MMS OFFSHORE GULF OF MEXICO

ORAL HISTORY PROJECT

Interviewee: LEIGHTON STEWARD

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Bio
Leighton Steward was a geologist for Shell Oil in the Gulf of Mexico for many years. He grew up in Fairfield, Texas. He attended SMU and received a bachelor's and master's degree (1960) in geology. Mr. Steward was in the Air Force for three years and was then hired by Shell in November of 1962. He worked in the Houston division for a couple of years and was transferred to Shell's research lab in Bellaire and then to New Orleans. He was a party chief on the Eureka Coring Program. Mr. Steward was responsible for locating good tracts for bids and was one of the pioneers of the use of bright spots. He worked in New Orleans at Shell One for many years and in fields like Eugene Island, Cognac, and J Field. He also briefly worked for an independent and is on the board of Burlington Resources.

Summary
This interview covered Deep Water and Eureka. A great deal of information on bright spots including the lease sale of 1970. Commented on Cognac and LL&E. He also had an extensive discussion of Shell's success and management style.

Tape #1, Side 1

TP: This is an interview with Mr. Leighton Steward on May 11, 2004, at his home in Brenham, Texas. Let's just start with a little background.

LS: O.K., I grew up in Fairfield, Texas up in Freestone County. I went to SMU, got a geology degree and then a master's degree, which made me a ripe target to go to work for an oil company.

TP: When did you get your degree?

LS: In 1960. My master's degree. Then, I went into the United States Air Force for three years and came back out and when I came back out in November of 1962 actually is when I went to work for Shell. I think I was the first guy they had hired in the Houston division in a couple of years because they had had a big hiring freeze on there for some period of time. Worked in the Houston division for about 1-1/2 years and then transferred out to Shell's research lab in Bellaire and ended up being the party chief on this *Eureka* coring program; wherein, we went out and drilled holes up to 1,000 feet in depth on the Continental slope which was defined at the time by the government as between 600 feet of water and 4000 feet of water. That was the deepest they would let us go which was a nice limit because that is all the pipe we could put on the *Eureka*.

TP: Who organized that? That would have been at Shell?

LS: It was organized there in the research lab. It was, of course, in conjunction with discussions that were going on with the offshore divisions that were wondering how far out might we take this some day. Most of the shelf had not been leased in 1964 when we started this. But Shell had shot some reconnaissance surveys off the edge of the shelf and down the upper part of the Continental slope, which showed some huge structures out there.

TP: So, they had already done that in the early 1960s?

LS: Right. And everybody kind of wondered what they were. Now, there had not been much seismic shot but those big, huge salt pillars out there were so widespread that she could hardly shoot a line without shooting a cross one. And everybody suspected that they were salt but it was difficult to describe how it got there because they were so different from a conventional salt dome which had kind of squeezed up through the rocks and usually were not more than a couple of miles across once they got close to the surface. So, we went out and drilled, I do not remember exactly how many holes – probably 30 some odd holes, around the edge of some of these salt structures and in some cases, on top of the structures because we wondered if they had a cap rock on them like a lot of salt domes do and the ones we drilled did not

have cap rock on them so we actually got cores of salt. And, in fact, we got cores of salt with inclusions of oil in it, and that was really a surprise to everybody because you could take the salt out of the core, you could put a little of it in a glass of water and, of course, as it dissolved, you could hear it pop because anything in there was under some pressure, you know. But then, the oil came out with it. And you could physically see the oil in the salt, the little black droplets of oil. That kind of answered the question as to whether any oil had been generated in deep water.

TP: Was this all kept internal to Shell Oil?

LS: Oh, yes.

TP: For how long?

LS: I do not know how long. I left there in the late 1970s and I do not know whether they had shared all of that information with industry then or not. We were required to obviously let the government know what we were finding out there. But in the deals you usually had with the government, if you were doing something that was for your company alone, usually they did not go out and broadcast it to the world. I am sure they had different arrangements for different people. Anyhow, that was . . .

TP: So, then Shell at BRC had geologists working, theorizing what might, as a result

of . . .

LS: There were three of us there at the lab. One of them was a fellow named Peter Lanier who is a Swiss geologist and has now retired, but he ended up doing deep water research and exploration for Royal Dutch after he left the *Eureka* program and drilled these kinds of holes all over the world on Continental shelves where they could. Peter was pretty much of a regional, theoretical geologist type. Another fellow by the name of Bob Chuoke was there with that program and he was really analyzing most of the seismic data, etc. He was a theoretical physicist – very brilliant guy. And then, myself, and I was just a fledgling geologist at the time because when I went there in 1964, I had been with the company, like I say, only about 1-1/2 years or maybe a little longer at the time. I had been an officer in the Air Force, and I had a lot of people working for me, and I had been an all state quarterback. I was used to heading people and trying to operate things. And so, I got the job of coordinating the activities of what was going on in the lab with what we were doing in the field. Our work schedule was eight days offshore and six days back in to refurbish the supply, replenish the supplies and everything. My wife laughed and said, "Yes, Leighton was on an eight and six schedule – he worked offshore for eight days and then worked onshore for six days," because when we came back in, we had all this new data, new coring data, and you wanted to come back in and see, well, what are we finding out about it? So, it was not easy to take days off and not stay in the lab.

TP: One question people ask is: why was Shell the pioneer in pushing into ever deeper waters? Did this have an effect, knowing that there is oil at these great depths, that you might potentially get there?

