and doing these things. And so, I would, you know, today we have handheld devices to do it but, but back then it took a whole van load of equipment to do this. But we were pushing the envelope, we were developing new techniques. So, it was fun, it, it was exciting.

And, for those of us, I was going to graduate school and to see our work and it was appreciated by the US EPA and we're developing sampling techniques, we're developing field laboratory uh, uh technique skill sets, how do we protect the samples so that they don't lose any of their volatile properties? And those sort of things. And, um it was different, it was different and so, we felt like we advanced the science.

Now, we didn't write a lot of papers, we didn't do a lot of reports. Ah. We ended up with sample results because we were looking for the sources of the contamination and how far had it spread? So, we constantly were taking samples of water from wells. When we'd get some money to ship, ship the samples to the EPA laboratories and they had the funding. And so, we sampled wells all over Tucson in the Phoenix metropolitan area.

Q: So now, so now, you did all of that interesting fieldwork your innovating the how, not only how you take the samples but also how you analyze them, all the technology behind that. And, you had to write a report in the end, right?

Lemmon: Well, yes. I mean, we did write a report for the surface impoundment assessment. We wrote some, probably some technical memos or shorter memos about what we were finding. But, most of the time it was, are we seeing contamination, where are we seeing the contamination, what is the
contamination? And so, there were not a lot of detailed reports because it was, you know, kind of a new experimental process that we were involved in. You know, we were, we were treasure seekers if you will, looking for is there a magic way to this? Are we gonna find this gold mine or this, this, this place with all the contamination coming out?

And, what we find is typical in many industrial areas we find, you know, little hot pockets of contamination here and there. But we didn't have a lot of sampling ah money and so we would try and, and do some field investigation. Just, kind of look around with our shovels and say, is this a more practical place to sample? We can only take a few samples, we only have limited funds to have a backhoe or a drilling rig, you know, where are we gonna go? And so, we're really – um it was a very biased sampling process, the mostly likely place to uh look and see what might be there.

And so, today uh in the work that I do we don't do it that way. We would screen, well, unless we're screening the sites out and looking with limited amounts of money. But we would be a- take a much broader sampling approach and, and take more samples and try and characterize the site a lot, lot better and focus on a smaller site area. But we focused on the entire Tucson Airport Area, you know. That's several miles and so, there were lots of different areas to that and lots of different types of potential contamination.

Q: And, what were some of the findings that you uh concluded?

Lemmon: Well, we, we found TCE, found TCA, we found breakdown products uh from that. We found some heavy metals, not many but we did find some in some areas. Um so, we found um different chlorinated solvents both in the soil at, at some levels. But it was harder to test the soil because you had to extract uh the contaminants from the, from the soil. And so, it was the order of magnitude less precise than what we were seeing in the drinking water. Um you know, it's, it’s been a long time [Laughs].

Q: And then, how did the US EPA, ah you mentioned that they came in and they provided, kind of, this analysis component of it. What other things did they do with you?

Lemmon: Well, they were interested after we had done the, the sampling of the, of the groundwater and the waters of the different wells. We knew the wells were contamin- contaminated with TCE; Tucson water shut down those drinking water wells that were contaminated. We were in the parts per million range in those days. And so, they had a level of, of five parts per million, if it was more contaminated than that they'd shut the well down.

Um and because the laboratories could not consistently test um below
about a uh half a part per million on uh chlorinated solvents or TCE and so, we focused on TCE throughout the state. And, some of our interim policies were based on that. Uh but, we knew that laboratories were working and getting into the part per billion range, but we just didn't have enough information about the uh health consequences.

And so, the five part per million was the action level and, and I'm not sure what it is today but that was the issue then. And, it was a health agency, it wasn't a pollution control agency uh like, like today's Department of Environmental Quality is. Ah but, EPA was thinking, well, what about aerial photography or aerial investigation for some of these sites because they're big sites. And so, EPA uh said, would you be interested in investigating your high priority sites from the surface impoundment assessment report uh through and aerial photo mission?"

