BOEM DEEPWATER GULF OF MEXICO HISTORY PROJECT

Interviewee:	Newsom Caraway
Date:	June 25, 2009
Place:	Rowlett, Texas
Interviewer:	Jason Theriot

Ethnographic preface: Newsom Caraway was born in 1923 in Houston, Texas. Caraway completed a four-year engineering degree at Rice University and the University of Houston. In 1942, he volunteered for military service during the Second World War, and signed on with the U.S. Navy. As a naval pilot, Caraway flew cargo missions across the Pacific theater while stationed out of Hawaii. In 1948, Caraway got "tangled up" with Tennessee Transmission Co. (Tenneco) and stayed there until his retirement in 1988. He started as an instrument man in Houston. Caraway's portfolio later grew to include management work for Tenneco, and ended up as the Chief Engineer of Tennessee Gas Operations.

File 1

JT: This is Jason Theriot. I'm in Rowlett, Texas, interviewing Mr. and Mrs. Caraway. Mr. Caraway worked for Tennessee Gas for a number of years on the Muskrat Line. Today is the 25th of June, 2009. This is an oral history interview. We're going to get started with Mr. Newsom Caraway's background, if you can remember that far back, and why don't you just tell me a little bit, what year you were born, where you were born, and maybe a little bit about growing up in Texas.

NC: Well, I was born in 1923. So far as I know, it was in Houston. I grew up there and completed schooling there and went out looking for a job and got tangled up with Tennessee Gas and been there ever since.

JT: So your wife was telling me, you did four years at Rice. Was that for an engineering degree?

NC: Yes.

JT: Then you went to U of H for more education? What was that for?

NC: Completed.

JT: So you started engineering. What happened? Why'd you go from Rice to U of H?

NC: Have to talk to Rice about that. [laughs] Didn't meet the qualifications of Rice for about the senior year, and they pitched me out and so I went to the University of Houston and graduated.

JT: Well, let's see. If you were born in '23, you would have been ripe for the U.S. armed forces right there in 1941, '42.

NC: You'd better believe it.

JT: So did you volunteer or did they come and send you a yellow postcard?

NC: No, I volunteered.

JT: What year did you volunteer?

NC: Forty-two, I guess it was.

JT: So you would have been nineteen, right about nineteen, twenty.

Mrs. Caraway: Navy.

JT: You joined the Navy.

NC: Went to flight training, flew airplanes for the Navy.

JT: Is that right? What kind of aircraft?

NC: Ones with wings.

JT: [laughs] Fighters or patrol or—

NC: Flew single-engine for a while and then most the rest of it was with four engines, across the Pacific.

JT: Those big PBY?

NC: Bigger than that. This was the size of four engines. PBY's a two-engine.

JT: So your main job was for aerial reconnaissance or patrol?

NC: Yes.

JT: Looking for them submarines?

NC: Whatever we saw. No, we hauled, mainly. We hauled stuff, people back and forth and equipment.

JT: Was it kind of top brass that y'all were flying back and forth or regular grunts?

NC: Oh, I did my share of regular grunts. Top brass had their own airplane, but I took some of them.

JT: You were a pilot?

NC: Yes.

JT: Wow. How many crew members on that rascal? Is that a four-man crew?

NC: Let's see. Two pilots, navigator, radioman, another radioman. Five.

JT: So y'all were flying across the Atlantic?

NC: Flying across the Pacific.

JT: Oh, across the Pacific, okay. Stationed out of what, Hawaii or California?

NC: I was stationed in Hawaii, but we flew from California to the China coast, entire Pacific, all the islands. We went to the islands as they were, shall we say, taken.

JT: Was it a float plane?

NC: No. This was four-engine.

JT: So you could go 20,000 feet, fly way above the clouds, huh?

NC: Well, I won't say that, no. We generally flew under them because you didn't want to not know where you were.

JT: Any type of weather reconnaissance or any other kind of uses for that type of aircraft other than just transport?

NC: Well, we used to do weather. I mean, we'd report in the weather all the time. It was essentially transport.

JT: What were some of those big islands you went to, if you recall?

NC: All of them.

JT: So, Saipan, Guam, Okinawa?

NC: All of them. Oh, yeah, we went to all of the islands because the islands out there in the Pacific are, strangely enough, [unclear] by airplane. [laughs] So we [unclear].

JT: Any troubles along the way? Japanese aircraft or—

NC: No, we weren't the type of aircraft that they exposed to the Japanese. There were people in front of us cleaning the house out.

JT: Interesting. Was there any one, China, for example, or other areas where you guys stayed a good bit of time? Except Hawaii?

NC: Well, we were stationed in Honolulu. Then we went to all the islands out there, whatever they had and [unclear] what they wanted people going to, and when new captains and new officers were going to take over, commanding officers, command facilities, we'd take them there. Wherever there was stuff to go.

JT: So after the war when you came back home, you went to U of H instead of Rice, is that what happened?

NC: Yes.

JT: You completed your—is it civil engineering?

NC: Yes.

JT: Did your training in the Navy at all help you out in your degree program?

NC: Well, I mean, any kind of training helps you out, but I don't think there's anything I learned in the Navy in the way of Navy stuff that was of any real value that you put your finger on.

JT: Not building these things, right?

NC: You learned how to do things.

Mrs. Caraway: You learned to say, "Yes, sir."

JT: So out of the war you come back home and you go and you finish up your degree at University of Houston. Was Tennessee Gas the first job that you were offered?

NC: First real job. I had a lot of jobs prior to that time, but they were summer-type jobs.

JT: Any idea what year you might have started at Tennessee Gas?

Mrs. Caraway: You were there about forty years.

JT: Maybe '46, '47, something like that?

Mrs. Caraway: And you retired in '88.

NC: I think it was about '48, I guess. I think '48.

JT: So Mr. Hancock was already there?

NC: Yes.

JT: So by ’48, you guys had already started working your way into Louisiana and other parts of Texas and even further up in the northeast part of the country, right?

NC: Well, I think not in ’48, no. It was still getting the main line done. Hadn’t gone into New England yet and hadn’t gone into Louisiana yet. Well, I say hadn’t gone into Louisiana; we had gone Louisiana because the main system crosses Louisiana, but we hadn’t done any of that coastal line.

JT: So it was really just keeping that pipeline maintained, adding onto it, because in some of the—

NC: We didn’t maintain it. We paid other people to maintain it.

JT: Tell me if I’m correct. I’m looking at just a map of the original wartime pipeline. But it’s got one, two, and I guess the dash means that they’re building another one.

NC: That stuff shows approved by the Federal Park Commission, but we had not built it yet.

JT: So were you guys laying line side by side, is that what it was?

NC: These were all side by side, about, if I remember right, I think about fifty feet apart.

JT: Really? That’s probably thirty inches, the big ones that were going across the country?

NC: Well, no, it started out at twenty-four-inch. The first line was twenty-four-inch.

JT: That was in ’43, right, ’43,’44?

NC: Forty-four. Then they got bigger ones, twenty-six into thirty and then, finally, to thirty-six.

JT: That was big ones, probably some big stuff going offshore, out in the deep Gulf. I imagine those are pretty big.

NC: Well, that was later. The original offshore stuff, twenty-four was as big as we got originally. Then I think towards the end of, shall we say, my career, we were putting thirty-inch stuff out there.

JT: So this was the original wartime line from Corpus [Christi], came up through here, I think.

NC: The original wartime line [unclear] here near Corpus. It went to—

JT: West Virginia, right?

NC: Yeah, it went to Charleston.

JT: How did you pronounce that town down here?

NC: Agua Dulce.

JT: I've been seeing it everywhere and I didn't know how to pronounce it properly. Agua Dulce. That's south of Corpus, probably near the King Ranch area?

NC: Yeah.

JT: Some big natural gas fields down there, right?

NC: That's where it all started from.

JT: Chicago Corporation. So in '48 you jumped aboard. I'm assuming that Tennessee Gas had their building in downtown Houston by then, or did that come later? Did that come in the fifties?

NC: They were in a building. They started out in a building, I guess before I came to work for them. It was located on the viaduct, I'm going to say. Right in the middle of the viaduct there was a office building, and that's where they moved when they started. By the time I had arrived, well, they had opened up that space about three floors, I guess, on a downtown building. Then later they built a Tennessee Gas Building.

JT: So you were hired as a civil engineer?

NC: No, I was hired as an instrument man.

JT: You were on the floor with the rest of the parties, huh?

NC: Yes. Then later I improved my standing.