LS: Yes, it was a company philosophy that did them well. Sometimes, they spent a lot of money in places that did not prove out, but the idea at Shell was if you discovered something and it was successful, the first thing you wanted to do was look through that entire trend and see if you could multiply that into a much larger opportunity. And so, the offshore was no different there. As we drilled on the Continental Shelf up on the shallower water, you just kind of wondered, well, how much longer is this going to go and how far can it go and everything else. So, part of what we were doing offshore, because we clearly did not expect to find any hydrocarbons when we went out there drilling such shallow holes, but we were really trying to find out what kind of sedimentation had gotten out there – how much sand was out there mixed with the shale and try to see if it had kerogens and then it might have generated hydrocarbons, you know, as it was buried deeper and brought under more temperature and pressure. So, that was the primary reason for it – the fact that we found oil out there was just serendipity, in a sense. And, in fact, we had codes that I would call in from the ship to say what we were finding. We were finding sand, we were finding shale, we were finding salt. And all of a sudden, we find oil that was physically inside the outer edge of the salt sheet. I just made up a new code, I said,

"We found something green," and they said, "green?" Well, they finally figured out what I meant. So, it was kind of fun. It was a great project because it was clearly leading edge kind of stuff, and it was easy to get excited about it. But, like I say, as a fledgling geologist, I was mainly an operations type guy there as opposed to somebody that came in to try to explain exactly how all this got there. I did not have the background.

TP: Who was captain?

LS: On the ship?

TP: Do you remember?

LS: No, I do not remember. If you told me his name, it might sound familiar.

TP: But Lainer and Chuoke were out there with you?

LS: Right. Kind of the tool pusher for the coring rig was a guy named J.J. Smith, but I just do not remember the captain's name. Now, Lainer went out on one of the trips. I am not sure about Chuoke ever went out on one of them but it was an interesting program.

TP: It just lasted one year?

LS: It lasted from 1964 to 1966 and, in fact, the last year, the 1966 year, we physically left Shell Development and went to New Orleans to be in the marine division there so that we could work more closely with the explorationists and the geophysicists who would be eventually acquiring a lot more information out there. And then, after that program terminated in 1966 . . . well, it did not terminate in 1966 . . . somebody succeeded me on the boat. I think it went through about 1967. But I just transferred into the division because another one of the real key things that I think allowed Shell to get ahead of everybody else is the vice-president of exploration there, a guy named R.E. McAdams, decided he was going to pull in the best people out of divisions from all over the country. I mean, maybe just a couple of guys, and bring them in to that division, so that offshore division really had most of Shell's highly ranked brain power there. And, in accumulating all those guys in one big area and letting them work on all of these things, I think Shell just leapt ahead of a lot of companies that did not put that much emphasis on the offshore.

TP: Who were some of the guys? Jim Wilson?

LS: Well, Jim Wilson was another vice-president, but Jim . . .

TP: Oh, you are talking about the technical people?

LS: I am talking about the technical people. I am not talking about the vice-presidents and so forth. They probably were doing that, too, but I would not have known much about it at the time because I was so early in my career. But technically, you could see that the guys coming in had been so well thought of in the different divisions.

So, in late 1966 but mainly in 1967, 1968 and 1969, I was involved in prospect generation offshore to get ready for the lease sales and, in fact, in either late 1967 or early 1968, they made me the offshore sale coordinator for that 1970 sale that was coming which, at the time, was the biggest sale that we had had out there. So, I really got my feet wet in that and it was during the period when I was the sale coordinator for that one big sale that I worked with Mike Forrest. We worked jointly on all of our prospects. All of my prospects that I was working as a geologist were identical to the ones that he was working as a geophysicist. And that is where I got to know Mike so well and came to appreciate him first for how accurately he could interpret the seismic data and make a structural interpretation with all of that seismic data. This is back before 3D, and you just had a few lines here and there, and then you had to interpolate in between and you also had to very accurately. We were interested in measuring the exact offset on the faults, the exact throw of the faults, because in other work that was going on out there, we were studying all these other oilfields where we had a lot of data and trying to figure out, well, why is the oil where it is. And pretty soon, in that tertiary sand/shale environment, became

convinced, well, not all of it but a high percentage of it was where you had a sand body trapped across the fault from a shale body to seal it. Now, if you had just a big old simple anticline, that is the lowest risk then that you can possibly drill out there because nearly all of those had hydrocarbons on them. But there were not that many of them. Most of them had faults that cut the structure or whatever. And one of the prospects that Mike and I worked was the Eugene Island 330 field out there. We called it Posy. As kind of the sale coordinator and everything, I was supposed to be trying to help make some predictions as to what kind of sand shale sequence might we see as we go further out on the shelf. Well, having no data out there, that is not too easy, but on this one prospect, Posy, it had multiple bright spot layers on it. And so, I thought, well, if the hydrocarbon is trapped the way we say it is and it is trapped sand against shale across the fault, then I will take all these bright spots in these various places on both sides of the faults where that goes, and I will construct a synthetic electric log for the SB portion showing where the sand was and say, well, that is the best guess as to what the stratigraphy is going to be out there. But to be able to do that accurately, you had to have a real accurate seismic map. And so, I just said, Mike's map is correct and that is the way I am going to build a synthetic log. And so, we had one fault that really cut across kind of the crustal part of that structure and is what we call a teared fault – right up next to the crust of the structure, it had about 400+ feet of offset and then, as it came off the crust of that structure, it died down to where it finally died completely out. So, this really helped a lot in figuring, well, O.K., you have got shale across there, how thick is the shale

before it gets down to some place it must run into another sand and then leak, so that all the hydrocarbon would have gone all the way to the syncline in the mini-basin it was in. So anyway, I constructed this log and then part it said, in a sense, might not have been all that significant because we were getting our courage up pretty good to go ahead and bid the bright spots. But the interesting thing about the log was when we drilled our discovery well on that structure, it was almost a laydown. I mean, with that log and the stratigraphy. I said, there has to be shale in here which we called the gray shale that was right above the F series sands which were the big producing pays. I said, "that shale has to be at least 400 feet thick." Well, it was about 450 feet thick. And then, here came these sands with thinner shales in between and all of that. That is how good his map was. All I was doing this trying to take what he did and take it a step further. But it came out really well.

