Recording #1—Fort Collins Utilities Oral History Project, Owen Randall

Location—Gateway Natural Area

Date—February 12, 2019

Abstract:

In this interview, Owen Randall, retired Chief Engineer for City of Fort Collins Utilities, discusses his personal background and his involvement in water supply projects connected to Fort Collins water treatment plant #1. Randall recounts his role in three separate projects, from the early 1980s to the 2010s, that occurred in and around plant #1 (presently, Gateway Natural Area). In the early 1980s Fort Collins Utilities modified the chemical feed system to minimize pipe corrosion in Fort Collins. As Randall explains, the Cache la Poudre River’s uniquely clean water, Utilities’ reliance on a hard-bid system, and inconsistent qualities of shipped-in chemicals provided a host of difficulties. In the late 1980s, the Fort Collins Utilities decommissioned water plant #1. This project necessitated years of planning and the construction of a 400-foot hard rock tunnel and taught Randall the importance of thorough planning and again, the limits of the hard-bid system. Beginning in the 1990s and carrying through the 2010s, Randall has also been involved in pipeline repair around water plant #1 and up and down the Poudre Canyon more generally. In conversation on pipeline repair, Randall stresses the importance of foresight and flexibility (through the use of the Alternative Product Delivery System) to deal with the unknowns and unforeseen issues that come with aging infrastructure. Throughout, Randall returns to the importance of teamwork, working with contractors through APDS (according to Randall, Fort Collins was one of the first municipalities to employ APDS), and adaptability in the face of new challenges. Randall concludes by elucidating the importance of not taking the city’s infrastructure for granted and continuing to fix and replace components before they fail, not after.

Interview

Q: I’m Ruth Alexander, professor at Colorado State University, and we are at Gateway Natural Area outside of Fort Collins, Colorado, and I’m interviewing today Owen Randall, Chief Engineer with Utilities, City of Fort Collins. It’s February 12, 2019, and Owen is going to tell us about his work in relation to Gateway Natural Area, which used to be the Fort Collins treatment plant #1, but I’m going to begin with asking Owen a few questions about his background, since this is our first of several interviews with him, and so, Owen, I’m going to ask you if you could tell us a little bit about your background, and I’m going to start by asking where you grew up and
whether you had any reason as a child or a young adult to think about water supply and quality or stormwater and wastewater, so, in other words, where’d your interest in water come from?

RANDALL: I grew up in Colorado Springs. I was born and raised there, and then came to Fort Collins to CSU to study engineering, and I can’t say there was any particular thing that interested me in water, etc., but I grew up spending lots and lots of time in the mountains fishing, camping, being around the native life in Colorado with rivers and lakes. I love to fish, so water quality was important to me. Anyplace where you had water quality suffered, so did the fishing, so that was a natural interest to me.

Maybe one of the things, and this may sound kind of funny, from a very early age, this kind of fits into the stormwater, water, everything, in Colorado Springs, there wasn’t much of a stormwater system, and every time it would rain whatsoever, across the alley from where I lived through my best friend’s house, there was a tremendous amount of water would come down the street, and we would build dams in the street, complete with outlet works and the whole nine yards and watch the water come up and watch the water go down, and we’d adjust the outlet works so we could keep our reservoirs full, etc. even as a kid.

Q: Sounds like a young engineer-in-the-making.

RANDALL: I didn’t even know it, but that was probably, and then my parents were the ones that encouraged me to go into engineering. I’m not really sure why they thought that was the right field for me to study, and certainly when I started engineering, I didn’t have literally any clue where that would lead and what all that entailed.

Q: So you chose CSU. Tell me a little bit about your training as an engineer at CSU. Did you work specifically in water engineering in your studies?
RANDALL: Water resources was the emphasis of my undergrad work at Colorado State University, although by the time I graduated, I don’t think I really understood at all what it involved and what I could do, certainly what the future would hold, so after I graduated from CSU with a Bachelor’s in civil engineering, I ended up going to work for a consulting firm out of Denver, who was working for Fort Collins.

Q: When was this?

RANDALL: I graduated in 1976. I went to work for this firm in 1977, and they were working for Fort Collins, and the project that they had was to build Joe Wright Dam up at the top of Cameron Pass on the Poudre River above here, and so that was my first engineering job was being a resident engineer onsite for the construction of Joe Wright Reservoir, and I was there from literally the very first day of construction until the end. It took us about three years to build that project.

Q: We’re looking forward to hearing more about that in another interview.

RANDALL: We’ll do that when it’s a little nicer up there.

Q: After working for that Denver contractor on the Joe Wright Dam, when did you then become an employee of the city, and did you start out in Utilities, or did you end up in Utilities?

RANDALL: So the end of Joe Wright was the fall of 1979, and the firm I was working for wanted me to come to Denver and work in their downtown Denver office, and, honestly, that just was not something that interested me whatsoever, living in Denver, working in downtown Denver, and Fort Collins Utilities was looking for a resident engineering on a large expansion of the water treatment plant, our other water treatment plant, and so I ended up going to work for them October 1, 1979, for the Water Utilities working on water capital projects.
Q: We’ll hear more about that treatment plant as well in another interview. So now we’re going to turn to a discussion of this site where we actually are standing today. As I’ve said, it’s now known as Gateway Natural Area, but it was the site of the city’s original water treatment plant, a plant that was established in 1905 and remained operational until the 1980s. Owen, can you tell us a little bit about why this location on the Poudre was chosen as a treatment site? Do you know about the choice of this site?