And so, uh worked with people out of uh the EPAs office, uh they're in Colorado, um I think in Lakewood. And, aerial photo folks and, you and know, course in those days ah the aerial photo experts had all come from the military. And so, I remember working, I can't remember Jerry's last name, but he'd been in the Air Force for many, many years and uh analyzing the aerial imagery from the U2 spy planes. And so, he was very interested in, in the military bases and in uh doing a photo mission with us.

And so, they came here to Arizona and we did photo missions of, of mining sites, the industrial sites here in the uh Phoenix area, we flew down to Yuma and looked at some agricultural sites, we flew down to Tucson and looked at those, the Tucson Airport and the mining sites. I remember we were up in the Globe Miami Area over the smelters and we flew through, you know, we didn't know but we flew through the plume from the smelter. And, everybody started coughing and, you know, that sort of thing and it was, you know, eyes were burning, you know, so we couldn't see these contaminants, but we knew they were airborne contaminants. And, and in those days the theory was the solution to pollution is dilution.

So, you’d disperse it and you give it a little bit to everybody and you hope the cloud disperses if it's an air contaminant. If it's in the drinking water, you hope that it's dispersed out at smaller levels. A little dose will be okay. And so, today we don't subscribe to that as much as we did but we still do it, and which is unfortunate in my opinion. But, that's, you know. We can absorb, as humans, quite a bit of environmental insults and contamination.

Q: And, did you ever present your results uh in the end to the responsible parties? Or, how did you interact with them when you were seeing what was going on?
**Lemmon:** You know, we probably did uh informally. I think uh when the responsible parties became aware that they were responsible parties the collaboration wasn't as close. Uh with Hughes Aircraft they allowed us to sample into their areas, they had some security issues in some of the areas and they had to check out who was doing the work, the drillers and myself and others. The same with active areas of the, of the Tucson Airport on the runway again, security issues. And, the runway was shared by uh, uh I forgot the Air Force, whatever the planes they were refurbishing. Not from Davis Mothan but from uh an engine test facility down there. And so, there were security issues involved and so, it took a little time, but we had permission to investigate.

Uh here in the Motorola situations and the Indian Ben Wash. Motorola was a little more forthcoming about trying to work and find out, "Do we have a problem?" And so, we collaborated a little bit more closely with them when we shared split samples and those sort of things. We did the same thing with Tucson; we would take a sample and would split it in half and provide it to them if they wanted to keep it and sample it. But they didn't share as much information as Motorola was sharing.

**Q:** And, is there anything else that you want to talk about with it comes to all of that work that you did with collaboration? I don't know – one of the things that I thought was interesting when I was looking at the archives-

**Lemmon:** Mm-hmm.

**Q:** that you have is that you collaborated with Ty Cañez. And I thought that, he was part of the hazardous waste –

**Lemmon:** Ty yeah, Ty worked with the Department of Health Services uh and he had his undergraduate degree was in chemistry I believe, very bright man. And, he uh was from Tucson and uh Ty ran the Hazardous Waste Program. Um and, I don't know if we really had much of a Hazardous Waste Program in those days but, but after, after about four or five years yes, we did. We had inspectors, we had people that were trained, and they started doing the RCRA program, the hazardous waste program subtitles C and D. One was landfills and solid waste the other was hazardous waste program so in those days. But Ty was- had the background in chemistry and also the background from the Tucson area where he grew up. And so, he was with the Department of Health Services for many, many years.

**Q:** And, were you interviewed by Jane Kay for her article that came out in ’85 I think it was?

**Lemmon:** Oh, sure. I mean I talked to a number of reporters. You know. I can remember uh when I was sampling drinking water wells and, you know,
the water's contaminated I can remember television crews following us around watching us take a sample of water. And so, yeah, I talked to a number of reporters uh both on camera and in both print.

Q: And, did you ever talk to community members? Did anyone approach you?

Lemmon: We had various meetings sometimes they were sponsored by the Department of Health Services sometimes I don't know whether EPA sponsored the meetings or not. Tucson, City of Tucson, uh Tucson Water sponsored some meetings. You know, “This what we're finding, this is what we know about our quality of water”, those sort of things and we were always there.

And, I'm sure there were community members that asked a question, you know, "Are you poisoning us?" And, of course, the official answer is, "No, we never intentionally tried to do anything to hurt anybody. And, once we found out that our wells were contaminated, we shut them down." But we still have to provide fire protection and water in the system. And so, that's kind of some of the issues. And, many of the systems didn't have the redundancy built in so they could pump water from somewhere else. So, it took some time to uh get some of those things in place so they could pump from a different area and not pump from contaminated wells.