After that, of course, our confidence just got higher and higher on the bright spots and I guess we cared less about the stratigraphy. But anyway, to a geologist, it was an exciting thing to do. As far as I know, nobody else ever did that – to try to make a synthetic electric log way before we ever drilled out there.

TP: Isn't that what Mike did when he first was theorizing about bright spots, that he put together some well package and made synthetic seismic?

LS: Well, after that, we made a lot of synthetic seismograms and things, but we were

trying to really fine tune it later on and say, O.K., is it gas, is it oil, and all that kind of stuff. But originally, the night I first heard anything about it from Mike, we were up there working on the 1970 lease sale and this would have been back in probably late 1968 or real early 1969. Then Mike walked in and he said, "Leighton, do you have any logs on this little shallow gas field that Forest Oil Company owned at the time?" Just happened to be Forest Oil Company – no relation to Mike. I said, "Sure, I have got those logs." He said, "Well, let's look at them for a minute. Come on over. Let me show you some seismic lines." So, we started looking at the seismic lines and he said, "You see where I am coming up on this structure and all of a sudden, this reflector gets so strong? It goes right across the top and then on the other side, it dims out again. Then, there is another layer in there that kind of does the same thing." I said, "Well, let's pull the log out." So, the log is out, we laid them down, boy, right where that strong reflector was you had a big, thick, shallow gas pay. It was about 4,000 feet, maybe 4,100 feet. Clearly, then we had wells off the side of the structure. No pay. And so, then we got to looking at it in three dimension on cross lines and it just worked out great. Well, it did not take much to get me excited about that because it just looked too convincing. But as we looked, then we started pulling logs from other fields that had been drilled out there that had pay on them. And in some of them, we could see that same relationship. But as we got deeper and deeper, we could not see any real bright spots or real strong hydrocarbon. The seismic data just did not have enough resolution in those days to do that. But that is what got it started and that set in the division probably for about

six months. Then Tom Connally, who had been the division manager out there and I thought was pretty much of a hands-off manager because he never came down to look at anything anybody was doing, happened to be up in the regional office, and he came back out there one day and we were showing a bunch of the preliminary prospects for that sale and he said, "What is all this bright spots stuff that I hear about?" Everybody kind of looked around at the division geophysicists and said, "Well, is it O.K. to say something about it?" And sure enough, we started talking about it. He said, "Well, golly, why don't you give me some of that data? I am going to Houston next week and I am going to take it out to the research lab and see if they think it is possible to really see this stuff." So, that is what really finally got it kicked off because at the research lab out there, it looked like it was totally theoretically possible that you could do it. And we were off and running. So that was kind of the way it got going but Mike was clearly, as far as I know the first guy in Shell Oil Company to ever see it and particularly to start talking about it and saying maybe this works. It was great fun being in on that time and pulling logs and looking at old fields and looking for bright spots, just so we would say, is this real? Yes, it sure looks real. How deeply can we use it? And really, in those days, out of about 7,500 feet, 8,000 feet seemed like about our limit at the time to be able to predict it. But it got much better.

TP: It was thought to be only useful for gas at first, but then also for oil later?

LS: Right. First, for hydrocarbon. We thought gas might show up more strongly than oil. That is what you would predict. And, in fact, that was the case. And as we later rolled the analysis, the A/B, the little formula that we called things to see, O.K., how bright is this reflector relative to background on the structure, because we had real good seismic data and nearly all the reflections were reasonably strong but some were stronger than others. That is the reason you wanted to interpret how strong this one layer was relative to the intensity of what you were seeing elsewhere. So, there was a lot of work going into all of that and a lot of fun.

I am sure you heard the story about Aubrey Bassett putting this big seismic line on the wall in his office one day and said . . . I am sure he caught everybody that walked down the hall, he said, "Hey, Leighton, come in here and look at this. I want to show you some bright spots." And then, he plugged in this thing and he had Christmas lights behind it and you could see them flashing through there. There were a lot of guys who, we were not 100% sure we could use it.

TP: Well, it seemed almost too good to be true.

LS: Yes, it did. It really did. And one of the things was to get the jump on industry. And I know other people have said, oh, all they recognize is that you could see hydrocarbons but in hindsight, going back and looking at the lease sale outcomes and everything and where the hydrocarbons were and where we saw that there were

bright spots and not bright spots, and see people's bidding patterns, we could not tell that anybody else ever used it. So, whether or not Shell was the first one to ever have an idea about seeing a strong reflector and thinking it was hydrocarbons, I do not know the answer to that. I sure can tell you that we must have run with it way harder than anybody else and wrote a lot of big checks betting on it.

TP: How long did it take before you saw that your major competitors were probably on to it?