RANDALL: Well, obviously, I’m getting older, but I wasn’t around then. From what I understand from the stories that I was told, it was strategically picked, right here at the confluence of the North Fork of the Poudre and the main stem of the Poudre, and the water that we treated here at water treatment plant #1 came off of the main stem, so it was above the North Fork where there’s a different water quality than is in the main stem, and so the decision was made to treat main stem water. It was even in the early 1900s thought to have better water quality than the North Fork water did, and so that’s my knowledge of what I was told years and years ago why they put the plant right here.

Q: I know that you didn’t work on this plant until the early 1980s, and we’ll get to that in just a minute, that is, your first project here, but I’m wondering if knowing a little bit about the history of this plant, if you’ve become aware over the years about the kinds of challenges that the city faced in managing this treatment plant.

RANDALL: There were a lot of challenges here. The Poudre has had and has extremely good water quality, but sometimes water quality, the water, it’s too good, and there was a lot of research done here in the ‘80s actually and treating really, really clean water. That sounds maybe like an oxymoron or something, but it’s difficult to treat clean water. The chemicals we used literally binds particles together in the water and settles them out or filters them out. In
really, really clean water, that’s difficult to do, because there aren’t enough particles to literally form together to build what they call a floc, what they take out.

We did a lot of—I didn’t. I wasn’t involved in that, but actually our utility director right, Kevin Gertig, headed that up, research that was applied all over the country and became pretty world-renowned, was research done right here in the labs, how to treat really cold, really clean water.

Q: That is super interesting. So obviously the city kind of figured out a fix to it, and what was that fix?

RANDALL: This is one of the later questions we’re going to talk about as far as why this plant was shut down and the technology that was used, but we ended up with certain chemicals to add and certain rates in order to get the water to build a floc as best we could, and then a certain type of settlement called lamella plates, we were one of the first plants in the United States to use lamella-plate settlers, which is one of the standards around the world right now is lamella-plate settlers, and we put those in plant #2. I think we were the third or fourth plant in the country to use lamella plates, so that was part of that technology and part of the research that went into the water treatment, treating this water up here.

Q: Well, that is really interesting, and I may return at a later time to a question about how knowledge that was gained at the city of Fort Collins in Utilities was then communicated to other water plants around the country and other utility systems, because it’s really interesting. Let’s now talk about your first project at plant #1 in the early 1980s, when it was still a working treatment plant. By this time, the city also had the second treatment facility near Soldier Canyon Dam at Horsetooth Reservoir, and so what were the issues that you were asked to address at plant #1 in the early 1980s?
RANDALL: Actually, the issues that we addressed here, we did it at both plants, at the same time. We had a project. We modified the chemical feed facilities here and at plant #2. We build both projects congruently, the same time, where we added different chemicals to the water for different reasons. When we stabilized the water with lime to bring the pH to a certain level that we wanted to keep the water at, because the natural water here was corrosive to pipes, the metal pipes that we had in town, and so we stabilized the water with lime, and then we also fed sodium bicarbonate, and so, once again, it was something that at least was done very few places in the country.

We learned the hard way making and finding out problems and figuring out solutions to being able to feed those chemicals reliably and consistently, presented a bunch of challenges that nobody had ever faced before, and so we were guinea pigs and learned as we—once built the project, and then started running it, there were significant challenges that we had that we worked through and figured out the best way to feed those chemicals.

Q: So can you say a little bit more about what the difficulties were in working with those chemicals? Were they safety? Were they health? Consistency you’ve pointed out.

RANDALL: Unlike some of the chemicals that you have to feed in a water treatment plant, like chlorine, which has significant health concerns, the sodium bicarbonate and lime, those were not health concerns, but we had challenges. One of the challenges with certainly the lime was the consistency of the product that we got from suppliers, and so over time we learned certain mines where they mined lime, that they would be more consistent in the product that we got.
If you didn’t get a consistent product, then it affected our treatment processes, so there was a supplier; actually got to go to their mine one time south of St. Louis, right on the Mississippi River where we consistently bought our lime for years and years and years, because of the consistency of their product.

The biggest problem when I think back was simply getting the product to come out of—they had large siloes that were up on the roof. They’d feed it in with air and siloes with a hopper bottom on it. Both those chemicals tended to solidify and wouldn’t feed. They literally would freeze up inside the tank, so we put big vibrators on the side of the tanks to try and shake it down. There were a lot of hard lessons figuring out how to make that work, but eventually we were successful at it.

Q: That sounds interesting. Now this is a project, if I understand it correctly, where you were trying to modify the chemical treatment of the water, largely to preserve the piping. Is that correct?

RANDALL: Correct, particularly the water services off the lines into the houses. That’s where we were concerned about stabilizing that water so that it wasn’t corrosive to the actual water services going into the homes.

Q: That gets me to the next question, which is how much was the public aware of this project? Was it necessary to educate the public about it? If so, how did the public respond? Were members of the public concerned, especially those household residents whose pipes you were worried about?