JT: Got boosted up to an office job, I guess, huh? So tell me about those early days as a survey man. Those survey crews are really an interesting bunch, as I've come to learn. These are the first guys that get out there and go and have to—

Mrs. Caraway: Cut the bushes.

JT: Well, cut the bushes, but also, you guys, did you have to negotiate and speak with the landowners?

NC: No. We had land people did that.

JT: You had land people that came in ahead of y'all, I guess.

NC: Well, with us. Soon as they came through a place and had enough information, they'd [unclear]. So there wasn't really any negotiation. I mean, they had to go in and get approval, but we had the right of eminent domain. No big stutter in there, shall we say.

JT: So in '48, as an instrument man, do you remember what was the first project you worked on or you took readings for? Because this is '51, so this is not too far after. You get Kinder, and then I guess this is the Pecan Island?

NC: That's Kinder, Pecan Island and this one.

JT: That's the Bayou Sale.

NC: That area and then struck on out down to there.

JT: So did you work on the Pecan Island? This one came to Cameron right there. I think that's the Cameron one. Oh, no, this is Pecan Island. Cameron right here, I guess, and then Pecan Island. Then Bayou Sale. So did you work in South Louisiana when you came aboard?

NC: Oh yeah. They had had this. [unclear] down here. I was on the initial stuff in this part.

JT: I'm kind of curious, and you may or may not be able to answer this, but why Kinder? Why would they build that main compressor station in Kinder? Was it just land was available, it was cheaper, it was kind of strategic between the mainline and the coast? Any idea why Kinder?

NC: It's been a long time now. I think that was where the oil, the gas started showing up, was that station there. Then the pipelines went out and these was the main lines, but there was scattered ones off at the end, going out to various areas and bringing in the gas. Why that was the spot picked, I couldn't tell you exactly, but I suppose it was cheap, or able to get it for that.

JT: I guess Gardner just said, "Put it there." Gardner Simons [phonetic].

NC: That's probably what it was.

JT: Mr. Hancock, when I asked him about the planning for the Muskrat Line, he said that Gardner Simons came to their department and said, "I need you to build a pipeline through the marsh." He didn't ask if we could. No one had built anything that large through the wetlands before. He didn't say, "Is this possible?" He came and said, "I need you to build this thing."

NC: That sounds like Hancock.

JT: Right. And I guess a team of guys went to work. Now, tell me a little bit about the process. If you're an instrument man at this time, and I guess you moved up to Hancock's right-hand man during, I guess, the mid fifties, mid to late fifties, but in order to build a system, let's say you've got gas down here and Mr. Gardner Simons, the CEO of your company, comes in and says, "I want you to build a line to the delta," walk me through the steps, the process of how that begins.

[Begin File 2]

JT: Walk me through the process from an engineering perspective and, I guess, a planning perspective. What's the process involved in first planning and designing, and then, eventually, building? How do you get out there?

NC: Well, I guess the original planning begins when the people in the gas industry, the gas—can't think of the word right now. Anyhow, the people that buy the gas, after they bought it from someplace, you build a pipeline there. When this area here developed, they went down along the coast, bought a bunch of gas, so we built a pipeline from there to there and on down to the coast.

JT: Fifty-one, fifty-two, and then fifty-three. I guess this might be the Pecan Island. And that's the last one. Then, of course, the Muskrat Line came later. So, of course there's got to be gas, there's got to be someone you can buy the gas from in that area first, and it's got to be economically feasible.

NC: Well, that was another department. They bought the gas and say, "We bought gas and you go down there and build a pipeline and bring it up the line." So then we'd take over. As it turned out, all this developed. We didn't have all this here, so we determined the best thing to do was to start here and bring one down in here, which we did, and then extend it on down. As time went by, we extended it out and went offshore and we built it.

JT: Eventually you built one came back up through here, up through Mississippi from the New Orleans area and then it went out offshore.

NC: Yeah, one big cross [unclear] out there.

JT: So the first guys, so you know where the area is, but you've got to send out people, the land department people, to get the right-of-ways.

NC: Oh yes. We go out there and find it. They originally, if you're on land, the landman goes out and gets permission for a survey. It's the first step. You don't buy anything yet. Then you go back later and buy the right-of-way.

JT: So the survey is just a little small crew that goes out with an instrument and a chain and some stakes. You stake it out all the way, 355 miles.

NC: Well, I wouldn't say that.

JT: Close.

NC: It's only in pieces that we built. I think we built from here to Kinder, and then later, a short time later, we built this leg down here. It was coming up and picking up gas and later we built that one.

JT: So I'm assuming that at some point before all this started, someone probably flew in an airplane over the area and kind of scoped it out and said, "This may be where we need to go."

NC: Of course, we did it on a map first, and then you'd come over and look it over from the air and see what was in the way, like Lafayette being right in the way or something.

JT: [laughs] Lake Barre or something. So then the surveyors go out and survey, do kind of the preliminary survey, and then the land people go out to get the right-of-ways. Does the company have to pay the landowner for that right-of-way?

NC: Yes.

JT: So there's a market dollar figure for whatever that piece of property is.

NC: I think they had a standard they worked on, and then as the need arose, well, the standard went up, you might as well guess.

JT: Right. I understand. But you had the right of eminent domain so—

NC: Could fall back on it, yes.

JT: —the few private landowners who may not have wanted a pipeline through their backyard—

NC: There were several.

JT: Really?

NC: More than a few.

JT: So you either had to convince them or you had to go around them?

NC: No, we condemned them. We had the right of condemnation.

JT: In this area, I bet you ran across a lot of French-speaking folks.

NC: Yes, quite a few.

JT: Little bit of a language barrier there, I'll bet, huh?

NC: Yeah, I guess you might say that. But no, I don't think it was a barrier. They didn't speak good English, but they spoke enough to where you could talk and find which one to know.

JT: Did you find ever that some of those folks in more the isolated areas were a little bit suspicious about what you guys were doing or about bringing in all this equipment or about trying to—

NC: Well, they were certainly suspicious, but we never went into it until the landmen had gone down there and gotten what we called survey permission. He had to explain to them what we were doing, what we were after, and what the rights that we had, and that sort of thing. So moving in down there to do the survey and locate the line, we didn't have any big problem.

JT: Where did you and your crew stay? Where did y'all sleep?

NC: Motels.

JT: And then you would take boats to get out along this coastal area, or trucks or how would y'all get out there to work? Just get out there and walk through the prairie.

NC: Walk through the marsh, yeah. Then later, of course, if you ran into something that required boats, well, then we had a boat. Did that for generally most of it, through the marsh.

JT: You wore hip boots or what? How'd you get through that marsh?

NC: Walked.

JT: With hip boots?

NC: No.

JT: Just knee boots or something?

NC: Just boots. Hip boots, you get them full of water and then you can't walk. So we never did have hip boots.

JT: So just knee boots. I guess you guys probably didn't have mosquito repellant back in the day, huh?

NC: Well, we were repelling them ourselves, shall we say.

JT: Yeah, you had armor, enough clothing on, because, boy, those mosquitoes in the marsh are pretty tough. If enough of them get you, they'll carry you away.

NC: [laughs] I don't think we lost too many people that way, but [unclear] sleeves and some people are just immune to them. Not everybody blows up when they see a mosquito. So they're no trouble.

JT: So what about the wildlife out there? Was that ever a problem that the machete couldn't handle?

NC: No. Snakes was the main thing. I mean, deer, all the normal stuff you see, wasn't any problem. They'd run from you generally.

JT: Did you have any guys in your crew who were, let's say, maybe city folk, more urban oriented in their growing up and not really used to that type of outdoor environment and took them a little while to get roughed up around the edges?

NC: I imagine there were some people like that, but they did not create any problem. They learned pretty fast.

JT: Any idea how much you guys were making? They were paying y'all by the week or a salary?

NC: I got a salary, got a salary plus overtime.

JT: You must have been working a lot of overtime. Sunup to sundown to run that line?

NC: Quite a bit of time we were running about ten hours a day and then six days a week, up to seven days a week.

JT: So when the Muskrat Line came, y'all began using helicopters. Prior to that, it was just Pete and Joe walking through the marsh carrying your instruments.

NC: Well, we didn't play that marsh game. It became pretty obvious right at the beginning that you needed some helicopters and that was the way to do it, and so we did.

JT Was the Muskrat Line the first time y'all used helicopters?

NC: I think so, yeah.

JT: So before that, would you employ some marsh buggies or whatever?

NC: We employed marsh buggies, yes. The first time we ever went out there, we used marsh buggies, because that was the standard for getting through that area. Then we found out that we could do better with helicopters and so we did.

