MMS OFFSHORE GULF OF MEXICO

ORAL HISTORY PROJECT

Interviewee: AUBREY BASSETT

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Place: Metairie, Louisiana

Interviewer: Tyler Priest

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Bio

Mr. Bassett joined Shell Oil in 1947, after obtaining a bachelor of electrical engineering degree from Georgia Tech, and a Masters in engineering from the University of Florida. He worked on various offshore and land seismic crews. In 1961, he became party chief of a marine crew shooting off the New Jersey coast. In 1967, he joined Shell's Offshore Division. In the mid-1970s, Bassett handled special technology, regional mapping and sale work. In the early 1980s, he became supervisor of the Data Acquisitions Group and helped design and oversea construction of the *Shell America*, the largest seismic vessel in the world at the time.

Summary

Interview discusses early refraction and gravity work offshore in the Gulf of Mexico, evolution of converted and purpose-built seismic vessels, and seismic recording and processing technology. Detail on move from analog to digital recording, deconvolution, the role of geophysical contractors. Talks about surveying off the East Coast and Florida in early 1960s. Sections on bright spots, depositional patterns, turbidite geology. Last section of interview covers the *Shell America* story in detail.

Side 1

TP: This is an interview with Mr. Aubrey Bassett. The date is January 16, 2003. We are at Mr. Bassett's home in Metairie, Louisiana. The interviewer is Tyler Priest. Let's just start off with some of your background and how you eventually came to Shell.

AB: That goes back to 1947. My first introduction to Shell was to Colonel Goldstone. I think it was Fred Goldstone. He was an English gentleman that was some kind of big shot in Shell. I am not exactly what he was but he was, among other things, the chief recruiter for geophysical type of people. They did not talk too much about geophysics with him. It was all about seismologists and seismic and the job I was hired for was what they called a junior seismologist. That was the beginning level.

TP: Where were you from originally?

AB: I was in college at Georgia Tech. When I was in the navy, I had been in the B12 at Georgia Tech for a while. And they were awarding what they called a basic engineering degree because none of their other degrees were offered with as few hours as you needed to get this basic engineering degree. The problem was that people in the B12 that would be coming from other colleges. They were going to need about two-thirds of the hours that Georgia Tech required for the same degree

and they thought that was kind of unfair. So they kind of worked in this special deal on there. What I was actually in was electrical engineering. So, after I got out of the service, I went back to Georgia Tech and started in the electrical engineering department. I continued in electrical engineering and got my bachelor of science in electrical engineering. What it was at that time . . . apparently, there were not enough colleges. I guess maybe Colorado School of Mines and a few others, like St. Louis University and Cal Tech, were about the only ones you could identify with geophysics, geology, and that sort of thing. Somebody in Shell decided, as well as other companies, that they would go look for physicists and electrical engineers that probably likely would need to be retrained or reprogrammed. We added education to make them useful in all our exploration business.

The sad thing was, prior to that time, nobody had any idea what in the world a geophysicist or seismologist should be trained in. Because I do not think that even at the bigger schools where they had these programs, anybody really sat down and made an agenda or a program saying this is what they need. And as time went on, we learned that that was a difficulty that never went away. The changes in science and technology and that sort of thing have been going on so rapidly from that day on to now. It is hard to predict in four or five years, before going to college, what he is going to need to know four or five years afterwards.

TP: It sounds like on-the-job training for your whole career.

AB: Well, that is about right. Different people had different ideas of what they should have. They figured electrical engineers and geophysicists at these other colleges and Georgia Tech would be one of them, would be probably the best bet to hire. At the same time, other geophysicists were using the areas of civil engineers and mechanical engineers and all that sort of thing to do these other jobs. But as far as exploration goes, it was a little different. And everybody kind of knew what you ought to train a civil engineer to do. And a mechanical engineer, you know what he is supposed to do. The geophysicists, seismologists, well, what is it? That is the problem.

So anyway, I went ahead and I talked to Colonel Goldstone and oddly enough, we became friends.

TP: Was he a Brit?

AB: He was British, yes. I think he was from England. I do not think he had ventured much out of England like lots of other people in exploration. They would have already spent some time in God forsaken places as well! My memory on this is kind of fuzzy but I think he was an Englishman. But he was well-respected, well known, and people outside of Shell knew who Colonel Goldstone was. He was very precise. He was a well known sort of guy. He offered probably a half dozen of us jobs.

TP: Was he in Houston?

AB: He was in Houston.

TP: Or he was in New York at the time?

AB: Yes. He was in Houston, so far as I know, at that time because the lab was still going there. And his office might have been out there at . . .

TP: Well, the lab had just started, I think, in 1947, right?

AB: It did. They had some small little buildings out there, but the new building really had its opening in 1947 -- lots of new employees and departments and so forth. They had offices downtown, which I am not sure what they were, but, of course, the head office was still up in New York.

The reason I went to Houston was really because what they called the New Orleans area. The New Orleans area was being organized in Houston. And most of the people I talked to were already assigned in the area and we had that floor where they were working. Some of them were called trainees in various other departments that were working there. And they were getting fixed up to come over to New Orleans

and be the beginnings of what they were to call the New Orleans area. As a matter of fact, my company number, if you go by the early system of numbering, you could tell I was in the original New Orleans area. They had a certain special set of numbers that they gave, and that did not last for long.

So, I am trying to think of where I was on what they did as they decided as you came in there . . . I guess the Colonel Goldstone and the head people in these areas . . . They had the Tulsa area and the Houston area and California area. St. Louis has just been shut down.

TP: I guess Denver had not been opened yet?

AB: I do not think there was a Denver. I am a little fuzzy on that.