RANDALL: I would say that that’s one of the things that has changed entirely from 35 years ago, 40 years ago to today. The role of the public, or even the knowledge that the public had of what we were doing is entirely different today. I would say there was very little input or
even awareness by the public of what was being done. We spent, I would say, a significant
amount of time working with our Water Board so they understood what we were doing and how
we were doing it and the issues that were associated with it, but they really represented the
public, and we didn’t have a public outreach program like we would have today if we were doing
a similar-type project.

Q: We’ll be able to talk more about that public presence as we move forward in our
interviews. Getting back to the specifics of this project, how did the city monitor all of those
pipes going to houses as the project was underway? How often did you monitor them to see that
actually this new treatment was doing what it was supposed to?

RANDALL: I can’t answer that question directly. I wasn’t involved in that part, but
we’ve had for many, many years a human- and nationally-recognized water quality laboratory
team and had a very specific program set up to monitor water at specific sites around town at
least on a weekly basis—it may have been more often than that—when we were actually starting
up this process to tweak the dosages here to what was actually happening in town and how it was
affecting the water chemistry, so that was a key part of the program from the very start was water
quality monitoring, testing to make sure that what we were doing was getting the water
chemistry like we wanted it to be.

Q: Good. Thinking about this particular project in the early ‘80s and what you learned
from it, what would you say were the most important lessons that Utilities learned from this
project, and then did it shape the way you or others in Utilities thought about subsequent water
treatment issues and priorities?
RANDALL: Big question with lots of answers. I learned a lot of lessons, and maybe it was the start of recognition that—I’ll change gears completely here, not about water chemistry or something like that, but about product delivery or project delivery and the way that we did it.

In the early days, the first 15 or more years of my career, all projects were delivered by what was called a hard-bid method. We hired an engineer. We designed the project. We put together a set of specifications and plans, and the you put it out for bid, and whoever was the low bidder got to build the project. My experience with low bid is that the goal of the contractor and the goal of the owner are not the same. The owner wants a quality project, done right, done on time, works perfect every time. When you do low-bid work, the contractors always try and make as much money as they possibly can, which he has to do in order to stay in business, but he’s also asked to do it at the very cheapest rate he can possibly do it.

When I started to see it on this project, among others, that the contractor, by definition, had a different goal than I had for the project, or a different goal than the city had, and so there was constant conflict over the way it was done, the quality, the timing, the products. Everything was always controversial. It frequently literally turned into a fight about how to do it, what to use, etc., and it just was a very combative situation that, in my opinion, I didn’t believe it served the city well to deliver projects that way.

19:05

Q: Was there one main contractor you were working with on this project, or were there multiples?

RANDALL: There was one contractor who was the general contractor. They had subcontractors that would come in and do particular parts of the work, whether it be the masonry or supply the tanks that the chemicals went in, or the feed systems that went in underneath it, that
kind of stuff. There was lots and lots of subcontractors, and that was just a whole other level, because they too had been asked to provide a price that was cheaper than anybody else’s.

One of the other challenges that existed and that I learned about for the first time was doing work on modification of existing facilities that are very old, and there’s limited or no plans. There’s lots and lots of surprises, and so when we dug up the foundation of this building, we found concrete walls that had been poured, for some reason, in the past that nobody knew was there. Therefore, they had to be removed. That cost time and money, change orders. Contractor wanted money for it, deserved money for it, so it was the very start of endless times you run into where you modify old, existing infrastructure.

There’s always surprises. The ground has always something in it that you don’t know about that can change, even sometimes very, very significantly, the project that you’re doing, how it works, how it gets built, how long it takes, that it costs, etc.

Q: So these are both really interesting problems that you confronted, and clearly you wanted to start thinking through alternatives, so let’s go to the contractor piece of it first. What were your thoughts, at that point, about what Utilities might do to find an alternative to this contracting system so that, in fact, the city would be able to get the product it wanted and that everybody would have the same priority?

RANDALL: Well, I certainly hadn’t thought of it, hadn’t figured it out yet, but I’ll go back to Joe Wright right even before I worked here, and one of my very first days on the job ever, I went in the job trailer, and my boss set me down and proceeded to explain to me that my job was to make life absolutely as difficult as I could possibly make it for the contractor, make it hard for him to do it, to be disagreeable, to not get along, to make life as difficult as I could possibly do for him, and it didn’t take me very long to figure out that the very same conversation
was going on in the job trailer for the contractor, that his job was to make my life as miserable as he could, and to cut every corner they could cut, to make as much money as they could make, and the quality of the project was not part of that equation.

To different degrees, contractors had that philosophy for a long time. Their philosophy and their goal for a project was completely different than mine. Would you like me to talk a little bit about our delivery model?

Q: Yeah.

RANDALL: That always rubbed me the wrong way. I guess I’m just a person that sees a lot more value in people working together to try and solve problems than working literally against each other, and so eventually, over the next few years, continued to struggle with hard-bid work that was late, wasn’t performed well, had large impact to the public and on and on and on, all kinds of negative context, and eventually we started a process that eventually became known as alternative product delivery system where we built from the very start of a project, almost from conceptual level, put our city personnel, operations staff, engineering staff together with an engineering firm that would design the project, and with a contractor that would build the project and together form a team of people that all had the same set of goals to provide the city for the most value for the dollar spent, build quality projects, build them on time, build them under budget, and build them in a nature that would operable by the operations staff for many, many, many years.