JT: So in 1955, when Gardner Simons and Tennessee Gas decide to go into the Southeast Delta region with the Muskrat Line, where were you at the time? What was your position? You had probably moved up through the ranks a little bit by that time. You were no longer a party chief, were you?

NC: Yeah, for a long time.

JT: So what was your role during that big construction project, the Southeast Louisiana one in 1955, '56, '57?

NC: Well, initially, I was one of the crew members and did whatever needed to be done. Later I became party chief, and then later I became one of the guys that had several parties under his jurisdiction.

JT: So what would that position be called? District survey manager?

NC: No, we didn't have such a thing as that yet. Later we had divisions, so we'd have a division party chief or a division engineer. Prior to that, when we first started in down there, we'd just send a party down, a survey party, and there was a party chief, and if you had some of this work was done in there, we'd have someone else headed up three or four parties, that type of thing.

JT: The way I understand it, the way they had it set up was Districts A, B, C, D, E, different districts all along the line. I think this area was maybe B or C.

NC: Well, initially it was B. Then later they had the offshore, and all the marsh stuff was a separate district out of Kinder.

JT: So at some point you went from party chief to managing a group of parties, is that correct?

NC: Well, let's see.

JT: So you would have been managing Dailey Berard's party, [Ollit Otis] Jones' party, the two or three—I forget how many were in this area that were running the Muskrat Line. So would you have been—

NC: I was trying to think. I was working down there as just a hand to begin with, and then later as a party chief, and then I think I went into Houston and managed a whole bunch of them, several parties. But I don't remember the [unclear], whatever you want to call it, when one stick—

JT: Yes, sir. So Olinger? Is that how you pronounce his name? Was he reporting to you?

NC: No.

JT: Because Olinger, to my understanding, was in the Houma office.

NC: Well he was initially, the land down there, supervising the activities of the survey parties that we had when we started. Then as we got more survey parties, I got mixed up in it and Olinger had stuff down here. [unclear] as far as getting the job done and who was responsible to who and that type of thing.

JT: So did you kind of have to divide your time between Houston and kind of Houma, New Orleans, the marsh area?

NC: Well, after I first worked down here just with the party chiefs. Then later I came into Houston and they came under my jurisdiction. Initially we had an office in Houma and they were the ones that all these ones down here reported to Houma and we reported back to Houston.

JT: Is that where probably a lot of this work was done? This may not be a good example, but I've got a couple of hundred of these documents that show pieces of the line, various pieces of equipment, bulkheads, the canals, the pilings for the platforms. All these drawings, was this done in Houston or would this have been done in the Houma office?

NC: Oh, I don't know that there was anything specific. A lot of it was done in the Houma office and a lot of it was done in Houston, dressed up in Houston, perhaps. I don't think there was any hard and fast direction or happening.

JT: I don't even know if you guys would have had fax machines back then, but did you just mail—if you had some drawings, your guy comes in from the field and you have a draftsman there that kind of drafts up an area and you needed approval from, let's say, headquarters in Houston, would you just put this in the mail, or how would that information get back to Houston?

NC: Oh, we'd draw. We had draftsmen down there. We drew things up, maybe sent it in and they'd tell them this is what we think, what we think ought to be done, and I'd say in 99 percent of the cases that's the way they did it.

JT: So a lot of communication between Houma and Houston. So Houma was kind of the hub.

NC: Of the offshore area. Houma was the hub of the marsh area. Later the main hub was in Houston again for the Houma and New Orleans area.

JT: So you all eventually had an office in New Orleans?

NC: Yeah, and they had one in Houma too.

JT: They had one in Lafayette too?

NC: Yeah.

JT: I'm going through a lot of the *Line* magazines, the old newsletter, monthly newsletter, and it's kind of neat. In the back it has updates from various offices or districts. You'll see a group of guys who caught some snapper offshore, south of Houma. There's a Jeanerette office. There's a New Iberia office. There's a Monroe office. Or course, Kinder; Jasper, Texas. So these little offices, were these just kind of little offices along the route and the offices were used for—

NC: Oh, it varied. The area or system went into service, well, then they established maintenance offices. They would be established in certain towns. If we went out on a new survey and did work, then of course we opened up some new offices that were, shall we say, closer in touch with the actual [unclear]. That was a while after that survey was done and the route was agreed upon. That office closed up and the development team went back to one of the regular field offices.

JT: Interesting. Then once the line was finished and everything, I guess you guys just kind of kept the main offices and maintenance personnel.

NC: Well, as it developed, construction developed, well, then they felt the need to have a field office, then they'd make a field office and install people there. For instance, I think at one time the Lake Charles office was the only one down here in this area. Then subsequent to that, we had opened up one down in Houma.

JT: So probably that Lake Charles was for that early extension through the Pecan Island area. They used that as the base headquarters and then as it moved to the southeast towards the delta, it moved on. What's interesting is that I read some of the documents that show how you guys moved a crew from Houma after the Muskrat Line back to Lake Charles because y'all were developing the Catco system, which was south of Lake Charles, one of the first big offshore—C-a-t-c-o. It was built in the late fifties. It was the one that ran kind of straight out like this and had little small little feeder lines, but it was a big offshore one, one of the first big ones.

NC: Yes, twenty-four-inch. Twenty-inch, I think, [unclear].

JT: You see a request for transfer of—in Houma they had a wives' club. All the guys who worked in that area and their wives kind of had a club get-together and then one of the letters said that Mrs. Jones and Mrs. Berard and some of the other guys' wives, they had a going-away party because they were moving to Lake Charles. The line, I guess by that time, had been done, had been installed, and

then they were moving on to the next big construction project. I guess you guys just kind of bounced around, huh?

NC: Oh, yeah.

JT: Did you stay in Houston primarily after the fifties, after you got up to that region, or were you all over the country like some of these other guys, Hancock?

NC: Well, I was all over. At one time I took over Hancock's total responsibilities. [unclear] developed, we would have somebody in immediate charge and then we'd expand and put some kind of division office, you might say a new division, a new division office, depending on the needs of things as they developed.

JT: I should have brought another map that showed—

NC: Oh, I'm the one who knows where things are.

JT: If this is 43, let's move this up—

NC: It's 53.

JT: Excuse me, 53 to 55. Because one of the questions that I have is, okay, so they build the Muskrat Line to the delta from Bayou Sale, wherever that's going to be, Bayou Sale, here, to the delta, but on some of the maps, you see a new line that comes up to Kinder, parallels the old line. Was that also part of the construction? I always thought that the line just tapped in right here, but some of the maps show an additional line right next to it. Do you recall if it was one built parallel?

NC: You ring a bell to some extent. I think that was after my time. You just got so much coming in, you couldn't bank it on one twenty-inch pipeline. It had to move.

JT: Part of the expansion into South of Louisiana and eventually the Gulf of Mexico was because this was expanding up here.

NC: Well, I think it was expanding, but I would say I think really it was expanding because we had made the gas available and we had it up there and then they wanted to expand and use our gas that we had. You understand the—what's the terms?

JT: The economics.

NC: Well, not the economics so much as just—

JT: The supply and demand.

NC: Yeah, supply and demand. You've got more gas down here, people still wanted gas, so we built. They picked us up, we built [unclear] carried up and we meet the supply and demand.

JT: So as there was construction projects going on here, there were subsequent construction projects going on in the northeast to extend that—

NC: Up and down the system. See, at the time I went to work, we were building the second line. Then as you see now, in some cases there's five of them there.

JT: I'll be.

NC: We were building [unclear] the second line when I went to work with them. We used to have a single line down there.

JT: Yeah, the original, you said a sixteen-inch?

NC: Twenty-four.

JT: Original twenty-four and at the time that expanded. So after they surveyed the Muskrat and crossed all those waterways, then you guys had to call in the contractors. The Williams Brothers was one. Is it H.P. Price?

NC: H.C. Price.

JT: H.C. Price, I think Houston—

NC: Houston contractor.

JT: These were the guys who were pipeline contractors who had the big spud barges.

NC: Well, some of them. [unclear] up here in this area. Here there were offshore contractors was one group of people and the onshore was another group of people. Then in some cases, I think, if I remember right, some of the big contractors had offshore equipment and onshore equipment.

JT: Because it was kind of half and half, wasn't it? It was half onshore, half offshore?

NC: Well, initially. I mean, the onshore was built, you might say, initially, and then the offshore a little bit and then later we started going forward offshore and then

we start looping this stuff and building more onshore to carry the different [unclear].

JT: Explain that concept, loop. What exactly is that and how does that work?

NC: Well, it's [unclear]. You've got so much gas on the line build up here so they've got more gas, so you build another line alongside of it and loop it.