One of my friends went to Texas, and one of the fellows I was with, he still lives in Houston, but he went to San Antonio and stayed there almost half of his Shell career. He was there in Oklahoma City eventually. I am not sure, but Oklahoma City might have been for a while, or Tulsa. Tulsa was an area at that time. But they kept bouncing those around and each one of them kind of had its own system. We were not carbon copies stuck around.

TP: Especially in the New Orleans area.

AB: There was quite a difference. Well, New Orleans had not gotten to the offshore at that time but it was definitely that way.

TP: So, you were organizing the New Orleans area even before . . .

AB: It was organized in New Orleans . . .

TP: The first state leases they got from Louisiana was in 1947, I think, right?

AB: They should have been.

TP: That was when they got South Pass 24, I think, in 1947. Maybe it was 1949 but it was . . .

AB: I think that came along a little later but I know later on in, say, 1950 or so, we were just . . . I am getting ahead of myself but I was in the Baton Rouge office and every month, we had one of these state lease sales to contend with. And it drove you crazy. You had three days that were kind of normal and then, maybe you were up all night making maps. Then, if we made one of them, made a deeper map. The boss would take it and he would go to a meeting the next day. And the same day, you would turn in your map to him, he will take your map and go down to New

Orleans or wherever. You had to meet the rest of the area people. The area people they called it. Area geologists. And then they would decide what they were going to bid.

TP: So, these are state offshore lease sales?

AB: Yes, and all of them might happen all in a day or two. Bingo. But I did not want to have these darned sales like that. That was pretty hectic. But when I was in Houston, then they sent me back to the . . .

TP: I heard that for some sales, you did not even have seismic information, and a lot of it was gravity survey.

AB: Oh, you did whatever was necessary! You see, on the tail end of it, getting back on that . . . I came over to a seismic crew in Lake Charles, and the party chief on there was a fellow by the name of Otto Holycamp. And Lee Herrings was the district manager or division, whatever they called it. This was the Lake Charles area, but the funny thing was that office in Lake Charles became the first one to be in charge of the boats. That Party 18, which I was on, was the land crew in Donaldson, Louisiana when they came onto that. They came off of the ones in Lake Charles. They sent me from that to New Orleans to be on Party 18, and it was just going on to the offshore . . .

They hired some troop luggers and they wanted to put the instruments on them. They had planned to do that earlier, but in those days, the instruments on the boat got rocked around quite a bit which is in contrast to your own on land and working on a truck. The big problem then was that Shell very stubbornly had maintained that they liked their instruments they had. We were using in early 1947 what they called Mercury Tower. Mercury Tower, have you heard of that one?

TP: No.

AB: Well, Mercury Tower was an instrument that actually, you would load this tube up filled with mercury in there. And it would have, whenever it would come down this tube, the diameter of the tube, the width of the tube, would change along the way. So that as the mercury came on down and flowed through there, the resistance that it offered was different at different times. So, you had to very carefully estimate how they wanted it. In other words, in the seismic signal that goes out, it starts out with a big bind and it gets punier and punier. If you go in to record it and was three feet tall for the start, and then you would have to use a magnifying glass to find it down here. It is like the same thing when you are driving a car and you have a volume control. In the early days, when you were driving in your car and you got a distant signal from a radio station, you had to turn the volume up. And that is where the ABC automatic volume control came. It was a technique for increasing your electronic

volume that is given as time went on.

TP: I see. You used this mercury tube to do this?

AB: Yes, the Mercury Towers did that. But depending on what area you were in or what type of geology, you would have to use different adjustments in your Mercury Tower. The way it was controlled, it has these pegs, you know. The operator and the party chief would have to decide how far to screw in the pegs and all down for variable width and the way to control the volume on it. It sounds pretty darned crude. Also, the cameras they used were hand-cranked cameras. The experts in the Shell lab insisted that the hand crank was the only way to do it. What it would be is that you would start cranking, and then you had these two pegs on the crank. And you try and keep the crank between the two pegs. If you hit the front peg, it made you go too fast. Certainly, when your recording came out, one inch at a time on the recording might mean one thing if you were hitting the peg down low there and the other side would be too slow. So, to keep the thing going, you did that.

Some early phonograph devices were the same way. You controlled with the sound. They had little arms on there to control where it was supposed to be. But the main thing that made a difference, getting back to where I was, is on the volumes, most people would have other schemes of automatic volume controls. They had adopted pretty much the techniques like you would in a regular heterodyne radio, like an AM

radio that they used to have. The thing they came up with was pretty slick but they were a little slow in getting it incorporated into the instruments. So, the first ABC systems were put on the boats because they needed them the worse. In other words, they went from being in lines on land type thing to when they got the ABC instrument, they took them out on the water. And now, it did not make any difference if it rocked or not because it did not have any effect on it.

TP: So, you were not using the Mercury Tower . . .

AB: The Mercury Tower, you could not use it out there because the mercury would swash and all, and you got all kinds of different results. It did not have to be quiet, any more than you have got to park your car to have the ABC work on it. It is an electronic type thing, independent of any motions on there. Although lots of people had other systems of doing it, ours was an evolutionary part or probably some form of it has continued on through . . .

TP: So, Shell developed . . .

AB: Shell was developing their own instruments. Yes, they had numbers on them. The AQ this, and the A this, and it indicated the number of it. I think they were using something, something one. The one on A would be the first one that they had. It had a letter designator and then the serial number that went with it.

TP: So, they were advanced . . .

AB: It really was an improvement. It worked but it was not the ultimate. The thing kept evolving, and other complications came into it. The whole volume system . . . And then when it got from the vacuum tube stage, on into the transistor stage, and to the imprinted circuit stage, until the next thing you know, you are in the digital world, which is another whole different world. So, all these things . . . from the digital world where everything is by the power of two . . .