And to do it in a safe manner, safety not only in terms of the construction phase, but safety in operations through the years. That’s what we’ve done for many, many years now is built basically every project that we’ve done with this alternative product delivery system. We’ve worked with many, many contractors, many, many engineers of all phases of our delivery
of different types of projects for the utility, whether it was a treatment plant or whether it was a sewer line or whether it was operations facilities, office building for one of the plants. It doesn’t matter what kind of project we did. We did it as a team working together to provide the city the most value for the money that we spent.

Q: Tell me the name of that system again.

RANDALL: Alternative product delivery system, or APDS as it’s become known.

Q: Has that system, which you developed here in the city, also been adopted by other kinds of entities all the way across the country?

RANDALL: Yes, a short answer is yes. In fact, when we started, it was very unusual for a municipality to do anything except hard-bid work, and through the years as we developed it and as it was successful time and time and time again, word got out. Engineers told other owners and other engineers about it, and contractors did the same thing, because people enjoy, they like working in this system, and so they told other people about it.

I still, to this day, get phone calls from people all over the country wanting to know how we do it, why we do it, how it works, etc. Many, many, many entities come and talk to us about it, and it has been instituted all over, particularly up and down the Front Range. That’s where I see it the most and where I am close enough to hear more about it, but entities all up and down the front range, different cities and quasi-government agencies, they have adopted it; not verbatim, not exactly the same, but have attempted to emulate what we’ve built here in Fort Collins.

Q: Did this alternative product delivery system also help you deal with the other issue that you spoke about confronting here, which was working sometimes on old properties where surprises happened?
RANDALL: Absolutely. So one of the biggest issues on every kind of project is there’s a level of risk that exists in a project, and that risk can be measured in all kinds of different ways, but money’s one way. How much is it really going to cost, and there’s two costs? In a hard-bid world, there’s the cost the day the contractor gives his bid. Very rarely or almost never is the cost that the owner pays for the project when it’s done, so there’s that risk.

Owners in general, they want to pass the risk, give the risk, assign the risk to the contractor, and what most owners don’t understand is that risk equals cost to a contractor, and so as an owner you can do that. You can assign risk, but you’re going to pay for it, and you’re either going to pay for it in your initial bid, or you’re going to pay for it in change orders and claims and lawsuits.

My philosophy is basically 180 degrees from that. As the owner, I want the risk, and I want to pay for the risk when it happens. In a hard-bid world, you’re asking the contractor to take the risk, and so he puts money in his bid to pay for the risk. Sometimes the risk happens, and sometimes the risk doesn’t happen, and if you put enough money in it, and I could talk all day long about examples of places that I saw risk. I’ve seen risk assigned to the contractor that never took place, and so it was money, sometimes hundreds of thousands of dollars that the contractor simply took, because the owner asked him to do it. The owner not only asked him, he told him to do it. You own the risk, so I’ll pay you for the risk. We want to pay for the risk when it takes place.

To go back to your question a little bit more about working on old infrastructure, one of the risks we always have in old infrastructure is we don’t always know what’s in the ground or what we can’t see or what we don’t know, and so as we design a project and the contractor is sitting at the table with us, along with the engineer, one of our goals is to identify risk. Where’s
it at? What risk do we have? How substantial is it? And through the design phase, we want to eliminate as much risk as we possibly can.

Sometimes we’ll spend money, a significant amount of money, to alleviate risk in the design phase, go out and dig up a foundation or do potholes in the ground or more drilling of geo-tech holes, or whatever the case is, to identify what the risk is, whether it’s really there, and then design around that risk and figure out how to minimize the risk. When you get in construction, you almost always know exactly what you’re going to do, because you identified the risk upfront.

Huge cost to a contractor is during construction to, all of a sudden, the owner has to call timeout or the engineer says stop, we have to figure out how we’re going to deal with this problem. That costs a lot of money when you stop a contractor. Our goal was always to eliminate that risk ahead of time and be able to solve problems before the contractor and of his equipment and people, etc. were out there on the jobsite and had to be stopped. Spend a little bit of money, identify risk, and design around that risk to minimize the cost.

30:20

Q: And work as a team so everybody’s in on this from the beginning.

RANDALL: Everybody’s on the same page. Everybody understands, and the biggest part of that, of the teamwork, is that we all have the very same goal, and we have the same set of goals. I like to say for a project to be successful, it’s not successful for me if it’s not successful for the engineer, if it’s not successful for the contractor. It has to be successful for all of us. They have to make money. They have to provide us the product that we wanted and built with a sense of quality, a real quality. There’s a whole bunch of things that go into the definition of success.
To go way back where we started all this, all the early projects that I did, there wasn’t teamwork. There was just the opposite, in fact, and you had people working against each other, not together, not trying to solve problems, and that’s what we’ve been able to do. ABD systems have everybody pulling in the same direction, going the same way with the same goals.

Q: I’m going to ask you next about the second project that you did here at plant #1 in the late ‘80s when you took it offline, and one of the questions I’ll ask you was, is to what extent was this alternative product delivery system in place by then, and we can start with that?

RANDALL: It wasn’t in place by then. For the day, it was a pretty massive project, including in a large expansion at water treatment plant #2, including the abandonment of this facility and taking it offline. It included right behind us here a few hundred yards building a tunnel through the mountain a sedimentation basin to take the heavy material, sands, etc., out of the water, and put them in the pipelines to towns.

