SHELL OIL COMPANY

ORAL HISTORY PROJECT

Interviewee: MARLAN DOWNEY

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Bio

Mr. Downey graduated from the University of Nebraska with a B.S. and a M.S. in geology. In 1957 he joined Shell Exploration in Tulsa. He quickly rose through the ranks to become Chief Geologist for the Denver area. He came to Houston in 1970 to serve as Western E&P Chief Geologist. He later became Division exploration manager for the Alaska division, and in 1978 he was appointed the General Manager for Exploration. In 1980 he became the Vice President of International Exploration, and finally President of Pecten in 1982. He served in that capacity until his retirement in 1982.

Summary

Interview covered Downey's experiences in his various positions. Good information on the development of oil migration theories and bright spots. Commentary on the Michigan pinnacle reef play, his time in Alaska. Great detail on Pecten with a continued section discussing Cameroon.

Tape #1, Side A

TP: This is an interview with Marlan Downey on September 24, 1999. The interviewer is Tyler Priest. The interview is being conducted at Marlan's home in Dallas. Why don't we start off with a little bit about your background and how you came to Shell?

MD: I started off as a country boy raised in southeastern Nebraska. The very first oil well in Nebraska was drilled on one of my relative's farms there, and I can remember buying a coke bottle full of real oil for twenty-five cents. That was probably the most money the oil business ever made in Nebraska.

My first degree was at Peru State College, probably the least expensive college to attend in the world. That is why I went there, as we didn't have any money. I took a degree in chemistry. I was drafted the day I graduated and went immediately overseas after training in the army. I spent two years in Korea and the Philippines. I came out as a nominally disabled American veteran and reentered graduate school at the University of Nebraska in chemistry. After about six or eight months in the Graduate School of Chemistry, I found that I was getting bored with chemistry and went over to visit with some friends who were taking geology. They introduced me to the head of the department, a fellow named Bill Gilliland who said he had never had anyone interested in transferring from the Graduate School of Chemistry to geology. If I would care to do it, he would enroll me as a graduate student in geology, even though I had never taken

any geology. I could take all of my courses in parallel. So I took beginning, intermediate, and graduate courses in parallel for 3-1/2 years.

TP: For a bachelors and a master's in geology?

MD: For a bachelor's and a master's in geology, and all of the course work for a doctorate. I got married in my final year. We had a baby coming so I left. I was interviewed for Shell by John Inkster, who hired me.

TP: This was in the Tulsa office?

MD: I went to work in the Tulsa office. It ended up being a far more unusual start than I had realized. Sometimes I started at the top of Shell and worked my way down. Shell had a policy at that time of hiring 30 or so geologists each year. They would send one to the Tulsa office to work with the area exploration manager as a grunt geologist. All the other people were out in the operating companies starting at the bottom. It gave me an exceptional running start that I didn't appreciate for many years. My predecessors almost all ended up being general managers or vice-presidents of Shell. Jack Threet, Tom Hart, and Pete Lucas were all in the classes ahead of me.

TP: How were you chosen?

MD: I have no idea. But leaping ahead, John Inkster was an area exploration manager, but then he spent about 15 years in charge of hiring for Shell Exploration. At his retirement dinner, someone asked him how he could hire people as diverse as Marlan Downey and Jim Hohler. And John's response was, "It takes all kinds to make a great oil company." I did not know Jim Hohler at the time, but I always wondered who was it who was so different that he made a contrast to me or vice-versa.

TP: You didn't know what he meant by the differences between Hohler and Downey?

MD: I wouldn't want this kind of thing to be quoted. I did meet Jim Hohler later on. He is a hard-driving fellow who, when I met him, told me of all the fields that he personally had found. I was probably more in the background; it was always my teams who found things. Jim found every field himself! Perhaps that was part of what was meant by John's rejoinder there.

TP: That is maybe a little degree of modesty.

MD: It's not modesty; it's just how one does things. Anyhow, I came to work for Shell. I almost didn't make it because I failed the physical for eyesight. I am very nearsighted without my glasses, but I served in the Army in Korea. John Inkster

got it overturned by pointing out that they had another fellow who was also terribly nearsighted who turned out well, Bob Nanz. Bob was about a decade or more senior to me, and I always told Bob that it was his good example that got my eyesight deficiency overturned. So I came to work for Shell and did basic grunt work like sample examination in the head office in training for a couple of years in the Tulsa office, in a time in which Shell was coming out of the dark ages in technology and management. The first time I got criticized was when they found me down visiting with the geophysicists on the geophysicist floor. That was not to be; geologists don't hang around with geophysicists and ask them questions. So I got run off the geophysicists' floor by the chief geophysicist. Nowadays we talk about integration and working together. In those days, they were separate shops.

TP: When did you begin to see more communication and a closer working relationship between the geologists and geophysicists in Shell?

MD: I give Bert Bally a lot of the credit for that. Bert was a classically trained Swiss geologist. As he came into Shell as chief geologist, one of his early hobby horses was, "We need to think of how the rocks sound, how they react to acoustic waves. Don't tell me what color they are or what age they are. Tell me how they will appear on seismic sections." He insisted that the geologists construct their geologic sections instead of worrying about what color to color this formation or

what the grain size of the sandstone was. He kept emphasizing, how do these rock layers reflect sound? What is their density? What are their reflection coefficients? What are their velocities? And in doing that, he, as much as anyone, forced the integration of the two.

TP: I recall Bally's name, but I don't recall where he was or what positions he was in.

MD: Bert was sent to BRC for a while, but he came in from Canada and fairly quickly became chief geologist under R.E. McAdams. In that position as one of McAdams chief advisors, he had a lot of power and stroke. He is probably the most famous of the Shell geologists. He just got the senior Sidney Powers medal from the AAPG. In fact, I presented it to him last year.

TP: He got the Sidney Powers medal?

MD: He's got the Sidney Powers medal.

TP: I heard that Rufus Leblanc, and there was another person . . .

MD: Jim Wilson.

TP: Jim Wilson got that medal.

MD: Yes, and Bert Bally.

TP: Where is he?

MD: After we left Shell, he went to work as head of the department of Rice, and he is still there as an emeritus professor. He retired a year ago, more or less, but he is still very famous. As a matter of fact, they are going to have kind of the fest shift for him in December. I am coming down there. They have people coming from all over the world to give talks in his honor.

TP: I should talk to him.

MD: Yes. In fact, the talk that I am giving is "How Bert Bally Changed Shell."

TP: When is that again?

MD: It is Thursday and Friday, April 13. You can see the people from all over the world who are coming in for this thing. Bert was a controversial figure because he was always seeing things in black and white. To other people who weren't as able as he was, I would say he could be a difficult figure. But, as I said, my talk is on the ways in which he changed Shell.

TP: He was under McAdams for how long? As long as McAdams was vice-president for Exploration?

MD: Mac might have had some other people under him at various times briefly as chief geologist. But once Bert came in, they worked together very well for six, eight, ten years.

TP: The period we are talking about is the late 1950s and early 1960s?

MD: I would say probably mid-1960s to mid-1970s because after that, he worked with me in the international arm.

TP: I didn't mean to get you off track.

MD: That is all right. After that, I went to Fort Smith, Arkansas as we opened up an office there. That was an excellent opportunity for me. We had three seismic crews running large acreage position and actively exploring for gas there. And that was probably the first time I got any special recognition, though I was the junior person in the staff there. We probably had about 20 geologists and geophysicists. The manager there, Bob Hillary, made me the technical coordinator for things there.

After that, I moved back to Oklahoma City and was there just a little while. I then had a tour of duty with the research lab. I went down there and I spent three months becoming one of Rufus Leblanc's proteges. They were attempting to convey ongoing research on recent plastics and recent carbonates to practical applications. They would bring in disciples or disciple candidates, and we worked eight hours a day, six or seven days a week with the researchers as they took turns sharing all their research with us. Then we would go back out with trays and trays of slides. In turn, we would teach the technology to our local groups as remote classes at night.