JT: So, parallel.

NC: Parallel.

JT: See, I'm thinking of a loop as if it makes a big loop, but that's not—

NC: No, that's not.

JT: It's parallel. Side by side. That makes sense now. I've read that in so many different places, they looped a line here and there. I'm thinking of like a freeway loop or something.

NC: No, it was just a side by side.

JT: You've got so much gas coming out that a twenty-four-inch can't handle it. You've got to double it, double it up.

NC: Put a pipeline there. It also made it bigger than twenty-four-inch, too.

JT: So when the contractors come in, I'm going to assume that these contractors had prior knowledge of working in this type of marine environment. Is that correct? They had built pipelines in the marsh or the bays.

NC: Well, not necessarily they had built. Some of this was initial stuff. They were original pioneers down there in the marsh offshore.

JT: One of the questions is, were there any examples that you guys could pull from previous projects to use in this kind of new kind of marshy, watery world or these were experiments and things that you were going to try—

NC: It was obvious that you didn't use the same equipment and the same planning for this down in here as you did that. We just learned how to do it.

JT: So for here you used like digging equipment and those cat systems that would lower the line, weld it right there, and go in and dig it. But here you couldn't really go into the marsh with a tracked vehicle per se.

NC: Right.

JT: So the idea was to build a canal, to move in barges that could lay this because it was so big. Now, had they done anything like that before, those contractors or Tennessee Gas, building those canals to get in there?

NC: No, I think we were the first ones to do it. It doesn't take much. If you're a good contractor, it doesn't take much to do things that [unclear] too. It's sort of a new [unclear] thing, knowing what needed to be done and just smart enough to do it.

JT: In some of the articles from the *Line* magazine, it says that some of these contractors had built specially designed—these pipe-laying barges. So I guess at the same time, you've got contractors like Williams Brothers who are also getting innovative to work on the Tennessee Gas project and coming up with their own—

NC: Most of this started, all this from Kinder on up, with standard pipeline. This down here was in the marsh, and contractors came up with different equipment and used their head.

JT: Just used their skills, all their talents.

NC: To work down there you need barges. They'd been drilling wells down there for some time and they used barges to get around and set up their wells, different equipment and that sort. It was kind of [unclear].

JT: And the helicopters was somewhat of a new creation after the Korean War.

NC: The helicopters were new in that we certainly couldn't use any rolling equipment and we couldn't get from one area to another before they had ditches that the pipelines were in, and so enough said, these helicopters could move your people as you were going to survey on down the road. So I guess the first thing that we started those helicopters was making the survey. Does that make sense?

JT: Yes, sir. Actually dragging the line, the chain, the thousand-foot chain instead of having a man walk over there.

NC: He couldn't. He'd do this.

JT: He'd swim in the marsh. I guess to also carry, because you guys had to have a platform to get up there with your instrument and take the elevation and the shot.

NC: Well, yeah. I'm trying to think. I think we built some platforms of our own. The survey parties just built one and they initially started, and then after that they put something a little bit more permanent and go from there.

JT: Let me ask you about some of these drawing that I have, because I think your handwriting may be on some of this, but you probably know more about what this is than I do. So for the bulkheads that you guys had to design and build, these were bulkheads that were used along the waterways, in other words, like when you crossed—

NC: In [unclear] ditch. If we crossed some type of a canal, well, we had to do some stopping to keep the water from flowing down the ditch and down the canal too. So we put in bulkheads that stopped both ways, because we didn't want to have water flowing anywhere as a result of our pipeline.

JT: This is an aerial view?

NC: No, that's looking sideways. Somewheres these planks were driven down into the ground somewhere and these deep ones were driven further down to act as support.

JT: So then this was another thing that you guys came up with, this earth plug. I guess that kind of answered my question. They're made out of sand, clay and mud. So you guys would just pack—it was almost like an earth bulkhead.

NC: That's what it was.

JT: You guys would pack all this stuff.

NC: Three foot of sand, four foot of clay, fifteen foot of muck.

JT: Muck. Gumbo, huh, that marsh mud. [laughs] Would you guys mix this in like a big drum or something?

NC: I can't answer that question, really. I think that that was the contractor's business. We told them we had to have a plug in there to keep the water from flowing down the ditch, so he put in an earthen plug. Some were different from others and this was just more or less a—I wouldn't say directive, but a method.

JT: Materials to use, also.

NC: Then what the contractor actually did, really, the contractor, he does a lot of things himself. You know what I mean?

JT: So in other words, you didn't have Tennessee Gas engineers going out and building this.

NC: Not in terms of a construction operation. They contractor put these plugs in and now people was looking at them to see what was in there, but we didn't have any real specifications much beyond that.

JT: Dailey did tell me that he thought at some point you guys began manufacturing either a plug or some type of a bulkhead at a facility somewhere in Louisiana. In other words, it required a certain kind of either concrete or creosote bulkhead of some kind.

NC: We had some concrete bulkheads we used by driving [unclear] slit in the middle, drop a piece of concrete in it.

JT: I think maybe that's what he was talking about. This was later on in the project as kind of the project is evolving. See, that's another interesting thing, is at the beginning it had a price tag of 52 million dollars for the Muskrat Line extension.

NC: The extension?

JT: Or the Muskrat Line project. Fifty-two million dollars is how much Tennessee Gas, the price that they submitted to the Federal Power Commission. That's how much it was going to cost for this construction project, 52 million dollars. But that was before the project really begins. One of the things that I think is really interesting about the Muskrat Line is, as it's evolving, you guys are running into different challenges, different problems, and you're having to come up with your own solutions kind of on the fly, like this plug, like whatever Dailey was talking about, these concrete slabs. "The bulkheads aren't working. We've got to come up with something else." So it wasn't like you guys started with the exact amount of equipment, exact amount of material, you knew exactly where everything was going. It almost seems like this project kind of evolved over time.

NC: Well, yeah, it certainly did do that, but remember that you first, if you're going to be offshore, where are you going first?

JT: On land.

NC: You're going to come through this land up here, where it's dry and high. Then you come down, it's gotten a little wet down here. You've got to do something more, so you do a little something more, you come on down, pretty soon you're offshore and you've got to do a whole lot more. But it wasn't a case of just, boom, doing the whole thing at one time. So a lot of things were tried and failed, but we got it done.

JT: Is there anything that you can remember that you guys tried that you realized it didn't work and so you had to adapt and move onto another type of material?

NC: Nothing in particular that I can think of offhand. I mean, you see this thing right there, that was somebody's idea. Whether that specific specification worked or not, I don't remember now. I don't know.

JT: I don't think I have it in here, but the way that the canal was like this. I've seen one that looks just like this. So this is the water line, and this is a canal that they would dredge to allow the spud barge, and then the pipe would lay in this one little trench. Was that something that you guys had seen before or had used before?

NC: No, I think it just came to mind. Didn't want the pipeline sitting up here in the middle of the floor unless somebody would run into it with their boat.

JT: You would cover this with—I think in some of the documents it says they were using shell, rock, or whatever to cover it. You have to coat these rascals with some pretty thick stuff to keep them from floating.

NC: Concrete.

JT: Right. And that was done on location, right?

NC: On location, what do you mean?

JT: It's not like you ordered a piece of concrete pipe. You had to order the pipe and then you had to coat it. So the coating was done by other contractors, specific coating companies, I'd imagine.

NC: Yeah, there are coating companies. There were coating companies, and some of them put concrete on it and others put it on later.

JT: On a barge, you mean?

NC: No, later. We'd put it on maybe a big yard and you're putting in coating things because you've got pipe that's going to need concrete coating, you've got pipe that's not going to need concrete coating. So it would be up to the contractor to decide which is most economical for him. Some of them put the concrete on and put the coating at the same time. Actually, not at the same time, but at the same place. Others would do it different. That was the contractors. That wasn't a specification of ours.

JT: You guys had the wherewithal and the forethought to know that eventually this was going to extend even further and that you would need to think ahead of time about how you would attach a new feeder line from a new field or from offshore back into the system, so that had to be part of the design and the thought process in planning and building this thing, am I correct?

NC: To a certain extent, yes, but you never know exactly where the connection's going to have to be made, so you can't make too much of a special dispensation for them. [unclear].

JT: That's what the platforms were for?

NC: Platforms? The platforms were if you build something of significant size or it's a substantial amount of stuff there, but sometimes [unclear]. There's all sorts of variations of things a guy can do. [unclear] of the pipeline, see down here where you just come in, there's the ground, just come in and tap it some, put a valve in, your measuring facilities there, go into the main pipeline and go on someplace else. [unclear]. You try to come over [unclear] working equipment, the valve and that sort of thing easily.