TP: I want to get in and talk about the evolution in the 1950s of the technology, but can you tell me a little bit more about the experience of being out there . . .

AB: Oh, I was answering your question. You really strained my memory on these things.

TP: No, this is good.

AB: That is not where I was headed but that did happen.

TP: You mentioned before we started talking on the tape about the hurricane in 1947.

AB: The hurricane of 1947 was particularly interesting . . .

TP: So, you went out and Party 18 became an offshore crew . . .

AB: It became an offshore crew. They went out there and did not know what they were doing. I will try and tell you some . . .

TP: You were still a junior seismologist?

AB: I was a junior seismologist for a very long time! My father in the Army was a first lieutenant from 1919 to 1929 or 1930, something like that. Things just did not happen that fast!

Anyway, back on the crew . . . the crew was, first of all, I will just tell you in terms of comparison. We had 7 traces of data, and they were each from geophones, single geophones that were placed on the bottom. When you were testing, you tried to put them on some kinds of floats and all, but on most of the ones we did there were always cables on the bottom spaced 200 feet apart. And the shot points had to be, I guess, 1,200 feet. And we were doing what they called leap-frog shooting because we would go another cable length down to 2,400 feet and shoot and record that. The reason they did that is the information we got was a little bit better if it was longer distances than the area we were shooting it. So, that was just typically, that is the way it was set up. There were 7 traces on there, and it would be on paper, hand

cranked on the paper. And they would be developed. It was very funny because on the paper, we would record the stuff and then hang them up. And when the paper would dry, it would dry up in little tubes. It would just roll up. That is where I learned to whip the hydroscopic because we had to put glycerin in the developing water to let them naturally absorb enough water so they didn't cut your finger off. Really, it was like little pieces of steel.

Anyhow, surveying was zilch at that time. Surveying was pretty much just using a compass and dead reckoning type of system. It was kind of fun to watch the seismic . . .

The surveyors, they would tell you where a line is supposed to be. They would go out there, and they would have a lever, which was the survey boat and they would take off with the compass going down the line, and they would be able to determine where on a map as best they could. And there were not very many maps. And there were not a bunch of places to tie to out there. There were a few in the original thing in Button Sound - the area where Party 18 started off. There were some surface type things you could tie into but not very . . . you could try and triangulate, put your survey instruments on there, try and get a few checkpoints, and things along the way. But really, once you determined which way you wanted to go. And agree with your map that this is where you want your data, the head boat would take off on its compass and go and 200 feet behind would be a little thing that was not much bigger

than a canoe, a flat bottomed boat . . . They had these little boats they experimented with, they were actually built on the crew. People would go off and, you want to talk about cypress wood. I guess that was somebody. I have been reading about that where they were talking about cypress but they would go and get a load of cypress and hire some fellow on the crew who had the skills. The next morning, he would make a little skiff. We would try the size out. And the fellow would get on it, and he would have a straw hat on. Okay, so they would have a bunch of cane poles up on the boat ahead. And so, they put a cane pole in the water with a size weight on the bottom to hold it down. When the guy in the boat behind would get by the cane pole with the seismic crew on, he would take his hat off. He would kind of salute with his hat. They would drop another cane pole. And they would keep on going.

Now, on the top of the cane pole, they usually had a piece of cloth or something tied, a flag on there. So, the first few poles you put in, you would just do the best you could on there. But as you progressed down the line, now you can look back and you can see the cane poles. So the fellow running the boat in the front, his job would be to just keep sailing and looking back and trying to line up the cane pole. That would make a nice straight line then. You had to keep on going on with the cane poles back there, dropping a hat . . .

TP: That was not in very deep water . . .

AB: No. The longest depth was probably no more than 12 feet or something like that in that area. As a matter of fact, they were trying to suspend charges. If the water got below a certain shallow and a certain depth, I think it was either 4 feet or 8 feet, something like that, you could not shoot these suspended charges because they would disturb the bottom. And even then, you were kind of ecology minded. If you went through oyster beds, you blew the heck out of the oyster beds and that sort of thing. They had pretty good reels on that.

What we would have to do is that each one of the cane poles . . . They came out there and they would put tubing in the ground and actually, tubing would be about a four inch piece of casing on there, but a very kind of teenie little casing. It was not very strong, but it was in generally 10 or 20 foot lengths. And it was coupled on the end. You would screw them together, and then they would jet them down. They would take the end of one of the pipes, and usually it would be one that had been shot off before. But they would take it, squeeze it down and twist it a little bit so it made like a bit on there. You cut a hole in it. You put it in the ground and you put a coupling on top and pump water into it. And it goes through a jet way down. As a kid, with a garden house, you've done the . . .

TP: What were those used for?

AB: You need to put these holes in the ground . . . the most common way . . . if they

could do that. That was one way to do it.

TP: So, you are putting the charges in the holes

AB: Yes, but if the water was deep enough, it was too hard to drill. So somewhere in there, you cross over between the pipe to the charger. If it got too shallow, you would have to be sure to use the pipe on there. If it got too deep, we had a hard time with putting this pipe in, particularly if it ever got . . .

TP: You got locals with shrimp boats and you outfitted these with your instruments?

AB: Right. Well, we on a quarter boat then. The quarter boat, the original one that Party 18 had, was called the *Bluewater*. I think typically, the crew would stay out there on one week and off one week or something like that, and it had the crew changes. The shrimp luggers would come in at night and they would tie up alongside there at nighttime. Everything shut down. There would be just a card game, and the darned gnats and bugs and stuff were horrible out there. Usually, the quarter boat would be in an area of about . . . we would not be out in the middle of nowhere. It would be up in a little bayou or a little cut or something, tied up as secure as it could.