LS: Just within a couple of years. Then, other people jumped into it.

TP: The 1972 sale probably.

LS: Yes. Not everybody in 1972 but a few of them came in. Clearly, Mobil was in there real quickly.

TP: Even Pennzoil got the best block on that Eugene Island 330 field, but I am pretty sure they were not using bright spots.

LS: We never heard any of them ever claim they did. They were bidding on anticline. This thing was a pretty big anticline. But we bid big money down the flank of the structure because we were so certain there were hydrocarbons down structure and

since we could not really tell the difference between gas and oil at the time, we thought, hey, if this is typical of a lot of fields where you have a gas cap and an oil leg, this next block down may end up being a really good block. And so, it helped us in our bidding pattern to acquire some blocks on that structure because they just put a real big bid right on the crest, which is what you would ordinarily do is bid the crestal block the most. But anyhow, it worked out all right.

TP: It is an unusual field.

LS: Oh, yes, it is the one that is getting replenished. I am not about to tell you we knew that was going to happen. But it is getting replenished at nearly two million barrels a year coming up one of those big faults on the side of that field.

TP: I read a *Wall Street Journal* article some time back on that.

LS: That makes a very commercial field. It really does.

TP: I wonder how long it will continue to replenish.

LS: Well, I do not guess any of us know. I have no idea. And not having worked out there for a long time. I do not know what they may have met deep and see by what you would call the fetch area for where the hydrocarbon is being generated, might be

coming from to refill it. But it is a real large fetch area in a rich, generating sequence – it may go on for one thousand years, I mean, who knows? We know there have been leaks at the sea floor in the Gulf of Mexico as far as man's history is concerned of keeping any kind of records.

TP: Do you have any documented . . .

LS: Texas A&M has documented about 180. This was three or four years ago the last time I heard that. I was on the advisory board up at Lamont – the geological observatory at Columbia University for several years and one of the geologists/geophysicists types there, Bob Anderson, had told me about that. In fact, he called me one day in the office and said, "I am offshore out here on lane 330, Eugene Island 330 field. We are just doing 4D seismic out here, documenting the fact that the thing is refilling. And he said, "By the way, Leighton, I do not know if you know that we documented 180 seafloor seeps out here." The other thing I found out was that a lot of the old Columbians, some of the Columbian and pre-Columbian pottery and stuff out there that has had the tar rubbed into it to help seal is, as you go in and do its "DNA," and look at it, is exactly the same oil that is leaking to the sea floor offshore – same hydrocarbon source. So, the oil that has been leaking out there these days, they all blamed it on the tankers and stuff but if you look back at the early history, there is a 1905 article that somebody dug up from a ship's captain log that says, "We are going through a big oil slick out there." And they even, I guess,

dipped up a little in it and they said, "This is oil." They were way out at the edge of the Continental shelf. They were 100 miles offshore. So, I am sure it is all the same oil because, by satellite, you can see these slicks now in the Gulf of Mexico where there was no drilling or anything, you can see these slicks that are up to 10 kilometers long from satellites. It is six miles long before it finally dissipates. Well, a lot of oil has been generated out there.

TP: That is a great story. So, in the 1970 sale, you were in offshore . . .

LS: Right. I left there actually three months or something, just before the sale. But we had wrapped that sale up pretty much a long time back because we had been working on it for three years.

TP: Yes, it was postponed, I guess.

LS: And a promotion opportunity came up and I got sent to the onshore as the division geologist there.

TP: Where onshore?

LS: In New Orleans. And then, I went from there to Houston for a while to run Shell's Vietnam properties and that job just lasted about, I guess, 90 days or so and the

North Vietnamese won the war, so that was . . .

TP: Before that, you were in the onshore. Were you involved with the Cox well at all?

LS: I was there. When Piney Woods blew out.

TP: That was scary.

LS: That was. I am telling you, that was scary. I thought for a while, everybody in Jackson, Mississippi might be in some kind of danger if the wind was just right.

TP: Yes, if the wind had blown in . . .

LS: And the stuff stayed right along the ground and everything, it could have been real bad.

TP: O.K., so then you went to Vietnam for how long?

LS: Just very briefly. And then, the guy that was the manager of the offshore division, exploration manager for the whole division where I had just come from practically, a couple of years before, resigned and they called me and said, "I know we just bid you to Houston. You do not have to take this job. If you do not take it, we promise

you, you will get the next division manager's job." But they said, "If you would like to, you can go back over there and have that job now. And I thought about it and that was clearly Shell's number one division where all the money was being spent, blah, blah, blah. I went home and told my wife, I said, "You lucky outfit." She said, "What?" I said, "You lucky outfit." She said, "Are we getting transferred back to New Orleans because she loved it in New Orleans. So, we went right back over there. For about three months, we were back there. And I stayed there until 1977, I guess – 1976 or 1977. Transferred to head office. I was, I guess, called chief of exploration and operations worldwide there at the head office working there for Tom Hart and then Jack Threet. And then, they said, "We would like you to do one more job before maybe a general manager's kind of job." I went in, and I was a division manager in the onshore division for everything west and north for Shell there which gave me a perspective on some other stuff.