So what we did when we took this offline, our water rights that we have here at plant #1, we put that raw water in the pipelines that used to take finished water to town. We put the raw water in it, took it to the little town of Bellvue, built a new pipeline from there into water plant #2, and we began to treat the same water we treated here; we now treat it at plant #2. One of the big challenges of that job was this tunnel that I just talked about behind us. We put a tunnel through the mountains, I want to say 400 feet long. Inside that tunnel, it’s a hard-rock tunnel.

Inside that we put a 48-inch steel pipe to carry the water, so we diverted off the river from the upstream end of this big oxbow where plant #1 is at, through the mountain, through the sedimentation basin, put it in the pipelines to town. Well, that tunnel, it was a perfect example of risk that we paid a fortune for that didn’t need to take place. The contractor was smart enough to
catch in the bid documents—we had a unit price contract, so we paid per unit of something or
other, and inside the tunnel are rock bolts, big steel anchors that you drill back into the mountain,
put a nut on the end of it with a big washer, sort of [ph] in effect, and tighten those up, and that
holds the rock in place around the tunnel.

Inside the bid documents, they only put a handful of rock bolts. I don’t remember the
number, but say 20 rock bolts. Well, in effect, there had to be 1,000 rock bolts in that tunnel, and
the contractor caught that and put an exorbitant price on the rock bolts. In the picture, this whole
project here and at plant #2, all the work that needed to be done, the fact that he charged $1,000 a
rock bolt instead of what should have been $100 a rock bolt in the big picture didn’t make any
difference, but it made a huge difference when it came for us to pay for the rock bolts inside that
tunnel, because we asked for it, and he gave us a price, and we paid a fortune for those rock bolts
that we should have never paid for in that manner for that amount.

Q: Another lesson learned.

RANDALL: A lesson learned.

Q: Let’s back up a few steps and talk about why Utilities decided to close this plant. Can
you tell us about that?

RANDALL: Yeah. That was a lot of discussion for a long time to figure out if that was
the right move to do. One of the advantages that we saw by having two treatment plants is that if
something happened to one of them, you had another one, so that was a plus to keep both plants.
But one of the concerns here was the age of the structure. The infrastructure was 75+ years, at
that time. It looked like there were some major upgrades that were needed. I talked about the
lamella plates that we put in at plant #2. There really wasn’t a way to do that here.
There were floodplain issues here. There was a concern of a major flood on the Poudre and if it would affect this treatment plant, if you’d lose it. There was the expense of running two treatment plants, so in the early years, in the ’70s and ’80s, this plant ran 365 days a year, and plant #2 was what was called a peaking [ph] plant. We only ran it late spring through early fall, and then we shut it down, but you still had the staff and all the expense of running two treatment plants. Those are some of the major issues around having treatment plants.

The decision was ultimately made to put all our eggs in one basket and abandon this plant and only run treatment plant #2. It allowed us to operate more efficiently. We still had the water rights with the pipelines that we had, that we converted our pipelines to take the same water we were treating here, to take it to plant #2 and treat it down there. We’re very fortunate at that plant that we have the Poudre River water source, we have Horsetooth water source, and now, later on, we actually have another pipeline too that we can get Poudre River.

We have a very redundant supply of water, depending on water quality issues, availability issues, to be able to draw from different sources, to operate as efficiently as we can.

Q: Interesting. Can you describe for us the various steps that were involved in decommissioning this plant? You had to put that new tunnel in. That’s one thing. You built a pre-sed basin. Can you build us a whole visual package of the steps that were involved?

RANDALL: That’s a big question. Certainly before anything physical was done, just the planning effort that went into it, the major decision to abandon this facility, that was made, and when that decision was made, something else I’ll touch on right now is the original idea was that we’d leave this plant in a condition such if we ever needed to, we could turn it back on. After a relatively short amount of time, two or three years, that became obvious that that was not—it’s very almost to the point of extremely difficult to impossible to abandon a treatment plant, and
then come back years later and “turn it back on,” particularly a plant that’s as old as this was. That just didn’t work.

Eventually, that decision was made that we’re never going to run treatment plan #1 again, but then, as I remember, I don’t remember a public process, but there was a lot of work with our Water Board and city council to get their buyoff and them to agree to the concept of a major change in the way we did treated water and to abandon this plant, so that was done. Then the engineering, the design work, that probably took a year-and-a-half to two years of planning and designing to change all the steps, because the treatment capacity that was here, which I believe was about 20 million gallons a day of water we could treat, we had to build that treatment capacity at water treatment plant #2.

So we did that. The pipeline, I briefly mentioned the tunnel and the pipeline modifications and a new pipeline from Bellvue into the treatment plant. Control systems, how you manage water that was going to be coming 12 or 14 miles to the treatment plant, a lot of things have changed in the communications world since the late ‘80s or mid ‘80s and how you control that system and how many times people had to come up here to make adjustments to gates and all that kind of stuff. It was a tremendous amount of planning effort before we ever got to the construction.

I believe the construction took the better part of two years from the start to finish by the time we shut this plant down. I shouldn’t put it that way. When the decision was made and modifications were made to plant #2 and the pipelines, it probably took two years from the time construction started until everything was done and in service.