Then, I was a province geologist in Oklahoma City, handling much of the mid-continent at various times. Then I was called back to the research lab. It had been remembered that I had a background in chemistry as well as physics, and they had started a brand new project on the origin of oil.

TP: What year would this have been?

MD: Very early 1960. I would have to think. Maybe 1962, 1963. I would have to look up my notes. At that time, there had been some hints that Shell might be on the verge of a major breakthrough.

I would say Shell had two major technical breakthroughs while I was around. One of them was understanding the origin and migration of oil, and the other one was bright spots. The first one solidified some work by Ted Phillipi, a Dutchman who had been at the research lab, and whose esoteric studies had gotten little or no attention. Most people thought that oil formed in the fine-grained rocks surrounding sands. It was an article of faith. Ted said, no, they formed at great depth and pressure where it has cooked out and migrated to only particular places. McAdams had set up a team called the Three Wise Men: J.T. Smith . . .

TP: I have come across the name.

MD: A wonderful man! And Peter Moore of Calgary, who was, I think, briefly, chief geologist for McAdams. And I believe Bernie Ferris, a manager. And they looked at all the data. There, J.T. Smith was the key person. They ended up saying, there may be something to what this oddball, difficult Dutchman is saying. He may be right and everybody else is wrong. So they brought in a small team of people who had backgrounds in chemistry to see if you could take Phillipi's theoretical ideas and turn them into practicality. So I came into the research lab then and spent about five years -- first as one of the grunts in the group, and then at the end as manager of the group, as well as manager of the research on carbonate research.

I can tell you a Shell anecdote that shows the way I remember working down there. My boss was Archie Hood, a very well-known theoretical mass spectrometrist -- probably about as esoteric organic chemistry as you can get. After I had worked there about six months, Archie called me into his office, closed the door and said, "Marlan, I have something to tell you. Next Monday, when we come back here, you are going to be in charge of research on geochemistry, the origin of oil, and I am going back to being a researcher and will be working for you. I have decided that you can do my job as manager better than I can and so, I have asked to have you take my place and I will be working for you come Monday."

That was not atypical. I was really honored by the people with whom I worked over the years. This was a very large project, the largest single project in the research lab. We had separate funding.

Then we created a series of techniques that would make Ted Phillipi's theoretical concepts useful. For example, Ted says you've got to bury a particular kind of rock deeply where it is heated up in the earth. What kind of rock? How do you recognize that rock? And how deep and how hot? What are the techniques that you use for measuring temperature in the earth, when what you are interested in is not present-day temperature but the maximum temperature that rock had ever been heated? How do you determine where the oil migrates and where it ought to

be? So we then developed the whole series of specific techniques with which you could answer that. They teach it in high schools and colleges now. But it was all started with this group and it was very confidential within Shell. We were not able to publish anything at all about it. All sorts of publications came out of Shell but as a generality, Shell did not allow publication of any confidentially useful material. So your reputation outside of Shell was almost inverse to your reputation within Shell.

TP: When did these techniques find their way to more widespread usage?

MD: As people left, they all bled away.

TP: Can you give some specific examples of where these techniques really helped Shell in its exploration?

MD: I'll give Bert Bally as an example. We were having trouble showing how useful these things were, and we pointed out to Bert Bally that we had a technique for looking at the tiny little bits of carbon that were in the source rock. By their reflectance or their shininess, we could tell within a few degrees of how hot that rock had been heated. And by telling how hot it had been heated, we could tell whether the product from that rock would be oil, which takes just a little bit of heat; condensate, which takes a little bit more; or dry gas, in which they are burnt

like anthracite coal. And that was extremely important to Shell because in those days, gas was valueless, especially in Canada. So that technique would enable you to avoid areas in which all the source rocks had been heated so hot that they would only yield gas. You would only need to drill one well at a basin, and it would tell you whether that is a gas only province. Burt, from his vantage point in head office, was convinced. He issued an edict that drilling recommendations would not be accepted in head office any longer unless they contained documentation of what kind of product should be expected by this wildcat well along with the basis for it. That forced them to come to the research lab and make use of these technologies. Though they screamed and hollered, it took the drilling out of a number of provinces that were gas only provinces, which were just like drilling dry holes in the 1960s. And that was the first of these many techniques.

TP: That is a great story.

MD: This came from science and no one had ever heard. It was so important that Royal Dutch Shell and Shell Oil sent in two classes of people, about 20 people each. We spent three months training people in organic geochemistry, and then they went back out immediately to implant that technology all over the world, those 40 or 50 "sorcerers," as we called them. And I was called "chief sorcerer" as a joke.

TP: Had the Group been working on anything similar?

MD: They had, but they were staying with the theoretical side. Ted Phillipi came from the Group. They were staying with the theoretical work, and they did some wonderful work, widely cited by Jurgen Isma. But they did nothing on how to use it for technologies to find oil. But they had wonderful theoretical things. Then we had a series of meetings and redirections together. Their geologists very warmly embraced it and were fully on board then. But at the start, it was really McAdams' idea to set up this fairly good-sized group to determine if the concept that Phillipi and Jurgen Isma developed had any meaning. And they weren't accepted for some time uniformly in Shell. I would bet for 10 years that there were papers being published within Shell calling all this stuff nonsense. "All that oil in the Gulf of Mexico can't come from deep layers. How would it get up there? It comes from the shales right around the sandstones where we find it." But it eventually prevailed and you wouldn't hear that kind of dogma anymore.

TP: Where was Rufus Leblanc in this?

MD: I don't think Rufus took much of a part in it, but Rufus' close associate, Rainey Rainwater, was one of the most vehement that this was all nonsense. I don't remember Rufus ever taking part in the dialogue.

After that, to my surprise, I had had 10 years with the company, and I was taken out of there and made chief geologist in Denver. I was the youngest chief geologist at that time. Like before, I was promoted before I was ready for it. I went to work for Gerry Pirsig. Jerry was the epitome of the geophysicists' geophysicist. He liked epitomizing many of the Shell people. He was not hired because he had a degree in geophysics or geology; he was hired because he was one smart son-of-a-bitch! He was an astronomer. With his mathematical background he became, as I said, the geophysicists' geophysicist. And it was an honor for me to go up there and be his right-hand man because he didn't know anything at all about geology. So that was a wonderful thing for me to work, first with him and then with Jim Jackson as their chief geologist. I did that for six or eight years.

In that role, I would leave typically on a Monday morning and go out to one of our outlying offices. I would go around to all the offices. Occasionally, we would have larger meetings in conference rooms, but basically, I would look hands-on at all the technical work that was being done. Sometimes, the exploration managers had something they wanted to sell as a program change. I would always see their proposal and the basics of it first. Then I would be in a position to advise the vice-president of my separate opinion as to whether it was a good idea. Being a chief taught me: 1) I needed to look very closely at everything, and 2) I was always the guy in the middle. Because the managers

always wanted more money, they always wanted all these things approved. The vice-president is a little too far removed. If he has the money, why should he say no? So in the role of the chief geologist not always a nay-sayer, sometimes an encourager, but saying whether this was . . .

Similarly on staff. When we value-ordered our staff, I was expected to know every person on the geology side in Shell. And as they were value-ordered by their managers, they had also a value-ordering by me. Some of Shell's managers were tough, mean sons-of-bitches, and some good people didn't do well working for them. So you needed to have an exterior opinion of worth. If it were based only on the supervisor, you would have gotten rid of a lot of mavericks during the years. Then as I moved around like a bee pollinating, I found that I didn't have to be the brightest guy around. I would see people doing some great things in Midland. When I went to Denver, I could make sure that the great things that were being done in Midland were transplanted to Denver. When I went from Denver to Los Angeles, the great things that were being done in Denver could be transplanted to Los Angeles.