In 1978, 1979, 1980, everybody was getting offers all the time to go do these things. It dawned on me that if I had stayed at Shell, some day, I would get gray headed and retire and I would not know anybody but a bunch of Shell people because, in the exploration department, we did not interface. The company did not encourage us to interface with people on that side. The people in the production department, you always interfaced with the vendors. I mean, they were wining, dining, hunting, blah, blah, blah – all that kind of stuff. But it was not that part. It was just I knew that we could not possibly have all the brain power in the world and must be some other nice

people there, too, so I decided to take a job that would let me not only see exploration but production, refining, pipeline, kind of the whole works and that is when I went to Burlington Northern because I got to do all that.

TP: That is how it ended up?

LS: Uranium, coal, and the whole deal. And looking back on it, I am happy I did it because I was there, I think, at the most exciting time for Shell. I really was. I was lucky to be around.

TP: Can you talk a bit about the 1974 sale and Cognac? Well, first of all, they merged the West Coast and Gulf Coast Offshore divisions, right, in the early 1970s?

LS: I do not know if it was quite that early but the people clearly started trying to move this technology around the West Coast line and the Atlantic. At the time I was the division exploration manager, we were only looking, and this was at 374 or 375 – we were really only looking out for the Gulf of Mexico and the Atlantic Coast, not the West Coast line. But they did take people and transfer them into where they could see what was going on in the early phases . . .

TP: I guess they had another California sale out there that Shell got the Beta lease on? It might have been the mid 1970s.

LS: But anyhow, they were fun times. Of course, as an aside there, the Cognac discovery well which was fine, our seismic data had gotten a lot better, we were shooting a lot more seismic, we knew how to process it better, we knew how to convolve it and deconvolve it and everything to try to make predictions for gas and oil and all of that. And we had done so much stratigraphic work trying to say, well, you know, if you get this kind of signature on your seismic data, is it probably in a good sand or may it be in a tighter sand? So, Shell had made all these predictions about what we were going to find at Cognac and we bid $212 million on the three blocks we got on Cognac which, at the time, was a lot of money. Even hundreds of millions were big in those days. So, about 1:30 one morning, Mike, who was the division sale manager, or whatever at the time, called me up and said, "Leighton, they are getting ready to wire in the log from Cognac. They are going to be running that log in the next couple of hours. Would you like to go down and see it?" I said, "Sure." So, boy, I threw on some clothes and Mike said, "I will be by to pick you up in a few minutes." I opened the refrigerator and thought, well, I might need something to eat or drink. And in the refrigerator, I had a bunch of bottles of champagne, left over from a Mardi Gras party or something we had had not too long before that and I thought, O.K., well, I will throw in a few cokes and I will also throw in a few bottles of champagne just in case. So, when Mike got there, I had this ice chest and he said, "What are you doing?" I said, "Well, I thought we might get hungry or thirsty before the night is over." He said, "O.K., fine." So, he put it in

the trunk. So, we go down there and sure enough, the log starts coming off and boy, Mike and the petrophysicist (I have gone blank on his name for just a minute – everybody knows who it was) said, "O.K., this is what we predicted. Now, let's see how this thing comes out. And it came out -- of course, you could not tell just from looking at the log whether it was oil or gas, but all the sands that had been called hydrocarbon, as soon as they took some cores and stuff on them, you knew whether they were gas or oil -- and the prediction had just come out uncannily accurate. So, about 4:30 or 5:00 that morning, I guess after all this gets wrapped up, I said, "Well, guys, is there anything else to do here?" "No, I guess not. Everybody was in a great mood." There were about four of us sitting there, and I said, "Well, let's go down to the parking lot. I have got some soda pop and stuff and an ice chest down there. Let's go get something." And everybody said, yes, yes. So, we go down there, I open the trunk, pop the top out of that and I am kind of covering it up and I am trying to get the top off one of these bottles and pretty soon, I turn around and about that time, it pops. "Why did you get that?" Anyway, we sat there and had a good time. And Shell may take my $700 pension away from me if they find out I have been drinking on Shell property. That was 30 years ago! That was exactly 30 years ago.

TP: That was down at the Shell building in New Orleans.

LS: Yes, that building was built I think in about 1972.

TP: One Shell Square.

LS: That was a good aside. Let me tell you something else that is my personal opinion as to why Shell was so successful. To me, this was very key and would rank up there real close to pulling in a lot of brain power from all over the country, to bring it into that one division. We had a wide open communications policy. Now, you cannot have that unless senior management backs it, not only with words, but with deeds, and I know it was a little later on that it really got drilled into me. I think we were working the 1976 sale. Charlie Blackburn, who was the executive vice-president at the time right under Bookout, who was running the company, came down to the lease sale review. So, Charlie gets down there and, of course, we have a jillion prospects running the look out over the course of 2-1/2 hours or something. So, we are going through these prospects real fast. Charlie is a quick study. So he picked up on the high points real well, but when all the dust had settled there, Charlie says, "O.K., we like this prospect the best and then we like this one, and then about third best is so and so," and about the time he said that, some young geologist who had had about 3-1/2 to 4 years with the company but who had been working on that prospect said, "No, sir." Charlie looked at him and said, "What?" He said, "Sir, I think maybe we did too good a job of trying to sell that one or something. That one does have some problems." He said, "No, we like some of these other prospects better than this one." Charlie said, "Oh, O.K." So, went on through and finished all

the lease sale stuff, wrapped it up. We did not talk in front of everybody about how much money we might expose on the sale but we were just trying to get all the value order there. Well, when that meeting was over, Charlie got up and he walked over to the corner, and this kid is standing on the corner, you know, and I think he probably did not know whether he was going to get eaten alive or what. Charlie walks up to him and he said, "Say, I want to thank you a lot for straightening me out on that prospect because I had the wrong idea about that prospect and I really appreciate it." Well, of course, everybody in the room heard this. Well, that makes you feel real good about the value of speaking up because Charlie is there patting the guy on the back for speaking up. In my discussing things with a lot of other people in a lot of other companies on the outside, that clearly was not the mode. I mean, once the big boss came in there, if he made a comment that kind of led you in a certain direction, a lot of people just sat there quietly and let it happen. And Shell did not do that at all. I mean, we argued a lot with each other without it getting into a hostile argument because we were testing each other's ideas and stuff. And it was the just the environment at Shell that I clearly do not think was in many of the other companies. Most of them were still very hierarchal at the time as opposed to trying to work it in a true teamwork fashion and get everybody's input.