Now, you are talking about getting back to the hurricane in 1947. In September, the hurricane came along. That particular hurricane was in the Atlantic. Nobody paid

much attention to it until finally, the hurricane decided to cut ashore somewhere just south of Jacksonville, Florida. At that time, we still had a lot of air bases in Florida and a lot of aircraft over there. So the Air Force and the Navy and everybody were sending their aircraft and all towards the west to get away from that. And so, the first day we were there, and the radio is talking about the storm and people are not paying attention. What happened was everywhere you looked, there would be different planes flying by and it would feel like you were in England in World War II with these planes coming by there! And the radio got more alarming than normal. I guess you have probably heard a lot about in Houston how the press and the TV people, that is their life, is being able to broadcast alarms about hurricanes . The fellows on the radio were just the same way in those days. "My God, it is the end of the world!" So, my family said, we'd better get out of there.

It just so happened it was not my job to be out there at that time. I was just a flunky seismologist out to see how it works and all. As a matter of fact, probably my third or fourth trip ever to be out on one of those crazy little boats out there. I said, well, it is blowing. If we do not go on, there will be nowhere to tow this darned houseboat, anywhere because the wind would get it on there. So, we started off with, I think we had four shrimp luggers on there. We had one of them on the back of it to steer. It would push it to try to keep the quarter boat off the bank. Two of them would be on the front pulling this thing, and we are looking for a safe place to go.

So, towed it up and, I guess, it was Delacroix the place there east of New Orleans where we decided to go with this thing. We had not gone more than about halfway where we were headed up there when one of the fellows on the luggers said, "I cannot do this. I have a family. I will see you," and he takes off! By the time we got it on there, they had two boats and another speed boat or something with outboard motors trying to control this mess. So, we went as far as we could and actually, they did a pretty good job. They got way up there, tied all the stuff off. The storm did hit, it did hit that area out there. It blew away the quarter boat. It had roof damage to it, but they had managed to get up where they had trees and stuff. So they had it pretty secure. One of the shrimp luggers, I think, went maybe a couple of hundred feet, or a couple of hundred yards maybe. Or it was blown out of the water and up on the beach there. And fortunately, it was not one that had the seismic instruments and that sort of thing in it. So, it was just a matter of a few weeks there to kind of get all this stuff back together and get it out. But that was quite an experience.

TP: _____ ?

AB: No, we did not have to do that for this. I am not sure. The luggers were powerful enough. It depended on the shrimp season and how available the luggers were. So, they were only good enough to do that. I don't know how all those problems were solved, but it was really a big mess is what it was. That was enormous because they

had not started naming them at that time. The storm hit New Orleans, and there were a couple of fatalities here in town where signs up on buildings got blown off. But the fellows with their families and all leaving, you cannot really blame them because they were really in a tough spot there. As you know, in that kind of country where it hits, it is just a matter of a few miles from where you are safe to where you are in a death trap type of thing. There are no signs that tell you which side you were on.

TP: You mentioned another contractor . . .

AB: I cannot remember the name . . . whatever the ferry landing is. It might be the last ferry that goes across the Mississippi River from the south. It is north of Venice where most of Shell's activity. They were on the east side of the river. They were not so lucky. They got blown up. The storm surge from the hurricane came up and up. They just took the boats in. It did not blow them through the air. It was just the water came up and blew them in, and when the water let down, now they had a problem of getting their things out of there. So that united crew was pretty much . . .

The plan at that time . . . they had actually bought two of these YMS, the wooden hull mine sweeper. One of them went to Party 88. It did go on to 88 at that time, and it was the original deepwater seismic crew that they had. What happened is Shell kind of struggled. They did not know what to do, and I think the original plan

was well . . . What they will do is they will fix up the second YMS and get that united crew back out on it instead. I think they might have been on a crash boat type of thing.

Another popular type of vessel to use . . . I do not know how popular the YMS' were, and I am not sure who in Shell was responsible for buying those darned things. But most of the other crews were operating off Air Force crash boats. If you were to drive from here to Houston along Highway 90, almost assuredly, somewhere along the trip, you would find a little spot there where off the highway some bayou, some body of water was there, and you would see three or four of these boats tied up. There would be the seismic crew or somebody would be out there because there were just a bunch of them out there. The crash boats could be used to go out into open areas all up and down the canals and all. But the era of the crash boats lasted for two or three years.

TP: The mine sweepers . . . the *Ora A* and the *Edna S*?

AB: Those would be some of the original dealings in there. Let's go see what they look like. Those are the YMS. And what happened on them . . . I do not remember the exact numbers, but it would be something like $15,000, $20,000, that they invested in these YMS. They brought them down from Washington State or Oregon, somewhere over there that. They were brought through the Panama Canal. The first

time they had to do anything really was change engines or something like that, the cost of an engine was a whole lot more than the cost of the darned things, to begin with!

Anyway, they were not especially good. They were too small, really. And what they were trying to do was shoot off on them. The big plan originally was they were going to try and use one shooting boat to put the explosives in the water and then have cables out to record off of. And that, in principle, is where, even like the *Shell America* . . .

TP: Single ship . . .

AB: Pretty much like that. They did try and do that. But on there, they did not have enough room to store enough explosives to do any good. Because a typical tour, by the time they got through stacking data where you actually shoot the same line where you are going over it a bunch of times and adding the data together in a certain way. In those days, you were not stacking. You just had one set of coverage on there, and even then, you would use up a lot of explosives on there. They quickly learned you were going to need another boat to carry the explosives. So they got mega boats, and although they claimed to be geophysical boats and all, they would just kind of be flat bottomed tubs. They were not much more than a big supply boat like they used. And they could haul those. They would have more than 100,000

pounds of explosives and they were 15, 25 to 50 pounds a shot. So, you do much shooting, it takes a lot of room . . . loading 100,000 pounds of dynamite.