Then, at the end of my assignment as chief geologist, I had one of the most interesting and difficult assignments. Gerry Persig called me into his office and said, "We have had this really great breakthrough. It looks like there is a chance in some circumstances, we can directly detect hydrocarbons." And Gerry went

over the basis on which it looked like we could directly detect hydrocarbons. It arose out of an empirical observation by Mike Forrest. Then Mike's work was taken by the research lab, and they went back in and did theoretical calculations as a result of some recent literature that had been published.

Then the question was: how do you handle this without such a tremendous breakthrough getting out? They set up a team of six or eight people to: refine the calculations and another group to search for opportunities for Shell where the rocks were right to respond to this -- where the acreage position was possible, where we could make a ton of money by using this tremendous technology that was known to only probably six, eight or ten people. Then I found a difficulty. I found that here I had the weight of Shell's head office behind me. I had this tremendous technology that was the greatest thing since sliced bread. I would go out to the operating companies and they would say, "Thank you, Marlan, that is very interesting. We will get to it. But, you know, what we really need is another seismic crew for our conventional or regular seismic work over there. We've got a program laid out. We will get around to that maybe in a year or two, but would you kindly get out of our way?" And I would say, "Well fellows, you don't understand. This stuff directly finds hydrocarbons. You need to stop what you" . . . "No, this is our program. I mean, we are doing it here. We don't need any help from head office."

This was a pretty general response and I was shocked. So we came up with the

second plan. We created a team in each of the operating divisions to re-derive these equations, these criteria for finding hydrocarbons directly. Instead of it being head office and research, it was, "You three guys are to look at these parameters and see whether or not it is physically possible. Here is the literature. We can do this. We are going to provide a new seismic crew out here only if you are committed to finding hydrocarbons by this technique." In a matter of about six months, why they turned around. But it was a shock to me to find the intransigence of highly able technical people to new technology sprung on them, but perhaps that is not a surprise to you. It was to me.

TP: Taking to people, I get the sense that Shell may have been a little parochial at times, even though this was such a breakthrough. It's hard to get people to look at information and adopt whole new ways to think about it.

MD: That's right.

TP: I finally heard about the bright spots story in reference to the bidding for offshore acreage. So you were wanting to apply this onshore and in every operating . . .

MD: Yes. In fact, the part that I was most involved with was onshore. We went out and found a number of fields onshore in the Los Angeles country, because gas was the easiest thing to find there. Where do you make the most money with gas?

Hey, find it outside of L.A.! We went into the Sacramento Valley and found a whole series of small oil fields that showed up beautifully out there. That was one of the very first things that we did. And nobody knew what we were doing. Every well was hitting gas for us. And that is very high priced gas. At the initial part of it, the problem was that the gas bright spot is easy to see. But gas was valueless at that time in much of the United States and world. And it is 10-fold more difficult to find oil with this technique at the start of the technology, certainly. So the businesses were not asking just where do you find gas? We didn't want to find gas in the offshore Gulf of Mexico. But where can you find gas that you can make money with it? And those drove us, as we took contracts internationally, all over the world working with this sort of thing.

TP: How about the Group? Did you transfer the . . .

MD: Yes. Very quickly. I can remember having a high-level conference. By the time we got over there, they had already made their own theoretical models and played them out. So they came on board pretty quickly but it was shared very quickly with them.

TP: That is great. I didn't appreciate the full story of the bright spot.

MD: Probably the diluting effect of it was, as I said, that gas was not worth much. And

there were not very many places we wanted to find gas. It took a much more subtle analysis to be able to find the oil in there. The gas bright spots and their drilling gave us confidence we knew what we were doing. We could work at the tenfold-more difficult things of oil underneath the gas or separate from the gas. By the time we got to Cameroon where we took the contract offshore gas was valueless in Cameroon. So we had to devise techniques to drill only oil amplitude anomalies and avoid gas bright spots and drilling that . . .

TP: The bright spot evolved right where you could actually see the oil versus gas?

MD: Yes, in the good settings. Gulf of Mexico, soft, or tertiary sediments. As you go into the more difficult, hard rock countries, it is still difficult to directly detect oil.

After that, I became . . .

TP: Chief Geologist for the western E&P, as your bio says?

MD: Yes, which is basically onshore. And we actually picked up California.

TP: Western E&P at this time was being run out of Houston?

MD: No, it was being run out of Denver, and then we collapsed everything into

Houston after a couple of years.

My career is probably like a lot of people in Shell. I moved in and out of the Research lab, from staff to manager, back and forth. One of the things that Shell did very well, which very few other companies have done, is make sure the senior managers had tours of duty in research. I think Jack Threet may be the only senior manager that I know of who didn't have a tour of duty in research. But that was a very common thing to do -- to show that you could sop up things in research before you went back out to operations.

So I switched and they made me a line manager for Alaska. I was exploration manager for Alaska for a couple of years, maybe three or four years. That was a newly established division for Shell. At that time, I was the youngest of the division managers. And we did a lot of things up there.

TP: What was the general strategy for Alaska by this time, because I know that Shell had already missed out on Prudhoe Bay. What was the purpose of Shell's participation in Alaska?

MD: It was probably twofold. The Native Claims Act had just allowed the natives to take over huge, solid segments of Alaska. I think there were seven native groups and hundreds of millions of acres were theirs. They became the government

entity that one could deal with. The basins in their areas had not been explored. So the first rush then was to see what was the prospectivity of these new kingdoms held by the natives. In a way, it prepared me well for international because a group called the Chalistas owned most of the country on the western side of Alaska there. They had several basins in which almost nothing was known about. I went to visit with them. They had just organized. In their state as far as I know, they had a single college graduate. He was serving as translator and technical guru. He later became the president of the Chalistas. When I went in there to explain to them that we would like to have a seismic option to be able to study their lands and make them an offer, they had a gathering of the elders. As I talked slowly, it was translated into Upic for these people. True Eskimos. They had the most innocent kind of questions. Eventually, I went up there about three or four times to talk with them because they were like primitive cultures everywhere. First, they need to be comfortable with you. They don't know the math, that this is a good deal for them. They don't know what a good deal is. But do they trust you? Eventually, we got an option on 10-15 million acres of land to explore up there. That was one of the things we did in several places there. We didn't spend much money doing that because our geochemistry data told us that these rocks had typically been heated so hot that they were . . .

End of Side A

Tape #1, Side B

TP: We were talking about your experience in Alaska with the Chalistas.

MD: That was something that, in a way, prepared me for the fact that I spent the rest of my life working with local cultures around the world and realizing that much of negotiating is having other people be comfortable with who you are. It is only in the sophisticated countries that they negotiate narrowly by the numbers. Much of society isn't that sophisticated.

We had two major lease sales while I was in charge. One was in the Gulf of Alaska, and that was an interesting one for me because that was the first of Shell's frontier sales. There was no information other than seismic; there wasn't a history of production. There wasn't anything that told you whether there would be commercial oil there. It was in one of the most hostile operating places in the world. And because there was no history of production I found that the Shell techniques developed laboriously in the Gulf of Mexico lease sales were not usable in frontier provinces, that you had to use different techniques of evaluating risk to work with things.

TP: And there was no infrastructure, so you had to factor that into your estimates.

MD: Everything. It was an extremely expensive place to go. So we spent a lot of work on it and busted a gut with the technology and the business to do things. At the end, we joined with Arco in bidding because this was such an expensive, difficult sale that we wanted a little help on it.

TP: Was this a state of Alaska sale or a federal sale?

MD: No, federal sale. Now, let me think about that. I said that strongly, but I am blank.

TP: We can find that out.