TP: I remember Mike and I guess some other people saying in the late 1960s or some time, the technical people who were doing prospects were given more voice in sort of helping determine the value of . . .

LS: The value of a prospect. And then, we would get an engineer that would get assigned to our division in the production department that would be an economics expert and he would come in and try to help us with all of our weightings and everything and O.K., well, if you think this is really only going to be 20,000,000 barrels, I am going to tell you whether you can develop it commercially or not at our forecast gas price. It was mainly oil in those days because gas was not worth a whole lot early. But that clearly happened.

TP: Do you give McAdams and Ned Clark credit for helping foster that kind of culture?

LS: I did not include McAdams in that. I am really talking about Blackburn who was, later on . . .

TP: The Bookout era . . .

LS: I am not sure McAdams was still there in 1970.

TP: No, he was not.

LS: But he was clearly responsible for a lot of the work that went on in accumulating that team. But people did not speak up to Mac. I heard just the opposite of that. I

have heard of him look at some guy's map, looking at it and saying, "Now, wait a minute. That cannot be the same contour here as you have over there." A guy would look across the floor and would say, "Oh, yea." McAdams would just take the map and roll it off on the floor. He was an old colonel, I guess, from the Army or something. But anyway, he was a bright guy and commanded a lot of respect. But I think we clearly were better off when everybody started talking to each other, both up and down the line. That suited my management style to a "T" because growing up being a quarterback, I mean, you like everybody to function and feel like they are contributing to what is going on. And the worst thing you can do is go grab a map out from under some guy that has been working on it for like 6-1/2 months night and day and run off in another room with it and come back and say, thanks for your map, and then you never hear anything else until the bids are in on the sale. I think that happened at some companies. It sure sounded like it did.

The 1976 sale. It seemed like there was something on that one . . .

TP: Was there a shift in the mid 1970s in the Gulf Coast as to what kind of prospects you were looking for? Maybe it was in the 1986 "lookback" study I saw that you started talking about geopressured prospects and gas prospects more in the Gulf. And then you were also busy on the Atlantic, West Coast and Alaska. It seemed there was a sort of shift in emphasis.

LS: Well, the shift in emphasis was mainly economics driven. Tom Hart was the vice-president of exploration in head office for a number of years. One time early on at one of the sales I was showing him prospects, and I said well, we really did not look over here too much because it looked like those were just small accumulations probably if anything existed over there. He said, "Leighton, your job is to find all hydrocarbons in offshore Gulf of Mexico. Then, we will decide, after we talk to all of our economics guys and so forth, as to whether we are interested in it or not." But he said, "Don't just pass something over because you think, well it just probably does not have very big potential. Go in and evaluate it and if that is, in fact, the case, then it probably will not cut mustard, but when you are looking for oil and gas, you want to find all of it that is out there. And then you want to go after the best stuff." And there was wisdom in that that I probably did not realize for sure at the time. It made sense to me at the time because it just makes you look harder everywhere but I think the fact that we can go in later on and put these satellite structures up and take these small accumulations and tie them back into things, they probably were planning all that at the time, unbeknownst to a young geologist like me working in the exploration department. So, that was good advice but I am sure he gave that advice to a whole lot of people! So, that was good, too. "Find it all."

TP: Another Tom Hart story I can put in the record.

LS: There were probably some you can and some you cannot at the time. Speaking of

communications, one of the key nights that I remember is we were working on the . . .

Side 2

LS: I was in there, and we were getting right up to the deadline. We had to not only have all these prospects value order, but we had to decide how much money we were willing to risk on them and that had to do with, well, how much might the structure hold if it is trapping them the way we think it is – sand against shale, and all that kind of stuff. So, we had these two guys come over from Shell Development – Bob Chuoke was one, who was this theoretical physicist. The other one was J.T. Smith who was our expert on saying how much hydrocarbon had been generated at the source level and all that kind of stuff, plus J.T. was just bright all around – both of them were, really. We had been in that meeting from like one o'clock in the afternoon and it is 8:30 at night, and we are still in there grinding away trying to finish our final value ordering and everything on that. Well, everybody is getting kind of tired and because their communication was so open, if somebody said, "Good," somebody else would say, "Yes, but it could be bad." That was the only thing – it took some time to walk through all that. The good part of it was you got your computer loaded with all the pros and cons of something. But a couple of the guys got up and I thought they were getting ready to start out of the room, and I thought, well now, wait a minute – I want to know what is really on that guy's mind so I am going to put him in my spot. He is going to have to tell me which prospect