Q: In this project, what was your central role?
RANDALL: I was one of several resident engineers that worked on different phases of the project. At that time, actually I didn’t have as big a direct role in this project. I was doing some big pipelines in town, but I was involved in some of the work at both treatment plants, so I stayed very familiar with it.

Q: You’ve mentioned that the city had to agree to taking this plant out and relying entirely on plant #2. Were there other kinds of concerns that were raised by the city or about the public? Were there concerns about how this project might inconvenience traffic going up and down the Poudre or any other kinds of thing that came up?

RANDALL: I really don’t remember any major issues at all that the public was either concerned about or highly impacted by, at that time. All the work that was done here at this plant site was all close to the public, so there wasn’t any direct impact to people. If we did work in here today with it being a park, it would impact a lot of the public, but that wasn’t the case. There was a minimal amount of work in the canyon.

As we talked earlier, all the houses that are between here and the mouth of the canyon, actually further than that, all the way to Bellvue, the houses that were along that pipeline, a huge majority of them got their water directly off the pipeline. Well, since we converted it from finished water to raw water, obviously that didn’t work anymore, so we had a whole project where we drilled wells, permitted wells with the state, and then drilled wells and hooked it up. All those houses had to be converted, so those people saw some major changes in the way they got water that they had never had to deal with before.

Q: What would you say were the major lessons that you learned from this project, you as an engineer and Utilities as a whole?
RANDALL: The first thing would be just the key of how critically important planning is in a project and to take the time and commit the resources and the money in order to plan to make sure you know what you’re doing, why you’re doing it, then how you’re going to do it, and then the implementation of it. There are so many, I’ll call it, moving parts to this big an aspect of our infrastructure, to change it entirely without proper planning and without the resources to do it, both in terms of people and adequate budget to do that. You’re just asking for problems.

Q: You’ve talked about the bolts, and that was one problem that turned up, or that you recognized after the fact. Can you identify a couple of other good examples of points in the process where the city should have done planning that wasn’t done, or had an opportunity to do some planning that would have been beneficial?

RANDALL: I can’t think of anything really directly in the planning stages about how it was carried out, but there were some instances of things that got done in the design that then got implemented in the construction that didn’t work well. One of the concerns that existed was that the pipelines would now have sediment in them from the river from raw water, and so there’s a technique called pigging where you put, called a pig, a large foam device with scratchers on it, in a pipeline and run it down the pipeline, and that would clean the pipe out.

Well, it was a theory that we would need to pig the lines. As it turned out, that theory was completely wrong. There’s never been any sediment in the pipelines that you could even measure, so we designed the pipelines to be able to pig them. The pipelines have valves on them so that we can turn the water off at certain places, and somehow or other we put in what were called plug valves, and there’s different kinds of plug valves, and then normally if you’re going to pig a line, you need a full-throat valve.
So when the valve is open, it’s the same diameter of the pipeline all the way through. Well, the valves that got installed weren’t full-throat. They were 70% of the area of the cross-section of the pipeline, so the first time we put pigs in the line to pig the line right down here at the sedimentation basin, put the pig in, put the cap back on, turned the water on, went down the other end of the pipeline to wait for the pigs, and the pigs never came, never came, never came.

Well, the pig only went about 30 feet when it ran into the first valve, and there it sat. A good friend of mine to this day probably lost five years off his life, because he spent days in the pipeline with an electric carving knife like you’d carve a turkey with cutting out a foam pig. Those valves went through the whole review process and got put in the ground. They would never, ever work.

In fact, we just probably a year ago took the last of those plug valves out of the pipeline, so there was some planning that went—the theory was good, but what got implemented wasn’t good, and somehow it managed to get through everybody who should have seen it and put a stop to it, putting the right valves in.

Q: I want to move on to some questions about your last project in the Gateway area, which was in the 1990s, and this was when you were doing some pipeline repair in the canyon below the closed plant. I also want to give you an opportunity, because it’s come up so much in our conversation today, to talk about when the city actually did deliberately implement the alternative product delivery system, and I don’t know if it coincided with this project or took place later, but I want you to think about that. Let’s talk about this pipeline repair, and if talking about alternative delivery is appropriate, you can fit that into your discussion. Let’s begin by my asking you what the issues or concerns were that this project needed to resolve with regard to the pipelines.
RANDALL: When we did the repairs on them?

Q: Yeah, in the ‘90s.

RANDALL: So there’s two pipelines that leave Gateway Park and go to Bellvue, and one of those is a 24-inch concrete line that was built in the 1920s, and the other is a 27-inch steel line that was built in the ‘50s. The older line, the concrete line is, I would call it a work of art. It’s absolutely amazing the condition it’s in, how they built it with the limited resources they had in the 1920s, now right at 100 years old, or almost 100 years old, but there is a weakness in that pipeline. It’s not the pipe itself, but it’s the joints, and the joints, the way they’re put together, there’s no rubber gasket like we would see in a pipeline today.

They used an oakum [ph] product. It’s a steel bell and spigot that slips together, but only slips together about half an inch or three-quarters of an inch, and then they fill the gap around it with oakum, pounded that in, and that’s what the seal was, and it works great, as long as the pipe doesn’t move, but if the pipe moves, it leaks, and so through the years we’ve seen different instances of that pipeline leaking, and the pipelines wander all over the canyon from 100 feet up on the side of the canyon to in the highway to under the river, across the river, and they’re not laid parallel either. They sometimes cross. They’re on top of each other. They’re 200 feet apart. We’ve had a number of times through the years when principally the concrete pipeline would leak, and the first problem we had was finding the pipe.