So, I think – their- sometimes they were advised, as I recall uh sometimes some of the contamination, we were finding had high nitrates, like from sewage treatment plants. And so, when babies get that they get this, kind of blue, blue baby syndrome is what I'm remembering now. And so, you want to make sure that the nitrates aren't real high in the water. And so, uh parents were advised, moms were advised not to serve that particular water to the, you know, to their babies or mix the formula with that and use bottled water.

And so, we looked at the bottled water plants in those days and we found uh many of the glass bottles that the water was coming in had been rinsed uh with TCE [Laughs] degreasant. And so, my uh, my thought was that quickly changed but, in those days, the big glass five-gallon jugs that were delivered and that quickly changed when the department found out what was really going on in the industry. And so, and so that's why you see today much more of the recycled plastic bottles than you do see glass bottles because the contamination issues.

Q: That's very interesting. [Laughter]

Lemmon: Well, we changed the industry.
Q: Yeah.

Lemmon: We changed the industry and because we're concerned about potential pathways to contamination, we regulated very strictly what was put into the drinking water uh systems, but we didn't regulate bottled water, and everybody started drinking bottled water.

Q: And you're right that's not a reg-, even still now from what I understand.

Lemmon: Not very much.

Q: And, uh one of the questions when we were talking is that you mentioned that all you work, this was very, obviously this you started in the 70s from what I understand.

Lemmon: Yes.

Q: And then, it went into the 80s and that's when the litigation started happening toward the site. And, did you, you mentioned to me that you had to present some of the work that you did at these court hearings?

Lemmon: Right. Um well, the Resource Conservation Recovery Act was just starting out in the late 70s and we had done the surface impoundment assessment process in contaminated drinking water through the Safe Drinking Water Act. And then, with, with the reauthorization of RCRA and much more robust program with hazardous waste subtitles C and D uh in the early 80s they started regulating the waste. And then uh, looking at the drinking water and the contamination there was more concern about well, what's happening, who's responsible, who's gonna pay to clean this up?

That's when Superfund started coming in vogue uh and that's a different regulatory program the CERCLA program. And, I remember telling the federal people Fred, I said, you know, "After Love Canal, they took the public employees hostage until the governor promised to do something about the Love Canal situation." I told Fred I said, "Arizona's kind of independent, you know, we don't negotiate with hostages you know so you may be here a long time." He said, "What do you mean?" I said, "We don't negotiate so we can't guarantee your safety if you go to these contaminated communities." And, he was kind of struck by that and then of course, we had a good relationship, and of course that wasn't true. But he got to thinking about it and the thought, "This is serious stuff." And it is.

People's lives depend on it, people are being impacted, their homes, they can't sell their homes in these contaminated areas. And so, we're doing a lot of work all over the state and we started seeing contaminated wells and
haven't has a testing program for this contamination. And so, it wasn't just in Tucson Airport area although that was in, in Tucson, we did see other contamination around landfills, Ina Road landfill, Rogers Road uh treatment plant landfill we see contamination plumes that are still, still there today. As is the contamination in the Tucson Airport area. Takes decades to clean that up to pump and treat.

Q:
And, did you ever think that um or, did you ever expect that the work that you did in Southside Tucson or even in the beginning when you were hired for this work that it would lead to the establishment of this really, I guess it's a fundamental case study of environmental justice that's known nationwide. Even Motorola 52nd too is another one. Did you realize that this was gonna happen?

Lemmon:
No, not at all. I, I was focused on protecting people, protecting people's drinking water, protecting that state resource from further damage from people that didn't know what they were doing. Or, maybe they knew and didn't care, and I think the Superfund Program CERCLA started looking at responsible parties. If you can find one responsible party, then they had to pay for all the cleanup. And so, what we say was these potentially responsible parties trying to find others and we saw Hughes Aircraft do that quite effectively, find the other people. "Go look over here." And they'd used to say, "Here's some information, go look at, you know, we talked to our employees, go look." And so, we did and, you know, they got more and more people.