MD: It took place in Anchorage so it must have been a federal sale. At any rate, it was one that was heralded by everyone in the industry as being the biggest thing since sliced bread. There was a lot of competition and I learned something deep in the bone as a result of that sale. As we looked at the data, we could not see any bright spots. For this play to work, it had to have not just a little oil; it had to have lots of oil -- 200, 400, 500 foot of oil columns there. We couldn't find a single, valid bright spot. The technical people then erected a hypothesis. Maybe we didn't see the bright spots because this was an unusual type of undersaturated oil that doesn't have gas. There are a couple of kinds of oil like that around the world, and this must have been what was happening. My geophysicists formed a little group,

signed their names and recommended that we bid even more because they thought there were hints of bright spots. They thought we ought to bid something approaching B-max. They had worked for two years on the sale. They wanted us to bid the maximum on it. I ended up dragging my feet and taking a compromise, taking a partner so we were only half exposed. About one-tenth of B-max was as strong as I could go because it bothered me deeply that we didn't have any physical expression from our technology that oil was there.

TP: This was based on a theory, right?

MD: No. By this time, we had had a fair amount of experience.

TP: But the geophysicists were going on a theory that this was a new type of hydrocarbon.

MD: That's right. The data made it all fit together. So we bought the acreage; we were the high bidder. We spent a lot of money and drilled nothing but dry holes. Right then as a manager, I decided that I was never again going to be swayed at decision time by the opinions of my subordinates. I should listen to them, make sure I understood it, but at the end there is only one person in the hot seat -- and that is me. Hanging outside here in my garage, where I see it every day, is the seismic section of one of the major prospects that was implied to be by my staff

"weak bright spots." My rule became if I can't see them, they ain't there. I hope it kept me out of trouble a lot in the future. A manager isn't a consensus relayer of what other people think. Other people think you know more about it than anyone else, and they are paying you to make the hard choices. So that was a time for me.

TP: It is fortunate that you managed to get a partner, and you didn't bid more than one-tenth of the maximum.

MD: That's right. Still, that is a lot of money. And that is my biggest single failure in the business.

I might drop back one step to talking about Gerry Pirsig. When we were in Denver, we ended up having one of Shell's largest successes ever, called the Michigan reef play. It was the most profitable thing.

TP: Where was that? That was done out of Denver?

MD: Yes, that's right. One of my interests as chief geologist was the history of what went on. I spent a lot of time when I wasn't out traveling, going back in the files to see what was going on. So I am probably one of the very few people who actually knows the details of the Michigan play.

TP: Please go into that. I haven't talked to anyone who could really speak to it.

MD: The play came out of a confluence of Bert Bally's Canadian experience and knowledge that there were some scattered Silurian or pinnacle reefs in Ontario. And the kind of rocks that they occur in extend into the Michigan basin, though no one had ever found anything like that. Pete Lucas, who later became general manager of research and a carbonate specialist, was assigned to work that area. He hypothesized by looking at the character of the rocks, that there was a broad belt running diagonally through northern Michigan that might be favorable for a shelf margin and possibly even for pinnacle reefs. The idea initially failed and was not funded. It was brought up again by the persistence of his supervisor, Peterson. Peterson pressed it forcibly, brought it back but got turned down. He pressed it with another letter. And with Bally's and other people's help, Shell took a broad swath of acreage through there because Gerry Pirsig agreed that there was a chance that, with modern technology, we could see through these layers of marshmallows, these very soft sediments that lay on the glacial till that covered northern Michigan. We might be able to have some techniques nowadays to see through it. So it wouldn't have worked at the start without Bert Bally's throwing out the idea about, without Pete Lucas doing the mapping and selecting the area, Peterson forcibly insisting that successive managers taking a look at it, and Persig, as the guru of geophysics saying, It is within the realm of possibility to get data

where no one else has gotten it." About that time, I came on board as chief geologist there when we were getting ready to make the play. I can remember that it barely made the cut. It was the last play surviving on the value order list by head office. The reason it survived was because Gerry made a very reasoned approach that he would shoot a few seismic lines, process those with state-of-the-art things and see if we could see anything. If we couldn't, we'd abandon the play.

We shot the seismic data. When we processed and looked at it, I was disappointed. Yes, we did wonderful things, but the reflections, every once in a while, didn't go all the way through. They weren't continuous. Jerry and his geophysicists looked at that data. They thought, "Well, it goes through up here, it goes through down here. Why doesn't it go through here? And at the level at which we expect to see reefs?" "Well," Jerry said, "Let's do this. Let's lay out a program of drilling wells for science, for the technology. What we will do is drill a well off this anomaly, which is just an absence of data, and we will drill one on the anomaly. Then we will drill one on this other type of anomaly. We will drill three wells, and we will understand what is going on. Then we can walk away from this play and say it's not the second well hit a reef. The absence of data was because that pinnacle acted as a defraction and the rays, instead of recording, went in and . . . We had a play and there was nothing there.

Then we had two hurdles to overcome. These things are small, a couple of

million barrels. What are we going to do up in northern Michigan developing fields that are only one or two million barrels? I remembered running across the paper on search theory for submarines developed in the second World War, in which they were trying to find how you run your destroyers in the optimum search patterns to try to pick up submarines. You can think of them as long ellipses, and what is the red search theory to intercept those? Sure enough, the mathematics had been done. It wasn't all that weird. What we were able to do then was to go into the seismic lines that we had and count the number of breaks that we had randomly encountered. From that, we would calculate how many were in all the areas that we had not shot. Can you visualize that? What are the odds of finding a little spot like that? You had lines going like this. What are the odds of finding a little spot like this. And when you find one or two of them, or three or four, how do you extrapolate from that accidental intersection of them to how many there would be in between with an infinite number of lines? There should have been over one thousand of these. Then we made a major land play, leased everything we could and started running seismic lines. We had a new concept: we are not looking for one or two million barrel fields, we are looking at one or two wells in a field here. Three or four miles away, there will be another field, another field and another field, and another field. And that made all the difference. For many years, perhaps even today, that is Shell's single most profitable play.

TP: Really?

MD: Yes.

TP: You had to have a lot more wells than you probably would have, of course, with the giant field.

MD: Well, in a way . . .

TP: How did the economics play out?

MD: It actually worked out well because the seismic is so good that we drilled very few dry holes. So if we needed only one well to develop the field, we only put one well in. We might have two or three. The only thing that was an extra expense was that we had to have long flow lines. Instead of a flow line that would go 80 acres, they would be four miles. But flow lines are not that big a cost.

TP: Were you using bright spot?

MD: It is an amplitude anomaly, but it did not indicate hydrocarbons directly. It indicated a place where the rocks underneath affected that seismic signal at that

layer and caused it to change character.

TP: You could be sure that those rocks were trapping a small amount of hydrocarbons?

MD: This was a setting where our geochemistry helped us a lot. These reefs are overlain by salt, which is a perfect seal. Nothing goes through salt. So most oil fields leak a lot one place or another. These are perfectly sealed, and they had a rich source rock between the reefs that generated the oil. It didn't have any place to go. If you could visualize that salt as a plastic membrane laid over the basin, the places pushed up in it were where the reefs were. So all the oil and gas went into these little bumps that stuck up. Until you got out from underneath the salt, they were charged. So we had a very high success ratio . . .

TP: An operator's paradise. Every well you drilled was . . .

MD: It was. The people who participated in that, if you talk to them, think it was probably the greatest play they ever were part of.

TP: What did the other companies think when Shell had leased all the vast amount of acreage in Michigan?

MD: Only one other company, Amoco, was right there with us, and only a step behind. And they were leasing right next to us, because they had a similar play concept. They didn't have the seismic, but they had the similar play concept. So the play was probably about two-thirds Shell and one-third Amoco. Then, because of the broken nature of these, there were all sorts of little blocks in northern Michigan and a whole series that other people, that could fill in, because there were always people we couldn't pick up on a quick lease through. So other people came in but it was the Shell play.

TP: That is quite a story.

MD: Remember, I didn't do anything with it. I came in as it was getting started.

TP: You identified what was involved.

MD: Yes, that is it. I know exactly what did happen and why, because I looked at the history of it. The guy's name is Reed Peterson.

TP: I had asked a couple of people about him and heard that there were these seismic, not reflections but . . .