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We literally did not know where it was for many, many years. Sometimes when we’d find the pipe, that would be when there was a leak, and we’d find it by the water coming up. One time, I think the one you’re actually talking about, was we had water coming up in the middle of Highway 14 in the canyon, and we had closed one lane of the road. The inside lane
was closed, and we had dug from the face of the rock cliff on one side across to the center lane of the highway, and we found the steel pipeline. We couldn’t find the concrete line, and the only thing left to do was to close the road entirely and see if the concrete line was in the other side of the road, and then it dropped sharply off into the river, so we knew the pipe was there somewhere.

We were literally talking with CDOT right then about closing the road, and one of the guys who was a contractor who was working with us got down in the hole one more time with a steel probe and started probing underneath the steel line. He’d stick it in and keep probing, and then, all of a sudden, he [tinking noise] hit something hollow and got down there with a shovel and dug some more, and the steel pipeline, the 27 was here, and the 24-inch pipe was literally directly underneath it, so we learned another lesson that we didn’t know, once again, where the pipe was at, and, for some unknown reason, through the years they must have built the highway up, and the best place to put the steel pipe when they put it in the ground 30 years after the concrete was to put the steel on top of the concrete pipeline. It’s one of our big concerns, has been a concern, still is a concern of having pipelines in the state highway. Right away, if we ever have a big leak, the road may be closed.

For years we operated under the pretense that you couldn’t close Highway 14, but then when the fires happened in 2013, they closed the Poudre Canyon for weeks and weeks, so given the absolute emergency of our big pipeline, we know you can close Highway 14 now. It would be way less than an ideal circumstance, but it can be done. Usually when we work in the canyon, it’s in an emergency sense. We have to go and fix something right now, so we have one of our contractors that is under our ABDS contract. He’s done a lot of repairs in the canyon. He knows how to do it. He knows what to do, so that’s worked well.
The other part of “pipeline repair” in the canyon was, we have looked at a way to rehabilitate that concrete line. It’s still in existence. We use it every day of the year. Basically, we run water down it. The water rights in the Poudre are so valuable to us, and so we can take approximately 20 million gallons a day out of the Poudre River through those two old pipelines and take them to our water treatment facility.

The reliability of having that pipeline is really, really important to the city. I personally don’t believe there’s any way in the world there’s enough money or enough political will or to get the public to accept trying to lay a new pipeline up the Poudre Canyon. Environmentally, permitting-wise [ph], I don’t think you could do it, so what we’ve looked at is trying to rehabilitate that concrete line somehow.

It’s a very unique product, project that we have in the ground, and literally today I have talked to everybody that makes any kind of lining system for pipe and have yet to see anything that will reasonably work to rehabilitate that pipeline.

It seemed like the products that are out there actually create more risk, not solve a problem. They create a problem. About five years ago, we tried a product called Swagelining, and you actually pull and HDPE pipe—it’s a plastic pipe, flexible pipe, and you pull it through a mandrel. If you think about taking a rubber band and stretching it, the rubber band gets smaller. Well, this works the same way. You pull it through a die. In this case, it’d be smaller than 24 inches. You pull it through that die and stretch it. You pull it all the way through the pipe, and then when you release the tension on it, it expands back up, and it’s called a tight-fit liner.

It would span all those joints, and so we work with a contractor out of Florida, and we did two sections of this. We did one section in the Poudre Canyon, and we did another section down by Laporte where we had some 27-inch pipe that had corrosion problems that was leaking,
It was in back yards, and that one, we pulled 2,700 feet of pipe. Straight as an arrow, we pulled it all the way through. Flawless. It worked great, and Swagelining, we learned, is made for straight pipes.

The only thing straight in the Poudre Canyon on that 24-inch concrete line is every 12-foot section is straight, and almost every single one, there’s a deflection in the joints. So we did the Poudre Canyon one first. We did them both, at the same time. We did the Poudre one first; long story, when we finally got to where we could pull a pipe through it, we were pulling a pipe through it, we’d been going for maybe eight or ten hours, it was a little after dark, it was wintertime, it was bitter cold; I remember getting back into my truck to try and warm up, and, all of a sudden, I hear this kaboom, and I didn’t know what happened, but that one thing I did know, and that whatever it was wasn’t good.

We had literally pulled that pipe. We broke the rubber band. We pulled it apart, and as the pipe winds to the canyon, it created friction, and we had a winch of sorts that pulled the pipe, and that pipe as it went through the die, all day long it would jerk, jerk, jerk. It didn’t just pull smoothly like this. I would jerk it. Each time it was just like taking a rubber band and doing this 1,000 times. You do that to a rubber band, eventually it breaks.

Q: It snaps.

RANDALL: Well, the same thing happened. We snapped that HDPE liner. We literally snapped it in two. Once again, long story short, where it broke, we were extremely fortunate. It was in a place where we could actually dig it up.

Q: And remove it.