he would bid on first and what level he thought we ought to bid on it because he has seen all the economics on it now and everything. Well, one of the guys started to just walk on by me and I just got over and closed the door behind me and I stood in front of the door and I said, "Guys, we are not leaving here until we get all these prospects and get a value put on them and get ready to get them bid because we have got to turn these bids in tomorrow afternoon." And, as soon as they figured out that they had to lay their bodies on the line with exactly what they would do, we got one more level, one last level of communication. And we value ordered all the prospects and we went in the next day – we could not put "yes, maybe or no." We just had to write one number on that check and that is where I was trying to get with that exercise. We were good until that point on – everybody realized they were expected to not only give their technical judgment but also to put themselves in the spot of O.K., I am going to have to make a business judgment, too. He may ignore me but I am going to be called upon to tell you, "O.K., boss, this is what I would do." And, for the boss, it helps so much because you can then pick out the guys out there that have a really good logic train, that have a good business sense, to go with technical sense because a lot of people do not have both. Some people have business sense but very little technical sense. A lot of people have a lot of technical sense and no business sense. I am not talking about geologists and geophysicists – I am talking about doctors and lawyers and Indian chiefs. That is the way we all are. But it really lets you see into people. The benefit of it was that after the sale was over and we won some and lost some and everything, everybody had some ownership of it

because they had been in on that right up to the end, and somebody had to just yank the map out from under them and carry it down the hall and stop what they were working on.

TP: When you kind of got the bid values, did it ever get changed much once it got up to Bookout?

LS: Well, that is an interesting point. No, they never got changed much with one exception, and the guy that did the changing came back to me later on and was just as forthright as possible. He said, "Leighton, I did not have any business changing that bid. I guess because of the overall magnitude of money we were spending in the whole sale, I just thought, well, maybe I ought to go in and reduce one of these higher level bids that we have." And sure enough, we lost the block. It was a good discovery. And the guy was Jack Threet. And he was as honest as the day was long. He told me why he made his decisions and he said, "I should have never cut your bid." A lot of guys would have never even said anything about it, but Jack was a good guy.

TP: People might have ownership of a property but you do not want to be blamed for a big bid that does not . .

LS: But I never saw anybody get reprimanded for that. It was a really good

environment. We were lucky the overall environment was just really good.

TP: But you wanted verification as many levels as you could get.

LS: Well, you did, but it accomplished all those other little things of making people feel a part of it, giving them the excitement to go into the next sale – thinking, boy, all these nights I am working up here, I know they are going to listen to me when I get through. And they might even evaluate the prospect a little differently once they said, 'Well, what would be your business judgment on this?'

TP: It is an interesting game.

LS: Oh, it was an interesting game.

TP: And it changed all the time. I guess it is alien to the oil industry except for offshore, right? This kind of sealed-bid auction.

LS: Oh, yes. Let me tell one other Tom Hart story. Tom was a very bright guy. Tom would have been president of the company in my mind, and I think the minds of a jillion people, but he did like martinis a lot. That always came to worry people at the top if that is the guy that is going to be representing you 24 hours a day.

TP: And he spoke his mind.

LS: Yes, and he spoke his mind, big time! But we were down early in the phase of one sale and we were talking about showing him one prospect, and I said, "Yes, see this zone up here – this may be a bright spot. We are not sure. We only give it about 30% probability of being hydrocarbon." And then, we went down through these various layers. Well, we really did not think they were all bright spots. We were not even for sure that any of them were but we would rank them. I mean, if it was really a good strong bright spot and fit all the criteria and matched the structure and where the trap ended coming around the corner of the structure and all that, we would give that about a 1.0. That was going to be a hydrocarbon. And then, got to where we could even guess whether it was gas or oil. So, we went through a whole series on one prospect which, on the entire prospect, we could not say for sure that there was going to be hydrocarbon in any given layer. So, after we went through about five of those, then I said, you know, this one we will only give about a 10% probability and this one 20% and this one 35% and so forth. He said, "Let's see, Leighton. If I add all those up, it says that you have got about a 1.0 probability that there will be commercial hydrocarbons on this structure and you guys have told me going in that you are not sure any of these bright spots are hydrocarbon," so he said, "You know how you built this?" I said, "Well, we know one thing – if it comes out a 1.0 probability it is not commercial hydrocarbons, we will discount it with our gut if nothing else." He said, "Well, that is fine because what you have done is just built a

prospect out of stick and plaster. If you go in and find enough layers in there and give them two-tenths probability and three-tenths probability and add all that up at the end, you are going to spend a lot of money on that prospect and it may not be much prospect because it has been built out of stick and plaster." He was right. He had real good depth of insight. He nailed that one.

TP: He was head of exploration for a good part of the 1970s and the early 1980s.

LS: Yes, a good part of it. He was. That is true. He was some character.

TP: So, you left in 1979?

LS: Right.

TP: It seems to me, it was right about then that people like Charlie Blackburn and Billy Flowers and Bob Nanz were starting to push this change in the federal lease program . . .

LS: Scattered the competition out some.

TP: Scatter them and get the deepwater tracts nominated, which they had not been successful in doing. Did people start to go back and look at those regional seismic

lines?

LS: Probably. I did that all the time. That was your analog. Shell was big on analogs. Real big. What made this field work, what made that field work, what made that field work? And does the one we are looking at now look like one of these other things? Does it have really strong similarities and characteristics and all of that kind of stuff.

TP: Once you are out in 1,000 feet at Cognac and getting deeper in the late 1970s, then Shell started to see some real potential that people might have not seen before that.

LS: Yes, that is exactly right. It is true.

TP: Is there anything about LL&E offshore, as long as we are collecting information on offshore generally?