TP: I would hate to be on one of those.

AB: The big danger was in the shooting themselves. Can I tell you a little story?

TP: Yes.

AB: It kind of reminded me that Shell had a couple of mishaps and I do not think anybody really knows exactly what happened. Because it is very difficult when you have accidents like that to be able to know exactly what happened. Everybody has got an idea and a little different story when you start interviewing people about that.

One of the problems that the boats had was that you had to make up a charge. And say, you would make up a 50 pound charge on there. It may or may not be one single package. You might have to tape together. Stuff was coming in different weights because at different times, you would be using. It was kind of your medicine. If you were going to be taking medicine at 10 mg and you buy 40 mg tablets, you have got to cut them up to use them. So the tendency is to have a lot of little ones and try and put them together. Well, the same principle involved on there. But they were finding that it was very slow and to be safe. They had all kinds of

procedures to where you would go to when you put a charge together and put your primer into a detonating charge. There were actually three parts to it. Then, the cap line would be sealed. So the idea is you try and put this charge out there and when you are shooting floating charges, you use a balloon or bag or something to float the thing. And you have got to tie it on. But when the boats were moving along at, say, six or seven knots, and you are trying to do all of this, you do not have a lot of time to go. Two hundred feet goes up in a hurry, and you are just back there wildly putting all of this stuff together. Almost everybody discovered after a while that you probably should have some way to speed this thing up. So you would have one set on this side and one on the other, so that while this was making up, that one was shooting, and so forth. I do not know how many seismic crews. You could probably go back to . . . what they would do is they would make up a charge and put it overboard and shoot it. And while they are doing that, they would make them another one here and they would alternate back and forth. Until there comes a time when somebody screws up, and you throw it overboard and shoot the one on deck. It is just a matter of time until you do something like that. So, that kind of took the edge off of that!

Shell had some near misses. Actually, some serious . . .

TP: It says here in 1948, two people were killed on Party 88.

AB: Well, that could have been the same thing. Does it tell you any details there?

TP: It says the cause of the accident was never fully known but was believed to be accidental triggering of the blasting box by radio transmission from the boat.

AB: That could be. It is always, like you say, well, the guy turned his radio on when he should not have, but it goes on. They still have a problem. I have a son who is an attorney. And every now and then, he will tell me about some land crew will have some kind of ridiculous accident, or something happened that nobody really knows because possibly, three or four things could have gone wrong. In all accidents like that, there is the consideration that to have a service accident, and observing all these precautions that they have there, that there are about 9 things that need to go wrong at the same time. These are violations of the rules or mishaps or just bad luck. About 9 of these things need to happen. And it makes you wonder, when you see the frequency of the accidents, how many times there were probably 2 or 3. And there were probably a bunch of them there that were 8 or 9. It is seen on land crews or seismic crews or just about any commercial activity that is dangerous. You have to have all these things go wrong and just, every now and then, you are going to find the right combination.

That is a nice book [Shell offshore seismic history]. You showed it to me, it sounds more familiar. Does it give any credit as to who put that together? Was it Ed

Maunder? He was very much interested in that.

TP: It does not say.

AB: He was interested in that sort of thing. He came from Midland to the offshore there, and it was probably in approximately 1980 when he was the geophysical manager for the offshore area there. I know he was very much interested. It seemed like the kind of stuff that he would do. And Ed was the type, he would have picked the people to do that. And he probably had very little to do with anything himself, but he knew how to get it done.

TP: How did offshore seismic technology and operations evolve, from your perspective and when you first arrived there in 1947?

AB: Well, it was pretty sluggish because in 1947, we were still doing refraction work and it was . . .

TP: You were not doing much reflection?

AB: Well, they were but bear in mind that the whole way of exploring for oil and the geologic concepts; in other words, how the hydrocarbons were trapped, was not understood and probably is not perfectly understood right now. And so, initially, the

thing was, just like the one on land, is you go out and you look for the easiest things to do. And you look for the Spindletops and that kind of thing where you can go out there, and you can go driving into the countryside and see the bump on the ground. Well, that looks just like the one at Spindletop, the salt domes come up like the Five Island trend and Shell's Weeks Island. Those are just known salt domes and so we started drilling on those. Now, you get out and the salt domes are getting harder to find. And some of them do not reach the top, and do not actually have any effect on it. If they only come up to 5,000 feet or something like that, they do not have any expression on the surface typically. So, certainly, the reflection seismic was work.

The easiest way to look for them, in the old days, on land and offshore, was to see the fan. And you would go out and you would have one instrument here. Then, you would go out here and you would shoot and you would shoot and you would shoot. The waves that go down. You are not looking at the shape in the wave forms or anything like that. You are just interested in the time. If you find that the signal has been accelerated going from here to here, that means there is something in between. The speed of salt is a couple of times faster almost everywhere than the speed through the sediments. So, if you could see the acceleration on there, you would know that there is something in between there. So, you look at your fan and you say, "It is on this one." So, you come out here and you suspect. You shoot another fan in that direction and you know it is there, and it points at the salt dome. The next thing you do, you are out there buying up that spot.

The next thing they discovered in doing that was that if you found the salt domes, the concept was, in those days, that each one of them had what they called a vented syncline. In other words, the salt that came into here had to come from somewhere, and it came from a circular area around it. And when it did, you had this area here . . . this would go down and leave this up right here. If there was another salt dome, this would go down. So now, you have grown a structure here that is like an upside down dish on there just by having surrounding salt domes. So, that is the residual . . .