RANDALL: If it had been 50 feet further, it would have been right smack in the middle of Highway 14, and it would have been a huge mess, but where it broke, we could dig it up. We
pulled a piece of pipe the last couple of hundred feet to end it, put a connection inside of it, and made it work, but that was the end of doing Swagelining in the Poudre Canyon. Contrary to what we’d been told, it works great on straight pipe. It doesn’t work on pipe that’s not straight.

Q: This was not that long ago, right?

RANDALL: No. This was probably five or six years ago.

Q: Five or six years ago. Going back to the 1990s pipe repair, was it just on the concrete pipe, or were there also repairs that were needed on the steel pipe?

RANDALL: From time to time, we’ve had to fix both. The steel pipe is a lot more conducive to being able to fix it than the concrete is. The steel pipe, what it suffers from is corrosion. Any kind of steel, you put it in the ground, given time it corrodes, and occasionally there are holes that literally corrode through that steel pipe, but the steel pipe is such that we just weld a patch of steel back on it. That’s all it takes. It’s quick. It’s easy to fix and very common way to repair steel pipelines.

Q: Well, we’ve reached the end of my fairly technical questions about plant #1. Are there other things you’d like to tell us about plant #1, how it looked before and what it looks like today as Gateway Natural Area? Are there things you’d like to tell us about what the role you played at plant #1 or about what you would like visitors to Gateway to know about plant #1?

RANDALL: I think the biggest thing that has made and continues to this day to make a huge impression on me was the foresight that people had to build infrastructure like this so long ago, to realize the needs of what Fort Collins was going to have. To some degree, they obviously needed water, at that time, and they needed quality water. There actually on Overland Trail is what’s called the Old Water Works. That was the original water plant of some sort. They just took the water directly out of the irrigation ditch and sent it to town. There were a lot
of really sick people from that, so this was the first treatment plant, and to think of the foresight that it took to build a facility that would run for 75 years and provide quality water and fire protection to the growing community of Fort Collins for a long, long time.

Q: It’s pretty astonishing to think that the piping from the ‘20s and from the ‘50s is still the piping that the city uses, and it’s more or less adequate.

RANDALL: We use it. We depend on it. In the wintertime, our demands in Fort Collins are in the ten to 15 main gallons per day, so the water that’s in the Poudre River basically can supply all our demand for Fort Collins still today through that infrastructure that is 100 years old, or very close to it. The foresight and the planning to build something like this and to build all the infrastructure that goes with it, and what I’d like people to—they need to realize, they ought to realize, what’s underground from this point all the way to their house and leaving their house, that infrastructure, it has a lifetime. It won’t last forever, and that infrastructure, it’s key to the vitality of Fort Collins, to the safety of Fort Collins, and it has to be replaced in time.

It’s out of sight out of mind. Nobody thinks about it. They turn on their faucet and water comes out. They flush the toilet. It goes away, but it’s not magic. There’s a tremendous system that makes that work for everybody, and it has a life. It will only last so long, and there will be problems with it, so we’re doing a lot of work right now. We’re trying to plan and put together a program for rehabilitation of our water and wastewater systems, and people need to realize it’s key to their life, their livelihoods, even their happiness. It’s part of what makes Fort Collins what it is. At some point, we need to replace a tremendous amount of that infrastructure.

Q: So you spoke a few moments ago about the near impossibility of replacing these pipelines.
RANDALL: In the canyon.

Q: In the canyon, but in a sense you’ve contradicted yourself in saying that nothing lasts forever, and so how much is Utilities thinking, at this point, about the lifespan of these particular pipes and about how it might resolve this really difficult problem, or difficult challenge, of replacing those pipes? You don’t want them to fail completely. Surely, you want to replace them before they fail. What’s that going to look like? When might that be needed? How is that challenge going to look?

RANDALL: There’s two topics there, and I kind of changed subjects in the middle. There’s the two pipelines that go down to the canyon and carry the raw water. The steel pipe, we’ve done a lot of evaluation of it, but I think it still has a lifetime; easily it could be 50 more years. The concrete is a different matter, and the failure of the joints is a concern like I talked about, and so we continue to look for and have been looking for 15 years for a system to line that pipeline from the inside so that we don’t have to dig it up. We don’t have to tear it up. We minimize all impacts to where there’s the people and the environment, and we minimize those impacts tremendously, and the city will keep doing that. We’re looking for a way for new technology to be able to keep the integrity of those pipelines.

What I was talking about, on the other hand, is once you get into town, and we have miles and miles and miles of pipeline that are 100 years old, even older, that deliver water right now to people’s homes, that provide fire protection, that’s the infrastructure that I was talking about that really, really needs replaced, and we need to replace miles of if a year in order to catch up with how far behind we probably are in replacing our infrastructure and to keep it up to par with the expectation that people of Fort Collins have.
Q: Well, I’m guessing we’ll follow-up with this more at another interview when we’re down in town.

RANDALL: We can talk a lot about literally what we’re doing with new technologies to replace existing infrastructure.

Q: Any last comments you’d like to make about this particular site?

RANDALL: I can’t think of anything in particular. I understand that they’re talking about making this a national historical structure. It’s an amazing amount of history here, amazing facility and look forward to that time.

Q: It could have a national historic site designation, and that would be really great.

RANDALL: That would be.

Q: Thank you very much. This has been a great interview, and I’ll look forward to talking to you again sometime very soon.