LS: I will be honest with you – LL&E was a company that was formed 1926 and through an accumulation of a lot of land in South Louisiana. A lot of this land belonged to the state and stuff and they sold off mineral rights to some of it. And then, the surface was sold like for one dollar an acre or something ridiculous. Well, of course, in 1926 . . .

TP: There was a guy named Colonel Sims, is that right, from Houston who had a lot of . . .

LS: Yes, had a lot of land around there.

TP: Do you know who he was?

LS: Not really, no. The Timpken family was the one with the steel roller bearings and all that – were the ones that really came in, I think, and had a great part to do in originally putting . . . well, that is not true. Some of this land had been put together earlier and it looked like there was not enough income coming in off of it to pay the taxes, and it looked like the early people that put it together maybe in 1899 or something, were going to go under and then Timken stepped in – Mr. Timken - and took it, said, "O.K., we will sell off 400,000 acres of the million acres that was put together at the time and keep this 600,000 after we pay off all the taxes and everything." And then, of course, shortly thereafter in 1928, LL&E made a widespread deal with Texaco and leased them about ten salt domes. Then, of course, LL&E had drilled a few wells at that time and had just barely missed hydrocarbons. It might have been a different company. If they had found it themselves, they would have never leased these others out. And I am sure LL&E would have become a lot larger company than it was. But anyway, Texaco found all kinds of hydrocarbons there and it took Texaco from being a modestly sizeable

company to being a real significant sized company pretty much overnight with all the discoveries they made in just a short few years there. They did. Then, LL&E was mainly a non-operating company. In other words, they did not go out and operate these properties, and even though they did it here and there . . .

TP: You came to them through Burlington?

LS: Yes, I had been in Burlington. I came back to Houston and worked for an independent there just briefly until I found out he really did not want any help. Then, I came on to New Orleans. In 1970, LL&E and Exxon primarily discovered the J field over in Alabama. It was 475,000,000 barrels or the largest onshore, the last large onshore oil field in the United States outside of Alaska. I guess it is still the biggest one onshore that has been found. Nobody has found one bigger than that since 1970 except, of course, at Prudhoe Bay which they do not have. But LL&E still just did not have the generating muscle. They did not have the geologists and geophysicists that could do much other than just look at some of these prospects that were being worked on where they had jointly bought prospects from other people and do not say it this way publicly but when I got there, it was almost like they would say to Kerr McGee, "oh, O.K., well, that looks fine, O.K., here is our check for $12 million to go do all that." And they just did not have a generating arm. And I am sure that is one of the reasons that there was an opportunity for me to go there because when I got the J field, production had gone into decline and they could see

that they were not going to be replacing the barrels that were on production. So, we hired more people, we reorganized and ultimately, kind of got that turned around.

TP: There are a lot of small companies now working on the shelf.

LS: Oh, yes, I know it, and at these prices, a lot of these little puddles that most of us ignored, some of them are doing O.K. if they can get the rest well enough.

TP: With the 3D and 4D seismic.

LS: Right.

TP: You can extend the life of it.

LS: Correct.

TP: Well, is there anything else?

LS: No, not that I am aware of. I am sure if we talked about it a long time, I would think of some more stories but I think this is probably the essence of somebody else's observation; in this case, mine, of how Shell became so successful and why they were successful and why they might have been successful as opposed to some of the

others companies they were doing business with and/or in competition with in those days. I agree with you at this time. I think that the reason that we just had a ton of people to the Shell offshore reunion and for some of us, not see each other for 20 years, is because we were on a winning team, exciting times, like being at Notre Dame in the four years there when three years, they were national champions or something like that. I mean, I am sure those guys are just real close knit. And they are a bunch of good, smart people there and one last thing here I can think of is somebody told me one time, said "You know, I have been looking for Shell for a long time. When I got down to look at our prospect generators, really, they are creative people, and you relied much more heavily on the geologists in the early days and much more on the geophysicists in the latter days because you had more technology." He said, "I know they criticized people for going out and drinking a little beer or whatever every once in a while, maybe partying it up pretty hard but he said, "Over the years, I found that the guys that not only worked hard but also played hard were our best generators, which was funny. So, I kind of watched that later on in my career and I think whoever told me that . . . I cannot remember who told me it. I think he was right about that – that they are the most creative people which is what you needed to generate a profit. So, out of all of those guys, there were quite a few in there . . . but once they got out of the office at 5 o'clock or whatever, everybody was ready to go out and just stay out late.

TP: Living in New Orleans . . .

LS: Oh, yes. It was a work hard, play hard group.

I get a sense in other companies and industry that you have a congregation, like LSU folk, but it did not seem like that at Shell. I do not know of any group that said, 'oh well, that is the Colorado School of Mine groups or something.' I did not see that at all. These were all just Shell people.

TP: Most of the geologists went to the good schools.

LS: Because there are only a handful of them. But they clearly were not all from the University of Texas or all from Oklahoma or all from the Colorado School of Mines or Wisconsin or whatever. They were just scattered from all over the country and some from a lot smaller colleges.

TP: Well, this is good.

LS: Well, if you think of anything else you want to ask me, just call me.

TP: Yes, and if you would not mind looking at a draft after . . . that might help jog your memory, too, once I get it all ready.

LS: I would be happy to. I will probably be in Wyoming. I do not know when you are targeting trying to . . .

TP: Not real soon.

LS: I will be up in Oklahoma soon but that is no problem. You can just mail it up there. In fact, I might have more time up here.

THE END