Q:
And um, besides the community meetings that you mentioned that you interacted with community members, were there other interactions? Like, there was some groups like the Tucson, TCE Subcommittee, Tucsonans for a Clean Environment and then other organizations that were occurring in the 80s did you ever interact with them?

Lemmon:
Probably not a lot. Um I didn't, our public information officers probably did from the Department of Health Services. Um my managers probably did, our assistant directors would go to meetings. I used to complain, I said that, you know, "There's seven, seven layers of people above me, you know, and I'm the only one doing the field work, you know, and doing the sampling and trying to write a report." you know. I said, "Maybe if I had all seven of those people helping me, we'd get these answers quicker." You know, of course that's not how large organizations work.

And so, a lot of the things that I saw from being familiar with the site, spending a lot of time uh and doing the sampling and testing, you know, it took them a while to absorb that information. They weren't trained in that area and we didn't have a lot of resources to help explain that. And, we were still using manual typewriters in those days and so, I would draft
something out I used to draft it on an old manual typewriter and our typist would type it up neatly in a report format and I would get my file copy and, which I kept. You know, because I was the author of that memo but most of them were one page long and some laboratory sample results.

Q: And, um just to go back into the litigation thing, what type of witness were you?

Lemmon: Well, because I'd done the field work and the sampling uh and did the chain of custody on the samples, whether it was drinking water or soils or other materials uh so, I was the person responsible. "Did you sample this?" "Yes." "Tell us about how you sampled it." These sort of things. And uh and so, as litigation started, we were often asked to, "Tell us about your sampling and your chain of custody," these sort of things. And then, I was the fact witness as while I still worked for the Department of Health Services, I was there expert, if you will, on, on soil and groundwater contamination. Soil and ground water contamination. Because my background is in geology and so I was still employed for the Department of Health Services we did some enforcement actions, typically against uh landfills. And so, we did some court actions with the state attorney general's office uh sue responsible parties. But, very little work in the Superfund Area because that was a federal program so that was the fed-federal um folks EPA that brought those actions about.

Q: And, what do you want others to know about your role of the Tucson International Airport Area Superfund site? Something that might not be well known.

Lemmon: Well, it's investigating large areas is expensive and time consuming. Um you know, the programs today where we do environmental assessment for property transfer work it really identifies contaminated property and so that you just don't pass it on to somebody else and you fix is then or you realize that it's a brown field or a hazardous waste site or whatever it happens to be. And, I think the entire thought about responsible parties, um we still have responsible parties but we're doing so much clean-up of contaminated sites now through the private sector because the banks will not lend on contaminated property. And so, people are not buying it and so, people that are on the property that's contaminated are cleaning it up.

And, I've spent quite a bit of my time consulting over cleaning up sites for um people, investors that were buying property or selling farms or things of that nature. And so, a lot more contamination has been cleaned up through those sort of private actions than anything that the regulatory environment has done. But we had to have those test cases, we had to drive it, we had to get out there and do that. But litigation is, is that last resort we want people to be responsible at the front end.
So, that's why I've spent the last 10 or 15 years concentrating on education because if people don't understand what they're doing or what's good or what's bad or how it can harm other folks um they're gonna continue to do something that maybe be risky. And so, I think that's where I'd like to focus now with children and, and the science, technology, engineering, math, and arts program so that they can be the people of discovery and preventing the problems and helping to cure them.

Q: And, when did you stop working at the site? How did you transition to your next job?

Lemmon: Sure. I worked with the Department of Health Services from October of 1978 to November of uh1983. And, in 1983 we were starting to investigate uh a number of contamination sites both with solid waste and hazardous waste. And but, we had no money to do uh the detailed site investigations so that we could um require the responsible parties to clean up. So, we were identifying problems, but we weren't solving them. And, I'd just spent the last five years identifying problems and we weren't solving any, we were in litigation, on some of them, but most of the parties you know declared bankruptcy and we weren't cleaning anything up. We were just putting you know soil caps on top of, you know, open burning dumps.

Um the uh asbestos contamination up in the Globe area, Mountain Park Estates they had built a mobile home park on uh mine tailings and had a lot of asbestos in them. The fibers were, you know, in the air so we just put a big cap over it and just closed the site down and created this area that nobody could live on. To me that's not a solution, it's avoiding, it's kicking the problem down the road and, and I don't think that's the way to go. I think we need to clean it up we need to do that.