End of Side 1

Side 2

AB: . . . in the same way. So, if you get a gravity feature and it could be a positive or negative gravity feature depending on where the salt is with respect to the sediments. Above 5,000, the salt is denser than the sediments and below. So you have a gravity minimum for the deeper salt. If you get a minimum with a positive in the middle, that kind of gives you some idea of the depth of the thing. So they go with the gravity people and try to use their information. As a matter of fact, the location for these fans was picked, to a large extent, on that . . .

TP: On the gravity . . .

AB: On the gravity. That is how . . . The residual features kind of came that yes . . . Fellows have the smart guys kind of study it and take with it the subsurface information. A lot of places did some drilling and some other things that you use on there. So, it was just a combined effort to put all that together. So, the seismic started off, in most of these areas, with the shooting, the refraction, then the reflection, and the reflection was not really great because of the multiples on it. You have heard that story on that? That is why when they caught on to the stacking data to get rid of multiples on there, now that is a new era. It is right there.

TP: Reflection began in the early 1930s, right?

AB: Oh, yes. The reflection and refraction both were used in the . . .

TP: Were there different kinds of problems offshore with reflection than there was onshore? You had the water reverberation . . .

AB: Well, yes. Different kinds of problems. It would be pretty much the same thing as far as the type of exploration you would be doing, but the nice thing was, and a real blessing offshore, is that there are not so many surface obstructions everywhere. So that you can pretty well do what you want out there, and you can shoot regular lines. If you are on the land, it becomes very difficult sometimes to put in a . . . or it used to be you would go out there and you would shoot a line and you try and get around the man made obstructions. And you have got to have a permit. You have got a lot of people who do not want you on the property.

On the seismic crew one time, we were shooting in, of all places, the East Texas field. But we were looking for deep objectives there and they were where there were the skeletons of all kinds of oil equipment all over the place. And you come through, and ask the fellow for a permit to come out there and blow holes in the ground again for your deeper objectives, and he thinks you are crazy because there had been 10 people that came by there in the 1930s or 1940s or something like that. And here, you guys are coming back, you are just now getting here and you want to

blow up my oil? You don't have to worry about that in the offshore.

Yes, there are different problems, but the main thing that came along was the tape recording. You get your data and you can record the analog just like on the tape recorder, when the magnetic tape recorder came along. And with that, you were able to actually stack magnetic data on there. What really helped, of course, was when we got the digital. And now, you can do pretty much anything you want with the data.

But even in the offshore, let's say, in the 1960s or something like that, we had these group surveys where either several of the majors would get together and say, hire a crew and go out and acquire data and share it with each other, or you have some contractor come out there and say he is going to shoot a lot of lines. He would speculate on a bunch of data out there and we will sell it. You will be surprised that you might have to record it on two or three different systems. One was with some kind of modulated things on here, which were amplitude modulation and other kinds of modulations that they would use but would be analog data. And then, there would be others who would say, "No, we want one where it would be digitized." And in each one of those areas, you would have . . . not so much now, but they was not standardized formatting for the data. So, there was one survey like that where we were actually recording the data three different ways for different clients. We took our data in such and such a way. This way for another person and this way

over there. It was no big problem for the fellows that were doing the job but they satisfied . . . everybody looked at underlying principles being evolved. Well, fine, it was just a recording type thing.

TP: Before you went to digital, there was a period where you had analog to digital converters.

AB: Yes. In some areas where the thing was recorded analog, people would actually try and take that data and convert it to digital, and then process it like it was acquired digitally.

TP: Did that work very well, do you know?

AB: Well, it depends on where you were. Yes and no. There is no standard answer for something like that.

TP: I know that GSI did the first proprietary digital recording for Mobil and Texaco in 1962. When did Shell convert over to digital recording?

AB: Well, it was kind of gradual. It was over several years. We were a little slow. You see, GSI kind of had the advantage in that a lot of their people were trained at MIT, and they had the right kind of smarts to do it. But eventually, Shell did hire GSI to come out there and do some special areas and try some special tests and so forth.

And we kind of got educated largely by that.

TP: By GSI folk?

AB: By GSI and by others. We were not any brisbanes. In fact, we were kind of stubborn, for some reason or the other. I mean, I do not want to cast aspersions, but I can guarantee you that we had people who were actually holding back the thing for unknown reasons.

TP: It was more expensive . . . difficult . . . even Shell was really ahead in a lot of other things.

AB: Oh, yes, they were, but we could have been ahead still on that. And then, the other people had a lot of credit. We went through a lot of trouble trying to educate people what was going on with that stuff from GSI that they did. From my own personal experience, I was kind of lucky in that Shell would dedicate experts in those days. I guess they still do that. "Say okay, this guy over here, we know he is the man, we will do it." Sometimes they are right, sometimes they are wrong. But my luck came in that there was a certain number of experiments that GSI had done. And the man who was going to present the thing who was pretty savvy and a good technician and knew his stuff, for some reason or the other, he was not available to present the information of the results to a certain group there.

TP: A man from GSI was not available?

AB: No, GSI was, but when it broke open and said, "Okay, GSI has done this, now we are going to evaluate it on our terms." That was clear because we did not share with them why we wanted things done necessarily. Sometimes we did, sometimes we did not. In this particular case I am talking about, the role of this man who did not get to do it and me who did do it. I was to tell the Shell people about how the prices of Shell type of stuff on there. So, I had to take a quick course from a couple of friends in GSI on what the heck we were doing on there, and I was amazed that this was fun.

TP: What year was this?