JT: Out of the water too. So then you tapped into the existing line, you'd put a valve and then you'd want to extend it above the ground.

NC: See, you'd put one as close to the line as you can, then you'd have another one that goes up so that you could get to it easy.

JT: The purpose of the valve was to both meter or to determine the amount of gas that was flowing and—

NC: The valve didn't do that, no.

JT: Or to shut it for emergency purposes?

NC: I think to shut it off, yeah. Just to connect, stop it. A lot of times you'd come by here and you'd cut a pipeline, you'd [unclear]. That's all you've got, hadn't done

anything else. So you've got to put there and put your connection there. That's what we'd do, come down with the machine and drill a hole into the pipeline and then you'd put a piece of pipe on there, put a valve up here and build on whatever you want to from there on.

JT: Which I think some of these may try to illustrate that here. This is a sketch of proposed tie-in facilities at Amelia. So is this the existing facility and then you've got an eight-inch—

NC: Yeah, this is here.

JT: That must have been like a Shell or Superior Oil.

NC: Could have been most anything. This was made in the field.

JT: So it looks like this is the eight-inch feeder line from the Muskrat Line and then here, is this a valve, is that what that is?

NC: Yeah, check valve, that's what that is. See the single line there? That's a check valve. Double line or X means your regular open-and-close valves.

JT: So the line comes, is that a stop? Is that where the line stops? So then you guys tapped into the side. Is that a side tap?

NC: They're generally [unclear], like this here. Because you couldn't really get to this valve to stop it.

JT: Yeah, shut it off in an emergency or something. So this was in some kind of facility that an oil company had where there was gas.

NC: Yeah, we had platforms out there, same thing, put a few things on, storage tank. It could be anything you wanted, put it together. The producer, generally we took possession up in here someplace. Yeah, we took possession right there. There was a meter station in there. Clear?

JT: Yes, sir. The meter station, that was something that Tennessee Gas was responsible for building?

NC: Yeah, we put our meter stations there. We might have the same contractor do it.

JT: You guys would design it, probably.

NC: Uh-huh.

JT: The way I understand it, because in the Federal Power Commission records, some of the justification for giving Tennessee Gas a permit was that a lot of these oil and gas fields like in Amelia, like in West Delta or Delta Farms or Bay Marchand or Bayou Pinchon, some of these oil and gas fields, the companies like Shell, like Continental, like Superior, didn't have a way to get the gas out. So as the oil is producing, it's coming with gas or they go deep down and they find a gas reservoir. What were they doing with the gas before the Muskrat Line showed up? Were they flaring it?

NC: Well, probably flaring it if they were producing. That was [unclear] production business, offshore [unclear]. There was lots of it flared down on the land, but as soon as they could get enough to warrant building a pipeline, well, then the flaring, and of course the FPC was very interested in stopping the flaring. [unclear] proper.

JT: As was the states, Louisiana and Texas were both interested in kind of preserving, conservation, conserving waste and all this gas can be used, but there was no outlet for it, there was no pipeline, there was no market, so they were either flaring it or—

NC: As soon as the market came, they developed a market when they got enough. The problem with our area was that once they got a new market, we didn't have enough gas to make it worth all going down there and get it.

JT: Till they discovered all those fields in the thirties and forties.

NC: Then the gas was coming in.

JT: Was there any gas storage like prior to the Muskrat Line? I'm trying to think of other ways. Was there any gas storages? What do you think this type of facility was with these?

NC: I think that this facility was separating it. Run the gas through here, separate the oil and the gas, put the oil in here, put the gas in there.

JT: That makes a lot of sense. So there's an oilfield near here, and the well that's producing the oil and gas is sending it to this separating facility. Oil goes into the tanks or out of one pipeline and the gas was probably being flared right here until you guys came in.

NC: Well, this separates the gas and the oil. There behind is the gas and dumping the oil in these tanks here.

JT: So a tie-in would be like just like this. This is a producer and there's your tie-in. Here's another one. This is Superior Oil. Where are we? Bayou Pinchon. I guess that's Terrebonne Parish. So you already had a canal—TGT tie-over. Okay, so it's two storage tanks.

NC: The producer had this. Flow lines coming from the wells, storage tanks with oil, separator he put in, and [unclear] over here. Flow lines go from here into whatever he's got to collect. I don't know what that's intended to be, but it would be something to either flare the gas or to get rid of things, I mean the fuel lines. This is the whole thing, flow lines carrying gas and everything, and these are carrying only gas. They're taken to the separator right here that separates the oil and gas at that point, so gas goes here and oil goes there.

JT: What's that number? Fourteen, seven.

NC: Looks like 14.7 to me.

JT: Is that the amount of gas pressure?

NC: No, that's the distance from this point to the edge of the separator.

JT: Yeah, because you've got 20.3. Did it make a difference, the amount of pounds per square inch, that the gas is moving from a producer facility to Tennessee Gas?

NC: Major difference.

JT: How did you guys compensate? What would you do?

NC: We didn't do anything. The producer had to do it because we had to get the pipeline up here, and this particular thing, we were running it to the twenty-four-inch. I think we were running 920-something, but it made no difference. It's 800 pounds. He had to put out gas enough to—

JT: So he would have to install additional equipment to—

NC: No, he wouldn't have to install additional—well, yeah, he had to put in additional equipment, but the additional equipment was to cut the gas pressure down. The gas comes up at 2,000 pounds, 4,000 pounds from the hole. Then our pipeline was running different ones, somewhere between 900 and 750.

JT: So he had to cut it. I got you. I wonder if the separators did that to some extent.

NC: Did what?

JT: Cut down the pressure on the gas coming from the hole.

NC: Oh, there was some loss in the gas pressure by virtue of [unclear] it here and separating the oil from it, but it wasn't a large [unclear].

JT: So all of this is on a platform above the marsh, right?

NC: Yeah.

JT: It makes a lot of sense. I've looked at these things so many times and you're helping me out explaining to me exactly what these are.

Here's a platform reported by you [unclear], Bayou Pinchon. So this is just a regular platform, I guess. Nothing real fancy about it. So you would have designed this in order to facilitate whatever kind of equipment needed to be installed and then the contractor would go and build that?

NC: This was what we had to put a platform on. It was our job to have a platform because we had things up here to connect. The separators was our responsibility.

JT The separators was Tennessee Gas' responsibility for certain fields that didn't have it, probably.

NC: Well, that was the agreement made between the people who bought the gas and people who were selling it and what they did with the oil. It was always oil mixed up with gas. There are some pure gas lines.

JT: So for each tie-in into each individual field, you guys had to build additional infrastructure for separators, to be able to separate—

NC: Somebody did.

JT: Somebody did if there wasn't one there preexisting.

NC: Well, I doubt that there was—in these particular cases, there wasn't one there per se because they just bought the field in, we just bought the gas. All this was coming together at one point. You with me? So they're going to separate it someplace because he wants his oil back.

JT: So you guys are just a step late from the actual drilling and drilling the well, producing the well, and then, boom, here comes Tennessee Gas with a pipeline to take the gas. He does whatever with the oil.

NC: That's his business. Well, it's not his business. I mean, that's what he does the thing for. The gas is sort of an extra.

JT: I'd like to know how much Tennessee Gas was buying that gas for. It couldn't have been a whole lot, ten cents a thousand cubic feet?

NC: I think originally it was about a nickel a thousand.

Mrs. Caraway: It was more than that now.

JT: About seven dollars last summer, wasn't it?

NC: I don't remember. I've been gone a long time from that area.

JT: It's down. I think it's about maybe two or three dollars this summer, with the recession and all. But a nickel a thousand-foot back in the day.

NC: [unclear].

JT: Then you can sell that for, I don't know, ten cents to your customers in New England, which over twenty years justifies a nice little profit on a fifty-two-million-dollar project like this.

NC: Well, the way it worked—do you want to know how it worked?

JT: Sure.

NC: Here's an oilfield, a gas field. The producer digs that and finds some gas. Then he was trying to find somebody to buy it from him. This is us with the big pipeline over here. So he sells it to us for a nickel at one time. With the big pipeline we take it on up here and we get to where somebody needs some gas. We deliver it up here and we charge them fifteen cents. They take that gas out and they go to some local place there in town that wants gas. They'll sell them some gas, [unclear] people for a dollar and a quarter. Each one's getting his cut out of it. That's not cheating or anything else. It costs money to build each one—

Mrs. Caraway: To bring it new business.

JT: That's what's so impressive about the Muskrat Line, is because without the big pipeline, these oilfields—

NC: Wouldn't even do it.