MD: Anomalies. Later on, with better data, we saw other little subtleties. Leo

Bonasera was, in my opinion, Shell's best interpreter of bad data. Anybody, even geologists, can interpret good data where you follow continuous reflections. Leo was the kind of guy who would look at that data, pace around, worry about it, sleep with it, and he made the best interpretations of difficult data. I can remember going in there and looking at his wall. He was standing there looking at this stuff, and he told me he thought there was something there. And I said, "What are you talking about, Leo? There aren't any reflections there." He seaid, "That is what I mean." That is the kind of wonderful mentality you've got to have for searches for things.

I became a manager in Alaska. This isn't part of the Shell history but probably the most interesting Alaska was that we had another lease sale that we worked very hard on in lower Cook Inlet. This was a state sale in state waters. We competed for it, and we bought the leases. As we were pretty certain we were going to buy the leases, I had contracted for a jack-up rig to be brought up from California, towed all the way up thousands of miles and fitted for Arctic waters to drill immediately. When you do these lease sales and you have all this lease bonus out front, the time value of money eats you up. You need to be in there tomorrow and drill these, and either drop them or start production. So we brought the *George F. Ferris* in and put it in the little port of Homer, which was about 20 miles away from where we were ready to drill. Under the conditions of our contract, it became our responsibility, not the owners of the *George F. Ferris*, as soon as it

was put on location about 10 miles away. Well, as it was sitting down in the bay, they had some inexperienced people around.

The legs didn't come out of the mud when they tried to jack the legs up. They lowered it down in the water and the legs wouldn't come up. The guy in charge of it thought, "Well, it is kind of a barge sort of thing that floats, so it is a little bit stuck in there." There are 40-foot tides in Cook Inlet. He'll wait until the tide comes up and he will pick up more lifting ability as the thing starts floating again. The tide came in and the motor to the jacks failed. He couldn't get the jacks to move, and 40 feet of water went over the drilling rig.

TP: Were the jacks stuck in the mud? There are boulders down in Cook Inlet. Was it possible the boulders . . .

MD: I don't know what was wrong, but the fool hadn't checked that all the equipment was working properly. When the 40-foot tide came in, instead of bowing it up, it covered the *George F. Farris*, which was a total wreck.

TP: It didn't capsize; it was just submerged?

MD: Just submerged, but it was totally ruined. Something like $30 million. There but for the grace of God goes I, because in the contract, it wasn't our responsibility

until it moved on location!

I had one other thing happen at that time which I have not uncommonly used in talking to people, about nationalization and its problems around the world. I point out that the first place I was nationalized was in Alaska, because that same acreage, in this narrow period of time, while we were getting ready to drill that well . . .

TP: You are still talking about Cook Inlet?

MD: Cook Inlet. They elected a new governor. The new governor was a fisherman, highly anti-oil. So the government of Alaska had already put the stuff up for sale and taken our $27 million. I think it was a $27 million lease bonus. The new governor couldn't undo that, so he declared the waters of Cook Inlet a state park, which governors can do. Do you think you can drill in a state park? And they had my money! I was furious. It took us years of litigation to get our money back from the state. So when I worried about problems in Syria, Algeria and Argentina, I had been there and done that!

TP: You had already gone through that part of the learning curve.

MD: After that, I went to the international arm which at that time, was kind of a

division of Shell.

TP: The international arm? Specifically, was it called Shell International Ventures, or was it called Pecten at this time?

MD: It was called International Ventures, and it was a small division, probably not too well-staffed. It was a hole-in-the-wall sort of thing. I came in there as exploration manager and Don Russell was in charge of it. And Don is a top hand. I don't know if you have visited with him.

TP: I have talked to Don.

MD: To my surprise, Don is a tough, profane, hard-nosed production hand. He has mellowed a lot. He is a wonderful gentleman but, in business, he is one tough bastard! To my surprise, we got along very well. We made all sorts of discoveries and around the world in developments and got along very well. Again, to my surprise, I became president when he left. At that time, Charlie and John Bookout decided to use Pecten as a prototype of having Shell reinvent itself by having, instead of divisions of a company, separate companies that would be responsible for their own profit, loss and generation of capital.

TP: This was the creation of all those subsidiaries?

MD: That is right. Pecten was the very first.

TP: Was it?

MD: Yes. We had then the challenge of, besides finding and developing oil all around the world, creating a separate company and devising what its relationship would be to Shell Oil and to Royal Dutch Shell. Our policies, everything that we did, had to be looked at again. One of the reasons why we wanted to do it this way was so we could borrow money without impinging on the credit of Shell Oil. For example, leaping ahead a little, when I was president of Pecten, we borrowed nearly $400 million for the development of our oil properties in Cameroon, non-recourse to Shell Oil, to Pecten's credit. For that we had to have the fiction of a totally separate company. I say the fiction in the sense that I always would go to Charlie or John on anything important, and we wanted to have our personnel be transparent. We had to have a separate board of directors and everything.

[PAUSE]

TP: We were talking about the creation of Pecten or subsidiaries and being able to borrow non-recourse.

Were the banks wary of lending that much money to a company that didn't have recourse with Shell?

MD: They wanted recourse to Shell, but when we negotiated our contracts in Cameroon, we negotiated a clause that gave us the right to have as a cost for recovery interest on borrowed money. It didn't sound like much because of that, we were transparent to interest costs. And we could go, as we did, to this consortium of banks and point out to them, to stretch a point, that we can make them a pretty good deal. Instead of paying them with Shell guarantee, they get eight percent on their money. We will give them nine [percent] because that is part of our cost recovery. In our Cameroon contract, as is common around the world, first we get to recover our share of the cost, which is essentially all costs. Then we have a very small split of the leftover money, which is profit. We get a small share of the profit. The government gets the dominant share. But first, we get all our costs back.

TP: Thus the banks get their interest up front.

MD: That is right, and it is guaranteed by the government of Cameroon against the cash flow. It wasn't all that uncommon domestically when you've got a competent operator, to borrow money against cash flow of the field. So our ability to do that was one of the things that made Pecten unique around the world

and it kept it off of Shell Oil's back.

TP: Is this a good point to go into a little more detail about Cameroon?

MD: Sure. The initial leases came about because Royal Dutch Shell had a small interest in Cameroon at which they had been unsuccessful. They were getting ready to give up their leases. We had good relationships with them and were frankly culling over some of their properties that they didn't think much of as we looked at with different ideas and, in some cases, even with different technology. One of the key players in this was the chief geologist of Pecten, F.P. "Hoppie" Conger. Hoppie looked at the data. As he came out of our Michigan background, he saw what Royal Dutch Shell saw in the acreage, but from a different vantage point. They said it was just a lot of little fields. Hoppie said, "Look at that! It is a meadow of small fields that we can develop and bring into a central processing platform." So we undertook it and we had probably a little bit more advanced knowledge of bright spot work. We took that contract, and it was about that time that we started having these sorts of successes.

TP: Was this where you needed to be able to identify the oil and bright spots?

MD: Exactly right.

TP: This was all offshore?

MD: All offshore.

TP: About how deep?

MD: Shallow water, just like Gulf of Mexico. The development is French speaking. We went down to Shell Oil, always most cooperative, and brought out 20 or 30 Cajun engineers and production people. They really loved it there with the same kind of food. And that Cajun French was just about the way Cameroonians speak French. We had a great relationship with the Cameroon government, thanks to our Cajun . . .

TP: The French-speaking operators.

MD: The French-speaking operators out there in the same kind of setting: mangrove swamps, shallow water. We knew that country inside out.