AB: Well, this would be in the mid 1960s or a little bit before - 1963, 1964 - somewhere in that period. I have always fondly enjoyed it. I was not the only one that did. And I am not sure what impact my explanations had on anybody except for me. I really thought they were super duper. Then, I started looking at stuff from other people other than GSI, and one thing I was really impressed with was that . . . one of the things we could do with the GSI data was we could . . .

TP: Eliminate reverberation.

AB: Well, that and, you had several applications. The idea is when a charge goes off, you do not want to "boom." That is what the sound is like on there, but you want to squash that back so that you get it back to where it looks like one spike. All that comes back and there is a spike in the time on it. That is what the big secret of that was. And that is not all one same process. There were several different angles.

[PAUSE] We were talking about deconvolving. To sum it up in signal shorting, you are trying to go from having a long signal down to a short signal so that the signals do not overlap. Because you get the right separation on there. In digital, of course, the power sensing was a big advantage on that. But there could be several steps to it. On this particular survey, that I was leading up to talking about, was actually offshore Louisiana, Mississippi, Alabama, and part of Texas. And on that, they had a number of combined deconvolution application problems that would be there. That was the point of some of the people's principles who were already involved in this thing saying, "If we are going to spend the extra money to have it processed, then we do not necessarily want to have GSI do it." They are going to have this thing all sewed up. They are going to be the tail wagging the dog if we do not watch out. So, everybody kind of agreed to this and said, well, how do we go about it? So, they said, well, GSI will give us some data, and we will have all these companies that are interested in it, have a shot of doing this. That was funny that when they did that. There must have been about one-half dozen takers who came and did that. You could just see these fellows and tech logs and computer centers all

over the place fighting how to do this because they really had never done it before.

TP: So, you got GSI to shoot the data and then you got other companies to try to interpret it?

AB: To come up with a processing system, a run stream that would get the desired results. Nobody really could define what the desired results were at that time, let alone who could do it the best. Well, all these outfits went off, and you would be amazed how in the industry, these people really worked themselves silly trying to . . . some just fell by the wayside. I mean, out of six, two or three said, "Well, jeez, thanks a lot." But there were probably two of them that came close to doing everything GSI did and they developed. Whatever they did, they almost came up with it overnight type of thing. One was Western Geophysical. That was a surprise. I never gave Western credit for being the technical wizards on it, but by golly, they did an incredible job on it. And, as a matter of fact, they were able to sell the original group of companies. They were really forced to go ahead and give it a shot and do it, because they had demonstrated their ability to pull this thing off in a whiz bang fashion. And they were a needed element in the industry to compete with GSI. Nobody was criticizing GSI. They just thought, well, they would be even better if they had somebody breathing down their neck!

So, Western, I do not know if they kept up that reputation that they earned at that

time but they did a remarkable job on that. And convinced . . . there might have been 10 companies involved in this whole deal.

TP: It was not just Shell? There were 10 companies that were . . .

AB: Ten companies that were purchasing the data or parts of it. I do not think everybody bought every piece of it. I think Amoco and Shell bought the biggest hunk of it.

TP: Did GSI know that this was going on?

AB: Oh, yes. They had an opportunity to take the data back. It was their data. They could do whatever they wanted.

TP: But they were trying to sell the digital recording.

AB: They were trying to sell their own. I think that they might have been a little overconfident. Just like all of us were thinking, "Maybe they were not the only ones that could do this." Well, it turned out that that was not the case. I still do not know to this day whether what Western did was better than GSI. I think we all did go back and try to determine. Everybody was impressed, not only with Western, but two or three other companies who had made a serious effort of the thing.

TP: Do you remember who those were?

AB: Not really. One man I know, he lives up in Chicago, that I know would know what that was. I could find out if I had to. If that was an important issue, I will do that.

TP: I was just curious.

AB: It was pretty clever.

TP: To go back a little bit, you ended up with Party 88. Were you offshore Gulf of Mexico for most of the 1950s, during most of that time?

AB: No, I was mostly onshore. Florida. Actually, from time to time, I would be called on to interpret data from all kinds of places on loan for whatever might be.

TP: So, you were not there in New Orleans during the big federal lease sales in 1960 and 1962?

AB: No, at that time, I was in Baton Rouge, and I was brought down here to New Orleans and was moving my family when they sent me to Jackson, Mississippi. Well, that is another story there. That is a crazy story there!

They gave me a project that a contract man was doing and he ended up in some kind of, well, like an asylum, while he was working on it. Then, they sent me to the Black Water Basin up in north Mississippi, Alabama and Arkansas which is an entirely different geology. I worked in Florida. Entirely different . . . not the same.

TP: The only reason I ask that is these are two big sales that Shell did very well then and I am just wondering how important was the new exploration technology with the magnetic recording and playback to the ability to analyze a whole bunch of prospects? Like, in 1962 . . .

AB: I do not know how important it was then because I do not think in 1962, we were doing enough to make any difference.

TP: Really?

AB: Yes. We bought . . . I cannot remember the names of them. I was familiar enough. The fellow, VanWyning, whose picture you saw in there? He was the big gun in that. They showed the picture, VanWyning was with me in the whole thing. We were up there in the Delaware Basin off of the New Jersey basin up there. So, that is how we were scattered around, and actually, I looked at some of the data and fooled with it. But he is the man on that.

As a matter of fact, he was with me in 1962. In 1961 and 1962, he and I spent a lot of time, in the summers at least, up on the East Coast. One of the big losers that Shell had, because of the multiple reflections, they just did not even recognize that they had the problems that they did. Do not tell anybody, but it was just trying to make a silk purse out of a sow's ear, and it did not work.