JT: —are producing their oil, but they're—

NC: Flaring the gas.

JT: —wasting the gas, and then your customer over here is either burning wood or coal, or oil, fuel oil, or kerosene.

NC: Well, of course, the FPC is telling them, "You ain't putting that oil or gas into the atmosphere. You do something with it." So they do something here someplace and get it out, and we took the gas right here, nothing but pure gas. But they weren't going to let them just [unclear], although Texas was just one big massive flare, a gas flare. They kind of said, "That's going to stop."

JT: The same thing, too, I'll bet you the same guy who's got a house or a business in, let's say, New England, or even in Texas, Mississippi, or Louisiana, is buying this gas for $1.25, I bet you before that he was probably paying twice that for coal. Or whatever energy source he was using to run his home or his business, it was not as cheap as that.

NC: Well, yeah. It's probably true of people under these conditions. With what we've got drawn here, if you're anything reasonable—

JT: You're saving the customer money at the end of the day too.

NC: Well it was either [unclear], putting it here, or it wasn't going at all, it was just stopping right there.

JT: Prior to the big pipelines, much of the energy source that was being used and burned in the Northeast was coal. So we know what that was doing to the lungs, to emphysema, to lung disease, to the whatever, the environment up in the Northeast. So by introducing natural gas, you see a decline in the coal industry for electricity, for heating, for cooking.

Mrs. Caraway: Saving lives.

JT: So after 1950 you see a big improvement in the air, cleaner air and health in that part of the—

NC: And less coal miners.

JT: Less coal miners, true. True. One of the downfalls of that is the coal industry. And they're always present at these FPC hearings. They want to make sure that the feds know, "We don't really approve of these guys coming, bringing natural gas," because it hurt their business.

NC: Exactly.

JT: So there's a lot of tank batteries. Here's a Shell Oil in South Pass, Block 24 Terminal. I guess what it's showing is your tie-in, right? So here's a ten-inch line that you guys probably built. That is a—what kind of valve you said? That's a mainline valve—

NC: A side valve.

JT: Side valve. And then that's a cut-off valve.

NC: That's a check valve.

JT: What is this little thing right here?

NC: That's a blow-off.

JT: What's a blow-off for?

NC: In case you have to shut this thing down.

JT: Oh, that's the opening, you blow off whatever's in here. Okay, I see.

NC: Now, this one's to blow off what's in there, and this one's to blow off what's in here.

JT: Then is this a facility? A presser. Eight-inch meter runs proposed.

NC: This is our pipeline. This is what we were going to build to that platform, where they were going to put a compressor and delivery platform, eight-inch mirror runs.

JT: So this is offshore.

NC: Could be offshore or in the marsh, likely in the marsh. South Pass, Block 24.

JT: It's in open water, I think. Might be. So what is this. The water line? Bank of South Pass. Oh, okay, so here's South Pass and then the line runs along parallel and then shoots up and then you have to build a compressor right here. Now, for the compressors, again, that was Tennessee Gas' designs.

NC: These were in the backwoods over there. The gas comes in here and this is our facility. We have an eight-inch line to take this gas from them and put it into our pipeline. So you've got the pressure [unclear]. Wherever they wanted the oil, that was fine. Then it's our business from this valve on.

JT: What's that mean?

NC: Point B.

JT: Point B to Point A.

NC: [unclear] in the contract or something, talk about Point A.

JT: There was [unclear] battery here, it looks like, and you guys were going around it to get to that.

NC: That's [unclear] oilfield, that's all. [unclear].

JT: Delivery Platform, Main Pass, this is 69. This is one of the more famous offshore fields, at least in the early days. It was just to the east of the Delta, Main Pass Block 69. Still a producing field for Shell.

NC: Is it?

JT: One of Shell's big fields. This is offshore. So this is a platform. So the Tennessee Gas pipeline would come through here. What's that say? "Gas in line for Shell," which came in from their facility. So then this would be the same thing as onshore, right, just a separation facility, and you guys would just tap in right here. But is this something you had to build, or this was already there?

NC: Well, I don't know. It depends on the agreement that they made.

JT: Plan of main delivery platform.

NC: That was ours.

JT: You'd have to build that because, again, Shell was just producing the oil and they could care less about the gas. If you needed to gather it, offshore particularly, you would have to build something like this.

NC: Depends on whether the way you are presenting it was right or wrong. They made one sort of gas and one sort of oil and just let us have the gas [unclear]. We didn't want the oil.

JT: It says here "Boat Landing." I guess you would tie up a maintenance guy.

NC: [unclear] tie up a boat. This would be something down below. We could get off on the boat, get on here and walk way over to the platform.

JT: Then it shows here kind of a horizontal view of Shell's six-inch gas line coming up and then some kind of way it taps into your line, TGT Line. It comes up. Okay, that makes sense. So any idea how many platforms you guys had to build for this thing? A couple dozen, it sounds like.

NC: There must be a few hundred of them out there, I'd guess. That's been a long time.

JT: Here's a close-up of that, saying so that Shell comes into right here. Ten- to six-inch T. So then it connected somewhere in here, I imagine.

NC: What does that say there?

JT: That's a Shell six-inch—

NC: Shell six-inch gas line. Oh, Shell's got a six-inch gas line coming in and—Shell six-inch gas line. I guess this is Shell's line that comes up, climbs on top of the platform, goes around there, comes in here and goes back out to the pipeline.

JT: Here's a larger version. This is the platform [unclear] clamp. Man, you guys had to do some pipe rearranging for these things.

NC: What do you mean?

JT: You had to put in some elbows and move that pipe all around and get it—why would it come out right here?

NC: Oh, I think the standard method at the time, pipelines [unclear] the platform. Where that goes, God knows where. This is where we tie into the platform. That's our pipeline to here. I don't exactly know where the oil shipment

[phonetic] [unclear], but that looks like a valve of some kind. Then from here it's all going to our pipeline.

JT: Somebody was telling me about drip lines. Is that because you'd get condensation in the pipeline?

NC: Well, condensation, some, yeah.

JT: Is that what a drip line is for? Or a drop tank? Or is it drip tank or drop tank?

NC: [unclear] show it. They've taken on a thing like this picture you had here—

JT: This last one?

NC: They've taken all the oil out of it and it comes up to here. We were taking it from then on as gas. Now then, a certain amount of oil stays in the gas, so at some later station in the flow line, before it gets into our main line, we put it through a drip station and drip all the oil out of it then. We don't want any oil in the main line, not because it's bad for it, but it just takes up space that could be gas.

JT: So I guess that's just a piece of equipment that—

NC: What, a drip?

JT: Right. What is that exactly?

NC: Here's your clean pipeline. Here's your drip barrel. You put a pipeline, a piece of pipe there and a piece of pipe here.

JT: It just drips right out.

NC: It just flows down here and falls in there.

JT: Because it's going to be heavier than the gas and the gas is going to be on the top.

NC: It's running along the bottom of the pipeline.

JT: Then would someone come periodically and take that oil out?

NC: Well, no, this is connected in some fashion, with a two-inch line or three-inch line or something like that, someplace where they can get to it.

JT: Interesting. So those things are located periodically along the coastal.

NC: Well, not periodically. These are generally any facilities producing gas, if it had any oil coming with it, then one of these things is there if it's needed. See, this is the way to do it at that particular point. At other points you don't need them.

JT: It sounds like most, if not all, of the producers where Tennessee Gas was buying its gas from in coastal Louisiana, was mainly oil producers who had associated gas. At some point I'm imagining that oil and gas companies began drilling for gas specifically to produce gas when they would find big reservoirs, and you've already got a system like the Muskrat Line or Pecan Island in place that now you've got companies who were going to actually look for gas, whereas before it was really just seen as a waste product.

NC: Before, if it was a gas area, then they would [unclear], and then later there was enough oil there to make it worthwhile fooling with, they flared that gas. Then later somebody finally said, "Hey, look. We can build a gas pipeline." So we separated them off, put the gas on one, put the oil in the other one, and off you go. Then Tennessee Gas was born.

JT: So before, if, let's say, a geologist would go down and say, "Oh, I see some sands. It looks like it might be hydrocarbons," and they'd go down and they'd drill it and it's no oil, and it's all gas, they would probably cap the well and move on.

NC: True. But if there was gas there and they wanted the oil and there was enough to make it worthwhile, then they'd just flare the gas.

JT: Right. But after pipelines like this in the fifties and sixties, it became commercially viable for companies—

NC: Yeah, commercially viable and—

JT: —to go down and say, "Ah, we found a big pocket of natural gas. Now let's produce it and sell it to Tennessee Gas," or Texas Houston or Transcontinental.