Uniquely, for the business side, we took this contract in the Rio Del Ray. I think we had 20% interest, which we took from Royal Dutch Shell. I don't remember what we gave them for it but we took that 20% interest, which they weren't interested in pursuing. They had had no success. Elf was the operator and had

the other percentage. We looked at this stuff, and I think we made them a really great deal. We went to them and said, we didn't want to divulge our bright spot technology, but we needed to use it. They were operators. We said, we would like to buy another, I think 29%, which would bring us up to 49%. They wouldn't do any more than that. And we will give you $1 million in drilling expenditure for every point, on the condition that we take over operatorship for the next year. They said, "Fine." And we were all mobilized. We moved in there with the number of rigs. We had already done the seismic and had reprocessed it to where we could see the hydrocarbons. My memory fails me exactly, but we had 19-20 discoveries that year. Of course, the French and the government of Cameroon couldn't figure out what in hell was going on. What are these guys doing that the bright spot idea got out? They were desperate to find out what was going on.

TP: This is a little bit later in the early 1980s some time?

MD: This would have been in the early 1980s. 1979, 1980.

TP: So bright spot hadn't even gotten out that far at that time.

MD: That's right. People were talking about it. But as far as having companies that knew it, they were in the same stage that we were for about six months, where these people in research say you can do this. But it really got the operational

managers' attention. We drilled about 20 wildcat discoveries in one year. In fact, I remember the numbers, where we found more oil in Cameroon for Pecten than all the industry found in the United States that year. So those were good years!

That got us up to 29%.

TP: Were you president of Pecten when it went into Cameroon?

MD: No. I took over immediately afterwards on Cameroon. I was president while we drilled almost all of the discoveries out there. Then, emboldened by that, we took the next block to the south in which we had 80% share and Elf had 20%. So we had 49% of the really good part and 80% of a less prospective area. We actually had gone in a year from being nowhere, then to 2000 share in one block, to where we had 49% of the best block, and 80% of the coal A block, which indeed we had. We found 100 million barrels of oil on it also. So we leap frogged over everyone else there. That was very good. We had a lot of problems with the government and with the people there. The guy who was put in to run the national oil company was a professional diplomat named Sam Lebock, who knew nothing about the oil and gas business. He was a very tough, difficult negotiator, and I would only leap ahead to say that we have become very close friends. He and his wife stayed here at our house last year. He is Ambassador to the Court of St. James in England now. But in those days, it was head-to-head.

TP: What percentage did the National Oil Company have in these . . .

MD: Zip. They did not operate or do anything with them, but the government renegotiated the contract on us arbitrarily after our discoveries and took about half of it away from us.

TP: And gave it to the National Oil Company?

MD: Just kept it to themselves. They didn't give it to the National Oil Company. They just kept it to themselves. And our fundamental contract in Cameroon was about the equivalent of we get our costs back and then we get about 13% of the remaining oil as profit. So it doesn't sound like much but you've got all your costs back. Then, 13% of probably 300,000 or 400,000 barrels a day is net to us and all profit.

TP: When that was half at a certain . . .

MD: No, we'd start off with 26 and half to 13. It was another good lesson. Ever try arguing with the government? All these fancy things about going to outside arbitration . . . I used to have a slide when I gave talks to the people around the world about what it is like to negotiate with a Sovereign government. I showed a

picture of a little meek person holding onto his money looking up at a gorilla! It is kind of . . . so, sue me!

But we were very proud of what we did there. We ended up training their staff. In fact, whenever I go to anything in which Cameroon people are, they know me typically. We brought in many of them, trained them with our oil company and then we set up scholarships to several universities -- at University of Houston and at Penn State, which we funded fully. They are now currently the cadre -- their senior people in the oil and gas business. In fact, we took off on one of the ministers in Cameroon right after he graduated with an engineering degree from Kansas. He worked with us for two years before he went to Cameroon. So we embedded ourselves pretty well into the country. There was always some comparison between us and the French who worked side-by-side. The French are wonderful people, tremendous businessmen, but they operate under a different set of ethics and morality. They made no bones about keeping two sets of books. And their idea always was to try to find ways of screwing the government. Because of the idea of openness and directness, I can imagine that the president of Cameroon liked to see us separately. We must have been as different as night and day in talking about things.

I was knighted by the government for my services to the country. I was the first foreign businessman to ever have done that. I remember one time we were

negotiating for gas development in Cameroon because, inadvertently and accidentally, we found about 3 trillion cubic feet of gas. The French had been in charge of the negotiations with the government, and they were at an impasse. They couldn't go anywhere. And President Beja (sp?) asked to see me. I went in there and he asked how to get the negotiations going. What is it going to take to have this gas development really go? What kind of share is fair? And I said, "Well, Mr. President, I hate to tell you this, but the shares don't make any difference. If you gave me 100% of all the gas in here, it wouldn't be economical and nobody could develop it. I know they are negotiating about whether the operator share ought to be 26% or 32%. If you gave me 100%, I wouldn't invest in it." His eyes got about that big and he realized the French had used this as an excuse to travel down and spend a few weeks visiting and drinking champagne. Nobody was serious about doing anything. The gas is still sitting there, 20 years later, and no one has developed it.

TP: How long did Pecten remain in Cameroon? Is it still there? Does Shell still have a interest there?

MD: I don't know. As far as I know, they still do, but I don't know, as the Group took over all those things.

TP: Another place I was going to ask you about was Syria.

MD: That is the one that they had asked me to write up, and I actually have an article in here that I just finished for a magazine. I'll give you this copy here and print out another one. It would be simpler than you having to listen to me. That, again, is a description of the details of Syria. I was very fortunate in Syria in the sense that though . . .

TP: This is not a problem for us to take this? You can send another copy.

MD: It is on the computer, so I will just . . .

End of Tape #1, Side B

Tape #2, Side A

MD: . . . I had with President Hassad, really stood Pectin and Shell in very good stead because we had all sorts of problems there. Corruption was rampant at lower levels as it is in Cameroon. But as in Cameroon, if you can see the president of the country every three or four or six months, and then say something to drop in his ear about the problems that are going on, those problems magically disappear. Our contract with Syria was set up that any drilling rigs or equipment brought in for drilling would be exempt from customs duties. The first time we brought in the drilling rig, they held it up and told us they didn't care about our contract. They needed to be paid before that drilling rig would be released. You could see that this would be a start of a whole pattern of things. So I got an appointment to see the president of Syria. I might digress to say that the reason this was unusual [was] the U.S. ambassadors did not ever see Hassad. We had very difficult relations with Syria and U.S. ambassadors weren't received by Hassad. The U.S. ambassadors saw, not the Secretary of State for Syria, but the Secretary of State for western countries. So when I could see Hassad and the U.S. ambassador could not, that was an exceptional advantage.

When I went in to see the president, we had a typical cup of coffee or two. "How is every little thing?" "Everything is wonderful, wonderful cooperation from

everybody." You know, we are running as fast as we can to get these wildcat wells drilled for Syria. Got the staff all in place. We had just one little problem: customs people said they won't release our drilling rig and will not honor the contract. He picks up the phone. He speaks in Arabic for about one minute, puts the phone down and says, "You will have no problem." After that, they wouldn't touch us with a ten-foot pole. That is when these personal relationships -- if you can use them for the benefit of the company rather than anything else -- really make a difference in many of these less developed countries.

TP: The Russians had been involved in Syrian oil for a while, right?

MD: Yes, the Russians and the Rumanians.

TP: If we have talked about it already, don't feel like you have to go over it again.

MD: No, it was just that when we succeeded, I came in to tell the president. He said in so many words, "You know, my advisers all said to stick with the Russians and the Rumanians? I said we should try American technology, and you have proven me right."

TP: That is great. Is there anything else you want to add about Syria?

MD: No, it is covered pretty much in there.

TP: The other place I was curious about was Malaysia.

MD: Again, it ended up being a shed from the Royal Dutch Shell Group. And I think, to some degree, that some of these things colored our relationships with Royal Dutch Shell who, on a personal level, were always very good. But outside of the pure E&P side, I think they got a lot of static for how much money we made taking their pigs' ears and making silk purses out of them. Malaysia had oil and they sold us half for triviality. We had a string of discoveries. They were operator, but we provided technical input constantly into it. But again, they sold us half of one of the richest things they had before the discoveries. Again, that was a very difficult place to operate in.