Ah, Rare Metals up on the Navajo reservation north of Tuba City was a uranium processing site and there were tailings blowing everywhere and people were living out there. And, I pointed that out to EPA, and they realized, "Oh, we didn't know there was anything out there." And then they started doing reclamation of the site. I drive by it, they're still doing reclamation up there, and sampling the groundwater and doing things but at least the contamination isn't blowing.

And, you know, I grew up in Grand Junction, Colorado or least high school. And, they used uranium tailings to construct buildings and so, there was radon gas in buildings um in my home and those sort of things and or asbestos from the pipes and those sort of things. So, there is a lot of risk sometimes if you're not paying attention to how the buildings are constructed and where the materials are coming from.
Q: Okay Jim, can you talk a little bit more about after the Arizona Department of Health Services?

Lemmon: Certainly Denise. One, one of the things in the fall of 1983, I needed a change. I'd finished my graduate school um program at ASU, um my wife had graduated, she was working as an attorney here in, in Phoenix and I thought, "It's time for maybe another venture." And so, I uh decided to start my own small uh consulting business in land use and environmental. And so, I left the department and started doing that.

And it was a lot of fun, didn't make much money but I still worked. But what happened and I didn't realize when it started, that because I'd done so much work all over the state with the identifying contaminated sites and potentially responsible parties that I couldn't work for these folks because I had a reputation for telling the truth. Whether it hurt the client or helped the client and hurt somebody else. And, whether it was an agency or whether um it was a big industry. And, so I didn't realize that at the time but um, I'm glad I'm honest and I'm glad that I have that reputation.

Um in fact, Hughes aircraft subpoenaed me for an action. They were having a dispute with the Air Force about who was supposed to pay for what share of the contamination and get on with it. And so, I was flown out to San Francisco um getting ready for the administrative law judge to rule between the Air Force and everything and because they knew I would tell the truth. And, I was proud of that. You know, I wasn't pleased that I had to go to San Francisco but uh that was the first time that, you know, that I was subpoenaed. And, after that with the toxic tort litigation, whether it was in Tucson or the Indian Ben Wash and the Motorola sites here in Phoenix, um all the litigation that went on I was subpoenaed many times.

And, my records from the Department of Health Services, my boxes of my file copies of all those memos that I'd written and little bits of information, sample results uh, they were interested in because they couldn't find all that information in the Department of Health Services. Or, they didn't want to go ahead and irritate the state government agency that regulated them. And so, I was subpoenaed many times, whether it was uh through toxic tort litigation responsible parties or whether it was the um insurance companies fighting over what share is it, Lloyd's of London and other companies. And, you know, went on starting in 1985, '84, '85, all the way up to 2000 um to 2000 was the last time I was subpoenaed and, and appeared in court. And, after that I was grateful that I didn't have to do it, but I, I was a fact witness. But I was also um sort of an expert in that area at the beginning you know to explain um what was happening because of the way the wastes were handled or disposed of. Whether they were poured down dry wells, stone water drainage wells, into the sewer system,
leaky uh underground storage tanks, all these things. You know I said.

I remember one of the sites, it wasn't in Tucson but they said, "Oh, this is great we never have to drain it or have it pumped." And, all the waste was being poured into a tank and it went out the bottom and it had rusted out and it was going into the environment and contaminating. Well, they're paying today to clean it up. And, I drive by the uh treatment plant today for the contamination in east Phoenix.

Q: So, I don't know if you want to talk a little bit about what we were discussing.

Lemmon: Well, we were talking about litigation and what was my role. And, I'd been contacted several times uh by various parties, either responsible parties or plaintiffs uh and defendants, um could I be a fact witness in the case. And, once they got into it, I said, “You know, I did a lot of the initial fieldwork and the discovery work of the contamination and sampling of the contaminated waters or the soils.” And, they realized that no, they couldn't have an expert that was also a fact witness, it wasn't appropriate.