NC: Exactly.

JT: It sounds like this is a big natural gas—kind of an early stages of a natural gas industry.

NC: What?

JT: From offshore, from coastal Louisiana. Before the fifties, it was just flare for the most part. It wasn't a big industry. The natural gas industry was not big.

NC: No, I think it was a little late. You're talking—it was in the early forties, during the war, when they started [unclear] the gas. It was necessary for BTUs to be available for the war effort. So I would say early forties it started getting valuable, but they were still flaring gas well up into the forties and fifties, but there was a raised eyebrow.

JT: That's kind of interesting. It's kind of putting it all together. Before you guys showed up, it was just wasted resources.

JC: Wasn't any value to it. Gas cost—you could sell it for two and three cents a thousand cubic feet. Of course, now it's fifty dollars. But that's all you could sell it for [unclear].

JT: I'm sure companies like United Gas in Louisiana, which was a utility company, built pipeline systems to their municipalities or to the factories, kind of in the early twenties, thirties, forties, so you had some consumer demand and some uses for gas in Louisiana, but the vast majority of the natural gas resources could never be used just in Louisiana. There was way too much of it, right?

NC: Yes.

JT: You had to find other outlets.

NC: [unclear]. We were using gas when I was a little boy. We had gas in our house.

JT: Did you really? In Houston? So that was probably coming from Goose Creek or Sour Lake.

NC: They weren't bringing it across the country and that sort of thing.

JT: There was probably fields that oil companies had piped in gas for utilities.

NC: I'm not sure of the numbers, but we were paying something like twenty-five cents a thousand for the gas that comes to our house, whereas up east, they're paying twenty-five dollars.

JT: Yeah, because there wasn't as much gas and it was harder to produce and to build a system for it.

NC: It wasn't worthwhile. I think they had coal and that sort of stuff. They just weren't building pipelines from down here up there.

JT: I had a couple of questions. You've probably answered most of these. Flared gas. Private property owners. Looping the line from Bayou Sale up to Kinder.

NC: What do you mean by that?

JT: Well, that was one of the questions that I had. If you look at the map—again, I don't have the '56 map, but—

NC: It's close enough.

JT: You already had this line that went from Kinder to—I'm going to assume this is—this is St. Mary Parish right here, which is Bayou Sale Field, which was a major field discovered in the forties. So I'm assuming that that line was built before '53. When the Muskrat Line—

NC: No. Before '53?

JT: This is a map from November of 1953, so that pipeline is already there. But the Muskrat Line, from some of the later maps, and I wish I would have brought a copy of, but it runs like this and then it doesn't stop here. It loops, as you say, all the way back up to Kinder. So that's kind of one of the other questions that I had, was this part of the Muskrat Line construction project too. But without the map—

NC: No, I know what you're talking about. I'm just trying to think of the order in which that—you know, the first thing we built was down to here, down to Kinder, and then this branched off and goes to South Louisiana.

JT: See, because there was probably so much gas down here that it couldn't have fit in that one twenty-four-inch pipe from Bayou Sale to Kinder. They probably had to build another one.

NC: Well, the way we did it, we came out of another one and started—when we'd get into all this stuff down here, this all came from—I forget now, but we used to get a lot of stuff from around in here. Then we built this extension to go down to South Louisiana and picked up all that stuff around in there. Then we took this all offshore.

JT: Then eventually you had one that went almost straight through New Orleans, with like a station somewhere in here.

NC: The main one.

JT: Right to the northwest corner of Alabama, maybe, too.

NC: Yeah, I knew it was something like that.

JT: Let me ask you this. Any idea how many years this pipeline system was designed for?

NC: Forever.

JT: Forever?

NC: Yeah. We had no intention of it blowing up on us. Is that what you mean?

JT: Well, I didn't know if there was like a lifespan, like a bridge or a nuclear plant has a thirty-year shelf life, a lifespan for it. Does a pipeline system like this have a lifespan when you guys are in the designing and planning phase?

NC: No.

JT: So you're not surprised at all that fifty years later this pipeline is still in operation?

NC: No, I'd be surprised if it wasn't.

JT: [laughs] Oh, Katrina kind of caused a little bit of damage.

NC: You may lose something down here someplace, but it don't mess up the peripheral area.

JT: I think there was a couple, two or three sections offshore stuff, that Katrina had moved around a little bit.

NC: Some of them were damaged and then there was others that they shut down so that if they were damaged, then they wouldn't create any additional damage like blowing up the platform or burning something.

JT: What about this? There were several documents that I run across in the early phases of planning this, about oyster beds. Apparently either United or Texaco was being sued by some oystermen, a coalition of oystermen, because that oil company came in, built a pipeline system through the marsh, and it destroyed the oyster beds. So they were trying to explain how things work down here, some of the hazards with oystermen in particular and trapping, and Tennessee Gas took that advice to heart and I think there was a couple of places where—

NC: Went around the oyster beds.

JT: —they actually went around some of them to avoid it. Do you remember? Because I think your name is on some of those memos that's going back and forth. In fact, Tennessee Gas hired a local biologist from one of the universities and paid them, I guess, kind of a per diem or whatever and had him take some surveyors around, some engineers around, to locate the beds and then to, I guess, evaluate—

NC: Well, mostly evaluate. You locate the beds. If you didn't know whether they were there, you never did know. But if you had been getting oysters out of there, you're done with locating, see now it's how many oysters were you getting out of there and what's it worth, that sort of thing. That was an issue, quite a problem when we first went offshore with the oysters because, "The poor little oyster beds. My livelihood is gone because we dug up my oysters."

JT: Did you get the same from the trappers, the same kind of response from—

NC: No, because the trappers were moveable. They'd move a trap. But the oysters are right there.

JT: I can't remember if it's from some of the documents that I read, but it says that you have to watch out, too, because some of these oystermen may not have a lease. But when the pipeline came through, suddenly they had a lease. Do you follow me? So they saw construction coming in, so they said, "Oh, that's my lease right there. You're destructing my oysters. I need compensation." Because a lot of this land, really they didn't have very specific boundaries or leases back in that period. The local landowner might have told the oysterman, "Yeah, that whole bay is mine. That's my property. You can fish the oysters there or whatever." So I think you read that in the documents that it was a big challenge, one of the bigger challenges that you guys had to face right at the beginning. What about crossing of the pipelines?

NC: You maintain a separation between them and you were careful that you don't bust them, but one goes up or one goes down, depending on what the conditions are.

JT: So no real big problems from other companies.

NC: No big problem. It was just a little bit of a problem to take care of the facilities and not damage them.

JT: What about permits? Were you in charge of acquiring the permits from the local—you had to get one from the state, you had to get one—

NC: Well, I wasn't in charge of it. We had a group that would get the permits, but we were deeply involved as to whether we were going through a permitting area and that.

JT: So for the organizational chart, if you had Hancock, who was in Houston office and he oversaw this project or this district, he was the district supervisor, is that what—

NC: Where?

JT: Over the South Louisiana during the Muskrat Line. Would he have been the head guy on that? Then you had the parties, so let's say one was Berard, one was Jones. You had two or three parties right here. Then under these you had kind of a party supervisor. So where would you have fit in this line? Would you have been the head party supervisor?

NC: I was here and then I reported directly to him, and I think—maybe it became the other way around.

JT: He moved on to somewhere else or—

NC: No, I think I moved around him. But that was later.

JT: Like the sixties or the seventies?

NC: Well, not very long. I guess the sixties. I spent about ten years under him.

JT: So this would have been called a party supervisor, this position here?

NC: That might have been the net result of it. I mean, I was just the engineer.

JT: So Hancock's job would have been chief engineer, something along those lines?

NC: No, he wasn't a chief engineer. He was in charge of the field survey people. Then it got real complicated after that because he was in charge of the field survey people, but they reported directly to the division superintendent.

JT: Which was who?

NC: Well, we had five of them up and down the system, but at one time it was exactly the way it was and then they decided the division superintendents didn't like that idea of somebody [unclear] in the field in their area reporting to somebody in

Houston. So then they started reporting to the division superintendent and then as a bypass, kind of a mixed-up thing, had to use a little bit of moxie in there.

JT: So then you had two or three or four or five superintendents along the line in Louisiana that eventually reported up this way, or something like that.

NC: Uh-huh.

JT: So for the actual construction, the laying of the line, who was in charge of that? If Hancock would have been in charge of the surveying—

NC: We furnished the engineering people that took care of the engineering aspects of laying the line and there was a construction group who took the bids, got the contracts and, shall we say, supervise the construction.

JT: That would have been out of Houston, right?