TP: That was offshore, too?

MD: That is all offshore. I would only say that when I went in though, Shell Oil had had a history of international ventures. As you can see, they started doing some good things. As a company, they had no confidence in operating internationally.

TP: Shell didn't have its own foreign legion as far as . . .

MD: That is right. And in the years I was there, that turned around and we operated all over the world. We had discoveries and production in Brazil, Canada, Syria, Cameroon, and New Zealand. I can't think where else.

TP: Was Brazil anything significant for you working under risk contracts?

MD: We were. Its success was interrupted by the fact that we were the only risk contractor of all the companies -- Royal Dutch Shell, Texaco, Exxon. Of all the companies that explored in Brazil, only one of us found a commercial field. That was Pecten. Not only did we find a commercial field, but after we drilled the first well, our partners, Royal Dutch Shell and, I believe, Marathon, if I remember right, thought it was too thin a pay and opted out of the second well. And in opting out, all of the monies that they had spent as costs accrued to us under cost recovery, though we hadn't spent any of those costs, if you can visualize that. We looked at the seismic and could see that the objective interval thickened off the structure. And as best we could tell, we've only had 40-50 feet where we drilled gas in condensate, noncommercial, but we felt we could get a much thicker section. Everybody else bailed out but us and I was kind of proud . . . We moved down flank and got a very thick section, a commercial thing. What accrued to our benefit was not only our own costs under recovery, but we recovered all the prior costs of the other companies who abandoned it. Immediately after that, we saw that there were a number of other areas that looked very prospective on other

blocks. I had an all-day meeting with John Bookout as to whether we ought to develop and whether we should go after the other blocks. After we went all through it, John said, "Yes, go get them. You got one. It will be OK, but not great. But we are first hog in there. We are the first one. Go get the other blocks." Petrobras, that area had all been closed for exploration until about a year ago, and no foreign companies have been able to explore there as they changed the constitution. The Brazilians just announced . . .

TP: This was in the north, right? This wasn't in the Campos Basin?

MD: This is in the south, offshore Rio almost. It ended up that they just announced in the paper, I think yesterday, a billion barrel field on those blocks that they had held for themselves, that we had not been able to get at. The field itself was a very interesting one, and I am proud of the business and the boldness of the technology, which I thought was a Shell characteristic. If you know the technology, you can believe in it and trust it. But if you don't trust the technology, you can't be bold. You can be foolish, but you can't be bold.

At one time, we held half of Shell Canadian's frontier acreage, everything except their inboard stuff. It wasn't widely known, but we were a 50% interest holder in all of Shell Canada's frontier acreage around the country. Probably the best thing we did with that was what I will call "making lemonade out of lemons." The

Canadians passed a law to discriminate against foreign American companies investing in Canada and altered the tax rates so that, on a percentage basis, the Canadian firms in oil exploration paid one-sixth of the taxes that the American companies did. It was so punitive that it kept us from doing anything with all this acreage we had in these interesting areas. It was intended to drive us out. At the same time, the Canadian government provided funds through the tax process for Canadian firms only to do exploration and production. And when I say, "making lemonade out of lemons," we were able to take our acreage holdings, which we couldn't afford to do anything with, and sell them at high prices to Shell Canada and to various other Canadian interests because they were using 15-cent dollars to buy them. And that is OK with me if they give me 100% dollars. So we basically got out of much of Canada, and we have made a couple of discoveries that looked . . .

TP: This would have been the 1980s, too?

MD: Yes.

TP: Where is the acreage that Pecten had? Was it Saskatchewan?

MD: No, that's the traditional area that we were never part of. We had the acreage in the McKenzie Delta. We had East Coast offshore. And we had a large interest in

the Athabaska tar sands. We had a large interest in the Peace River heavy oil project. I remember analyzing it once. The technology was all there, not a problem, easy to do. The problem was the value of heavy oil in that part of Canada. To give you a feel, if we started producing at 100,000 barrels a day from that field, it would go for nearly 200 years. And the technology is easy. We kept the pilot plant running. As far as I know, it is still running there. It is just that when you need crude oil at $25 a barrel to sell heavy oil, you probably only get about $14 a barrel for it. But that was a wonderful technological thing, but all you could do is sit on it and wait.

TP: It is back up there again.

MD: I don't know. They may have given it away. I don't know because, I think Shell, in the last few years, has had great difficulty in taking the long view on anything.

One of the things that I had talked about in an article was the differences between Shell and Arco, trying to emphasize how incredibly different the two companies were in their people and their training, and how that influenced what they did. I thought, in my years, Shell was a technocracy. You couldn't get to the upper reaches of Shell without being world class technologists. Don Russell is an example. Don is in the National Academy of Engineering and president of the Society for Petroleum Engineering. Jim Wilson, one of my predecessors,

president of the AAPG, as I am. These people are all technocrats. Among the lawyers, and all the other people in the head office ranking, I don't recall any of them who were ever executive-VPs. Those were reserved for the technocrats. I never saw an M.B.A. that I know of in Shell. In my 30 years there, I never saw one. The business is painted on to promising technocrats, so that I had to take accounting and take a number of other courses, like an MBA might, but that was part. I was already a senior manager.

And what that meant is that Shell had a deep and abiding faith in what could be done or could not be done in technology. And that let them do things like the deepwater. When we took the deepwater acreage in 1984 and 1985, that technically was like shooting fish in the barrel. We knew that there were very large fields there and that we could pick up the acreage for almost nothing. And we had deep faith that we could develop the technology to produce it some time in the immediate future. Everybody else could probably see it out there, too. But their senior management, unlike John and Charlie, didn't know what it was out there. In Exxon, maybe the technocrats were telling the vice-presidents that it is out there. But in Shell, the president knew it was out there. And that colored some of the things that Shell did. So Shell would take a very long-term view. Your budget was essentially set for next year. You ran into kind of a two-year current budget, and your next year's budget is almost set as you are working within a two-year plan. And you always are working within a ten-year plan that is

reviewed every year.

Then when I went to work for Arco . . . after I retired from Shell, I organized my own personal oil company, by the way, named after Shell, Roxana Oil. They hadn't maintained a copyright on that name, so my company is Roxana. When I came back to work for Arco, after clearing it with Shell, I came in. I was the highest-level person ever brought in to Arco. And I found that I was the only technocrat in Arco. Everyone else was an M.B.A. There were no people with practicing engineering, geology, geophysics backgrounds and everyone there is an M.B.A. And they all look at the world as M.B.A.s do. They don't know how to build platforms or find oil. They know how to make money if they've got an asset to start with. So I thought them as the kings of . . . if you've got anything, how do you make money from it, and ludicrous on how to find that thing. And Shell, almost the other way around, probably one of the poorer companies in making the maximum of money out of its incredible assets. Now maybe that has changed, but that's the way I'd seen it a few years ago.

TP: I am still looking for the origin of this technocracy, as you call it, at Shell. Does it date back to the Group's emphasis on science, geophysics and engineering.

MD: I'll bet it does. You may not be aware that for many years, Shell was just about the only company in the United States that hired Ph.D's. Shell used to, almost

tongue-in-cheek, say they hired Ph.D.s without prejudice. If you look, many of the senior people in Shell have the doctorate. They have never used it. It doesn't appear on their business cards. They got nothing for it. In other companies, the Ph.D.s are only at the research lab. In Shell, following a European tradition, Ph.D.'s . . .

TP: Are more highly valued?

MD: Or just scattered and made use of without prejudice. It doesn't make any difference, but Gerry Pirsig only had a bachelor's -- the geophysical guru. But most of his staff around him were Ph.D's. Nobody ever used a degree within Shell, as they don't within Royal Dutch Shell. But I will bet they have a far higher percentage of Ph.D.s than any other company. For a number of years, when we went to campus, we were the only company in the United States that would hire Ph.D.s in operations. So that colors it. I think you are right: It is the European tradition of not being afraid of people just because they have the doctorate.