Because, you know, how would that look uh under testimony, that, you know, your fact witness is also your expert witness for your side, and not the other side. And so, I wasn't hired but I was repeatedly subpoenaed to be a fact witness about, what did you discover, where, and what did you do? And so, I, I spent quite a bit of time in depositions, days on end for some of the toxic tort litigations. And there were very few federal or uh state actions where I appeared.

Q: And do you still keep up with the Superfund site, the Tucson Superfund site?

Lemmon: Well, you know, it was in the 1980s, uh I think it's appropriate to tell this story, that I I, was uh working with uh a number of environmental groups that were concerned um about contamination and groundwater contamination. And um and, they'd started a citizen's initiative uh to clean up groundwater and it eventually created the Department of Environmental Quality. But, during that time uh Superfund uh was expiring so we wanted to have it reauthorized and, at that time John McCain was our congressman. And, my office was in downtown Tempe and uh Congressman McCain's office was in downtown Tempe, so we all met at my office, walked across the street to McCain's office and, and uh talked to him about reauthorization of Superfund. And he said, "Well, what are these sites like?" And so, we went to one here in the Indian Ben Wash Area and we were also here in north Tempe which today is Tempe Marketplace but at that time was a large open dump and a lot of contamination. The garbage was uh decaying creating explosive gases,
toxic gases and they had signs, no smoking, beware of poisonous gas. He said, "Somebody ought to do something about that." We said, "Exactly. Reauthorize RCRA, uh CERCLA." and so he did.

And, that reauthorization then was the Community Involvement Program that started. And, later on I did more work for some of the contaminated uh areas in Indian Ben Wash particularly with Motorola 52nd Street as their expert. But again, without the money to sample we, we relied upon the responsible parties or the agencies to do that work. And then, the agencies didn't have a lot of money and so, the responsible parties would do enough work to drag in somebody else to help pay for the cleanup. And, that's exactly what happened in, in I think in Tucson Airport area from my understanding of what went on. Certainly, happened up here in the Phoenix area in the Indian Ben Wash area.

Q: And so, were you a technical assistant to any of the TAG grants for the community?

Lemmon: I was in a hearing in the Motorola 52nd street side but not down in Tucson. And um, you know, I don't know if anybody contacted me or asked me if I wanted to do that or not. And it's a long way [Laughs]. You know. And, I just, I just don't remember in those early days of the tag grants, but I did work here quite a bit in the Phoenix area. And, whether it helped the neighborhoods or not they certainly understood what was going on and the stakes that were there and they couldn't sell their property they couldn't get money uh lent to them to improve their properties. So, it was an issue.

Q: And, thinking back on your work and experience at Tucson Superfund site and maybe even Motorola 52nd and Indian Ben Wash, what would you like to see future generations learn from this experience?

Lemmon: Well, I think you're uh actions always have consequences. You hope they're all positive that that builds uh and restores and that it helps um your community and yourself and your family. But, there's also things you can't ignore it and it's like that funny noise you hear when you're driving your car. "What's the funny noise?" You don't turn up the radio louder to drown it out you try and find out what it is and get it fixed before the wheel falls off and you crash. There- you know, things have consequences and I think just throwing your garbage or your waste the easiest way is not the safest way. And, I think that's what I'd like people to learn, that their- they can impact the environment. It's not just, you know, “Should we reduce our carbon footprint,” but we should be more responsible about the materials we use. And, I think we've seen the change in the, in the variety of household chemicals that we use, cleaning products, how we grow our
food, how we um prepare it, those things have all changed as a result of, you know, little things can make a difference.

Q: And how would you like your memory of the work and the experience that you had to be remembered?

Lemmon: Well, I'd like all of my actions that I did in, in the environmental arena to have a positive impact in making it better so nobody else um gets hurt, nobody else uh dies from the contamination or gets ill or has birth defects or all of those things. And, we have done things um trying to be beneficial, um whether it's to use pesticides to drive out um pests that destroy the cotton crops or whether it's to use defoliants in areas so that we can increase the um– well, in Vietnam we used it for the safety and security reasons so we could see through the jungle canopy. But it contaminated it, you know agent orange. We also used it in Arizona to improve the watersheds in some areas, but we also saw impacts to the, to the wildlife and those sort of problems. And so, things have consequences. So, whether, when we start changing the landscape in large numbers uh and in large degree it may be beneficial in the short run and maybe have unintended consequences. So, it needs to be studied further before we go out and do some of this stuff.