NC: There was always, as you might well imagine, there was a little bit of a conflict between what Houston did and what the division superintendents did, because they felt that anything that happened in their division, "By god, I'm responsible for it." They didn't really have the knowledge to take care of the basic engineering difference while constructing [unclear], so there was a little—

JT: Yet they were also probably more knowledgeable about what was going on on the ground than Houston was.

NC: Well, no, I don't think that, but these people did not report directly to any of the division people. The construction was handled in Houston. These people, superintendents, they reported to the operating tree, shall we say. There was always a little bit of a conflict there, but it was also handled by those of us who knew how to do it.

JT: Because you all had had the experience in building the big line in the forties and early fifties, and so you knew how to handle authority.

NC: These had too. These division superintendents here, they'd been the ones that had done it. They just had to learn how to do their business together. My point was jurisdiction is one thing and actual leadership is something else, if you get what I mean.

JT: Yes, sir. So what was the highest-up position that you held with the company?

NC: With the company? Chief engineer.

JT: Chief engineer of—

NC: Eventually.

JT: —of Tennessee Gas Operations. All of them?

NC: Yeah.

JT: So I see how you went above Hancock at some point because Hancock never did get that high up.

NC: No.

JT: He was more of a project manager and so you were chief of engineering. So you had a big crew of people working under you.

NC: Oh, yeah, something like two hundred.

JT: That would have been more like in the sixties?

NC: Sixties, yeah. I'm lost on years now, you know what I mean.

JT: You did forty years at the company when you retired? Is that about right?

NC: About right, yeah.

JT: So if you started in '48, so then '88, so you went up through the eighties.

NC: If you say so.

JT: [laughs] That's a long time with one company. You don't hear that much these days.

NC: It was not with just one company, but I went through several phases, shall we say. I didn't peck the same typewriter all day long for years and years.

JT: What was your impression of—I'm not asking you to do a comparison, but what was your impression of the way that Gardner Simons conducted his business versus some of his predecessors that came along later? Was there something different about Gardner, the way he did things?

NC: Not that I know of. When he was there, I was not in a position to hear what he said and did, if you know what I mean, but I felt the results of what he did.

JT: So the guys that you would have worked under would have been Kettleson [phonetic] at the end?

NC: No, we had somebody else after that.

JT: I can't remember the lineage.

NC: Somebody came even after Kettleson, it seems like to me.

JT: [unclear], and that person's name slips my mind right now. You were there kind of at the end of the company's height in the eighties, and then after that it started—

NC: [unclear].

JT: I've asked different people this question. What would you say are some of the main reasons why Tenneco, the conglomerate of Tenneco, eventually went downhill? Is there something you can place your finger on? Were they overexposed in some of their other departments, other businesses?

NC: That I don't know. I was pipeline all the time. I had nothing to do with the rest of them except occasionally. We had the only engineering group of any size in the whole Tenneco operation that was pure engineering. I just don't know what happened [unclear].

JT: Some people also talk about the effects that deregulation that had on the gas, the interstate transmission side of the company, which was the bread and butter of Tenneco for so many years, and that deregulation era, government policies, removing those policies, and then the decline of the oil and gas market in the eighties, how they had some consequences.

NC: Declining gas market?

JT: When the oil and gas prices tanked in the early eighties.

NC: What's this now? Where are we now?

JT: I would say '81, '82, '83, '84, '85 and '86 is when—

NC: [unclear].

JT: 1982, ’83, ’84, ’85, ‘86, kind of that early eighties period is when the industry began to tank.

NC: I’m trying to think where was I then.

JT: Still in the Houston office?

NC: I don’t think too fast anymore. Hold on.

JT: That’s okay. Take your time. Let me ask you another question, because I see a note here. You’re second-generation pipeliner? Did your father work on a pipeline?

NC: No.

JT: Somebody must have told me that. Your dad did not work for Tennessee Gas.

NC: No.

JT: What did your family do for a living?

NC: My mother taught school and he worked for the Texas Company.

JT: Oh, for the Texas Company. So he was in the oil and gas industry also.

NC: Well, you might say that.

JT: Was he a lineman or something?

NC: No, he just worked for Texaco. I think he was in the credit union, I think.

JT: These are just some additional questions I have. I think that’s going to be about it, Mr. Caraway. Was the Army Corps of Engineers ever involved other than just the permits? They didn’t come out and inspect any of the work that y’all did crossing some of the big—Atchafalaya or Mississippi River?

NC: Well, I think they were.

JT: They were around?

NC: Yeah.

JT: You wouldn't happen to have any photographs or any personal papers from your time in the fifties and sixties with the company that might be of use to telling a better history story?

NC: Not that I know of offhand. I'm sure there's some stuff back there, but I threw most of it away, as you well might imagine.

JT: Dailey had two pictures. I should have brought them. He's got one of his party crew in the marsh and Dailey looked like he was twenty-five years old. Horace Meyers [phonetic], I can't remember all of them, but there was five of them there and they all got k-knives [phonetic] in their hands and they're right in the middle of the Roseau patch, and somebody took a picture of them. I guess it was probably McCurdy [phonetic]. Then he had another picture of a hot tap that he's standing on top of, and it's in the middle of Lake Barre. He had a little inscription written, 1962, so that would have been a few years after the Muskrat Line.

But he was telling me that he was one of the guys that kind of helped design these hot tap systems where, if you needed to begin expanding the pipeline into offshore waters, which is what you guys did in the sixties, that you needed a hot tap to go on top of that pipeline that's laying at the bottom of Lake Barre, puncture a hole, put a valve and tie into another line, which I think is a much bigger part of this story, is that the Muskrat Line was one, yes, there were several others, but this line over time it didn't just end; it extended. The technology in place in the mid-1950s allowed you guys, with some adaptation, to build a system in the marsh which facilitated the movement, allow these companies to go offshore and go, "Oh, if we've got gas thirty miles offshore, with Tennessee Gas and the other companies we can build in another tie-in line offshore and begin selling this gas to them.

NC: Well, you've almost got that right. They didn't build a gas line offshore. We went out and got it.

JT: You guys built the extension with the feeder lines. I guess those lines went pretty far out by the sixties and seventies, huh? Probably had one or two mainlines that went out pretty far on that.

NC: There was a whole system [unclear] the way the Gulf. That being the Mississippi River and we went out from down around Lake Charles area like so with a line. Then we split up like that and it was the same thing. We didn't have any single thing like this one. Then we built something close, I guess, here.

JT: Tie that in.

NC: But the whole thing was interconnected.

JT: Dailey refers to this one system called CATCO.

NC: CATCO?

JT: I'm not sure what that acronym stands for. It might have been a joint venture between maybe some other partners. But he talks about a big system south of Lake Charles that was built in the sixties that went offshore, deep, further offshore.

NC: We had something like this out of Lake Charles. Came out in single lines and then branched out from here anyway.

JT: Then I guess when El Paso bought it, they acquired those assets.

NC: El Paso bought what?

JT: El Paso bought Tennessee Gas.

NC: Oh, well, yeah.

JT: So in other words, there are still addresses for Tennessee Gas compressor stations. So it's El Paso-Tennessee Gas. How does that work, is Tennessee Gas—

NC: I don't know.

JT: I'm imagining that Tennessee Gas Pipeline is a subsidiary of El Paso.

NC: That's likely, yeah.

JT: In other words, it's not El Paso gas line, it's Tennessee Gas which is part of the—

NC: I think that's more reasonable.

JT: Want to go watch that movie right quick?

NC: What movie's that?

JT: I've got that *Making of the Muskrat Line*.

NC: Oh, yeah.

JT: You want to watch that before I take off?

NC: Sure.

JT: Okay. I'll go ahead and shut this down. Let me ask you this last question. What would you say was the most challenging part of building a pipeline in the Louisiana marshes?

NC: In the marshes? Not offshore?

JT: Right, in the marshes. What would you say was the most challenging from your engineering perspective?

NC: I'll admit you had to learn how to handle water that you didn't have to on the land. I mean on the dry land. But it wasn't anything challenging after you once did it.

JT: What about for offshore? What were some of the major issues of building pipelines offshore? You guys were some of the first to do that also.

NC: I guess the major issue was how to operate under water. We had to put in some new designs as far as the connections was concerned because they were down under on the floor of the Gulf. Then you had some additional after you clean up above the [unclear]. Then you had some more facilities you had to install, valves and things of that nature. I don't think of anything extraordinarily different, though. Just a little—

JT: Different way of thinking about it, huh?

NC: Yeah.

JT: Okay, I'm going to press "stop" right here.

[End of interview]