TP: Also, the understanding that Shell had to find oil in the United States and that it had to be very good at finding hydrocarbons, not necessarily being satisfied with just making money on what it had

MD: And for that, there was, I'm going to call it a problem, that Shell had. All the years that I was handling international, and probably before that, Pecten always got 10% of the E&P budget. Not 15%. I could never get them up to 20%. It was 10%. Because as much as they liked the fact that during the years I had Pecten, we found between one-third and 50% of all the new oil found by Shell, we had 10% flat every year. Shell was not an international company and very reluctant to go there. To give you an idea, Tom Hart, who was the exploration VP for a number of years, never came out to Pecten to review an exploration play. Not once. Never went overseas. Not one time. Charlie, on the other hand, was very interested, constantly following it, as did John. But Tom, who was in charge of exploration overall, not one time! And one of the things we probably did wrong was staying too long in the onshore.

I can remember being extremely frustrated to see how much money was going to the midcontinent division, where they had finding costs of $17-$20 a barrel against my $1.50-a-barrel finding costs. And it was justified because they were planning on $35-$40 a barrel oil. It didn't and we were hanging onto some $17 a barrel finding costs. Because we wanted domestic oil and gas, we kept on looking, like that old story -- the drunk searching for his keys under the lamp light. That isn't where he dropped them, but that is where the light is good. For many years, we poured incredible sums of money into domestic projects that

wouldn't pass my sieve at all. The point that I tried to make: it doesn't make any difference where that oil is as long as we are making money. If you want it brought back here, we will ship it here from Cameroon, Malaysia or wherever. What you really want is money.

TP: Was the constraint within Shell Oil, or did the group not want Pecten to become more active than they already were?

MD: I don't know. Verbally, Pecten was greatly respected, and if you look at the offering documents on the takeover, there will be specific paragraphs stating that they will leave Pecten alone and not interfere with it. But, of course, that couldn't be. There was a dichotomy in Royal Dutch Shell that I was aware of in my years, as I was probably, outside of John, the major contact person with the Group. I had tremendous relationships with the E&P management, even the E&P group, everywhere in Royal Dutch Shell. Never had a problem, ever. But that is only a small part of Royal Dutch Shell. In every country they have, what I call dukedoms that are run by often superannuated people who run Paraguay and Venezuela. These are literally dukedoms. They are a shameful part almost to the Royal Dutch Shell thing, to see the kind of perks and waste of money that go into these things to set up these dukes in these places. Under the Royal Dutch Shell rules, they could not enter into a new contract in a country without going through the local duke, who would take them to the president who would counsel them on

whether their search for oil and gas would affect his three gas stations in Ascencion, Paraguay, or not. They had to work through them, and they couldn't even enter the country without a telegram of permission.

TP: You are talking about Pecten having to go through this?

MD: No. Pecten did not.

TP: The people from the Group?

MD: All the Group people.

TP: So the Group's E&P people had to go through . . .

MD: That's right. And I know I caused a lot of problems with the dukedoms because I was under legal direction from Shell Oil that I may not ask permission from Royal Dutch Shell as a minority shareholder. I don't get to do it. So I would come into Venezuela, and I would send a note that I was going to be visiting with the petroleum minister. The guy would say, "Well, I'll take you there. You can't go there without me." And I said, "Yes, I can. I have already made an arrangement and thank you, I am going to go on in." I would go on in and meet with the petroleum minister. And those were the directions and the law. But it made

Pecten very unpopular with the dukedoms worldwide, not with E&P. We had great relationships with all their people.

TP: The oil that you produced in places like Cameroon and Syria was mostly marketed in Western Europe, or did that come back to the United States?

MD: That is an interesting thing. In my innocence, I thought this crude oil from Cameroon is just like Gulf of Mexico crude oil. I'll bet they will really love to have it in the United States, in our refineries. We sold the first couple of loads to them. They bought it at prices two dollars less than what Elf was selling crude oil to the French. So I go to the crude oil people and say, "What is going on? The government is on my ass! They say I owe them millions of dollars because I am selling to you cheaper than anybody else." They say, "Well, as we look at it, we look all over the world. There are other oil companies and it is cheaper. That is just what it is worth." I said, "Well, I can't do that. I am going to be doing nothing but losing money if you take the oil from me at two dollars less than the going price, and I have to pay taxes on the full price." So it went all the way up to Bookout and we ended up with one of these developing things that you have in new companies. We'll sell the oil to whoever pays the most for it because our responsibility in Pecten is to get the most money for our oil and gas. The refinery purchasing agent's job is to buy oil as cheaply as he can. Maybe we will intersect but maybe not. What we can't do is go on with this thing in which they want to

get it free from me and I pay the taxes on it. So almost none of the Pecten oil ever came home. It was always sold to the highest bidder worldwide, and we had our own marketing that did that.

TP: I am trying to think if there are any other questions I have for you. Looking back on your career -- this is a standard question I ask -- what was the most enjoyable period? What were the most enjoyable assignments that you have the fondest recollections of?

MD: I don't think I had any bad times. I greatly enjoyed my tours of duty in research. It was a delight, in a way, to go down there on Saturdays and Sundays and find 40-50 people, my vintage, down there working in the lab. I was fortunate enough to be associated with a number of lease sales, and those are seven-day-a-week things. I was fortunate enough to be successful in Pecten, and then to have the additional dimension of organizing that company from scratch. As part of organizing Pecten, one of the conditions of production in Syria was that as soon as the oil is found, it has to be developed and produced by a joint Syrian-American company, not Pecten. So we had to then to create yet another company, largely staffed with Syrians, in Syria, with human relations policies and trivia like that. So I don't think I can recall any bad times other than the first year when it was nothing but grunt work and stay off the geophysicists' floor. You are not supposed to talk to those people! [Laughter]

TP: Who are the notable individuals? You mentioned Bally and Persig. Are there others? And, of course, the Blackburns and the Bookouts, McAdams, people like that.

MD: J.T.

TP: J.T. Smith?

MD: Yes. When I went to work at the research lab, J.T. was somebody who really liked and admired for his brain power. In fact, at a Shell training, they asked you to describe three people who you admired. The three people I admired were Abraham Lincoln, R.E. McAdams, and J.T. Smith, for different reasons. McAdams was like Patton; he had a lot of faults but he created morale, esprits de corps. He would charge a semi with a pitchfork if he thought it would find oil for Shell. And J.T. brought an intellect that -- J.T. was at Bell Telephone Labs before he came to Shell -- was a Nobel Prize level. So he was a delight to be around. Have you ever heard of Aphrodite Mamoulides?

TP: I have seen her in the BRC history.

MD: Aphrodite was the librarian at BRC for many years. More than a librarian, she

was confidant of generations of people who were in and out of the research lab because everything in tech files or research went through Aphrodite. And she was a remarkable person. I had been at the research lab for a couple of years, and I was asked by J.T. Smith if I would care to come Friday night and have a drink after work at his house. I said, "Well, yes, J.T., I would be happy to." I went over there and I found out that for something like 30 years, the same group of people had been meeting for Friday night drinks in a rotating way. And I looked around and these were the people that really ran the lab. They weren't the vice-presidents who came and went. They were about six or seven people that collectively were the retained wisdom of the lab, and Aphrodite was one of them.

TP: Do you know if she is in Houston?

MD: As far as I know, she is in Houston. She has been very active in the Greek church there, and I think she is still there. She never married, and took care of her mother. But she was a wise, savvy bird, and she might have some interesting sidelights, because she has seen us all go through. She would have opinions on everybody!

TP: Is there anything else you can think of that you would like to add?

MD: Probably trillions, but you've got 10 times too much now! I hope you are going to

have a great book out of all of this.

TP: We will see.

THE END