Q: And, how do you think that the memory of the Superfund site in Tucson and its related contamination will be remembered?

Lemmon: Well, I think it was one of the early test cases. Uh in the early days the federal government said, "Arizona, you can pick two sites that we can focus on." So, we picked the Tucson Airport area and we picked and area up here in Phoenix or the Mountain Park Estates in Globe, I forget which one. But uh Tucson Airport area was one of the first ones, so it's been around the longest. Uh groundwater is very important in Tucson, uh sole source aquifer and, even though we have Central Arizona Project water coming to Tucson it's not of the chemical quality that can easily be used. And so, it’s not being used directly in the older parts of town because it creates a problem.

Q: Do you have anything that you want to talk to or, I guess, mostly, like, do you have a message for community members specifically on your work or your experience with the site?

Lemmon: Well, I think it's important to be involved. And um, what I learned from using, um working with the Technical Assistance Grant up here in, in the Motorola site was people need to understand that things can't be fixed overnight but we have to understand what it is, and it takes time and it takes effort. And so, you can't just force that to happen, particularly when we start doing investigation of the subsurface and the drilling. And, I still
do drilling today as a, as a geologist and it just takes time to get the

clearance, get the equipment, get, figure out where you're gonna sample,

what are you gonna look at, what are you trying to discover, how you are
gonna design, it just takes time. And but you need to stay involved and
have a regular reporting cycle or it just gets kind of forgotten.

And so, you need to, to be engaged. You just can't send your kid to school
and then check 12 years later what did they learn? You check that
backpack every day, you check and see on a quarterly basis or an annual
basis wherever it what happens. How are they doing, how are they
learning? And, you do the same thing with your community, how are we
doing? You know, is it improving, are we having better quality water, are
we having less um breaks in our water lines? Or, you know, the sewage,
how's it being treated? All of those things and it's important. Are we
making progress or are we just hiding from making those improvements?

Be consistent. You have to be that squeaky wheel so that people get things
do and you have to do it in a way that is not nasty but saying, "I'm
concerned. How can I help and help you do your job, or you help me? You
know, give me some training, guidance and help." That is much better
than just yelling and screaming. And, I've been in a lot of public meetings
in my career and some uh and of them are exciting and some of them are
not and some of them are just plain useless meetings where we just yell at
each other for therapy.

Q:

And, did the Superfund site or all your experience with environmental or
Superfund site, did it change your behavior when it came to pollution in
your community or your household?

Lemmon:

Yes. Um, um I don't, although I buy bottled water in the plastic, you
know, half liter containers because I do a lot of field work and I need
something that I can take into the field. I don't buy big tanks of water that's
delivered by the truck in those sort of things because I'm just not very
confident on the safety and the security and the cleanliness of that product
that's delivered that way. So, I choose not to do that, but I do use a, a
countertop filter to filter out.

Forest fires in Arizona and our Salt River, Verde River system it has a lot
more buildup of organic compounds, naturally occurring compounds and I
don't like the taste. And, although I drink it, but I still think the safest thing
is usually drinking the water right out of the tap so that's what I do. I drink
it out of the tap, I don't like the drinking fountains because sometimes the
uh plumbing in that has some lead solder or some other metal taste and the
water is more acidic or whatever and the chemistry changes the taste. So, I
tend not to do that, so I drink bottled water.
Q: And, is there anything else that you'd like to comment on that I left out or I forgot to ask you on your personal history with the Superfund site?

Lemmon: No, I think one of the, one of the things that I saw recently was the number of people employed in journalism and media, whether it's electronic or print is about half of what it was a decade ago. And, I think, you know, 20, 30 years ago we had a lot of little small newspapers, a lot of hungry reporters looking for stories, asking questions, doing investigations. So, there were a lot of reporters that went out and did work. Jane Kay was just one of those did a lot of background research. But there were other reporters that did things in other small newspapers. Well those small newspapers are gone, and the bigger um television stations and radio stations, I used to get interviewed a lot and among these things and but not so much anymore and I don't see that coverage in the newspapers or on TV.

[End of Interview Session]