TP: But this is before you really were using . . .

AB: They did not have the right kind of data. As a matter of fact, even when we had the right kind of data, it would still be a complicated thing. They know how to do it now with the systems they have got, and there is a lot of production out in this area. That would be the area just . . . what is that big original platform out there in 1,100 feet of water? Just south of the mouth of the river. It was just up on the shelf itself.

TP: Bullwinkle?

AB: No, it would not be Bullwinkle. I am trying to think of the one that has been around for so long. Everybody knows the platform out there. Booze is in the name.

TP: Cognac?

AB: Cognac. It was just west of Cognac, but up on the edge there. That is a notoriously

bad area, in through there. I think that really what happened that screws up the geology is that the ancestral Mississippi River goes through there. And actually, when it goes off into the deeper water, now they get down to the turbidites and all that came through that area. Some of them did not prove things at all up in that other area up there. And nobody understood turbidites, what was going on. That was just way ahead of us.

TP: So, in 1960 and 1962, they are still doing salt dome . . .

AB: That is right. In 1962 when we went up to the East Coast, we were stacking seismic data. And actually, when we got up there, what we got up there . . . let me put it this way: I know from the configurations we were using up there which was the same that they had on . . . You would never do that now. What we know now, you would never use those to do what we did. You would get some improvement but not the kind of improvement we were looking for in there.

TP: That is interesting. So, how long were you on the East Coast?

AB: Well, in 1961, we went up there, and I guess we started shooting in May. I know we were there Memorial Day. We got blown off a hurricane coming up from that direction. Well, we did not get blown off. We had to stop because of the threat of one in, say, August. No, it would be in late September, and we came back. That

was mostly refraction shooting, and we had three boats. We had two boats recording and one that was shooting charges in between there.

TP: Were you looking for prospects or were you just trying to map the basin?

AB: That is a good question. Our assignment was really to go up there and determine about the basin that was supposed to be there. So, that is why we were using the refraction. There was stuff in the educational literature. The government had some work done up there. So we had that, and it was not very good stuff. But it was good enough and the fellows were smart enough, the geophysicists in that world, that they kind of described what was going on pretty well. The curious thing about it is that we thought when we went off the Coast, it would be like you go down, and it would be like some of these things out west or elsewhere in the world. You go down and it comes back up and you have a true basin there. Well, we just had a heck of a time finding it. The funny thing was the basin was all kind of open-ended. In other words, you never saw where is the other side of this so-called basin? They still call it a basin but if there is a basin there, it would be some of the deeper stuff, big warping of the earth's crust. It might look like a little basin of some sort but that did not really describe it. We have learned a lot since then about how all that developed. Believe it or not, what they are calling plates and subduction and all that were not very popular. And even though there were people back years and years before talking about the plates floating around on the earth surface and all that, that was not

a problem. You did not go back to the office and try to sell them on that kind of stuff. But we kind of convinced ourselves. We could not find the outside of the basins up there. But, ahead of time, we would try and shoot a reflection line. The more senior management seemed to be the most interested in finding out, "Well, where are the salt domes? Where is this and where is that?" They could think of it only in terms of on the Gulf Coast. And guess where we found a couple of salt domes? We found funny looking things up there - enough to get everybody kind of excited. The innocent thing about salt domes that makes them attractive is that if you have got one, you have probably got others around there. And it makes it an interesting spot to go look for these things. Well, I do not know how many salt domes you ever saw on the East Coast. I think the one we found the first time up there maybe close to being the only one that even looks like it could have been on a salt dome. And we just stumbled across it. So, we did almost the same thing in offshore Florida down there. We found the only one in town the first time out there. And you draw the conclusion, "Boy, this place is lousy with these."

So, to answer your question, we were looking, trying to get the overall picture together the first year. It was mostly very little reflection we put up on them all. The second year we went up there, we were stacking but, as I say, the dimensions and the way we acquired the data, it really was not worth a great deal. But we did have at least a couple of areas that we had identified as being kind of hopeful on an early shooting. So it had a little more detail before, and we put wave on that to make

maps to kind of get some idea of the thing.

The international geophysical year was in 1961. That was the year before. Now, they have got all these guys telling us that, "Hey, you have got all these plates." They started talking about continental floating around and all that sort of that, and it was not as hard to sell and look at it in a different way. The subsequent shooting on the East Coast was mostly contract stuff that they got. By 1962 and 1963, we actually had some competition coming in. Contract crews that . . .

Yes. Prior to that, in 1961, we went up there. There was a man who went to each one of those state capitals. The basic permit was issued by the Department of the Interior. They really then had control. In those days, the states really did not have anything to say about what was going on. I am not sure they still do. And they did not make any noise. They were very nice . . . 'oh yeah, anything we can do, come talk to us. The geologic department would like to work with you,' and all that kind of stuff. By 1962, 1963, attitudes were beginning to change. By then, we were killing fish, swordfish. I had to go up and give a talk in Washington at the Department of the Interior where they had people sword fishing from up around Long Island claiming we were up there. We were going to come up and kill their fish. And they would take off at 30-40 miles an hour and they could not catch up with us. The boats we had could make about 12 knots, you see. Can you see us like the ranger [laughter] _____. We had a hard time sometimes getting through the

straits of Florida there because the current through there can be as big as five knots going in the opposite direction. You do not get anywhere when you are on a little boat like that. So, it was kind of funny.

Actually, we kind of saved because people were finally convinced. And I was able to tell a story which was not much of anything because the people there were so prejudiced against us. The Navy got the brunt of it because obviously, whatever these people were seeing, were some kind of Navy boats to make that kind of time. And the Navy kind of got the brunt of that. Plus they had some people from the Wildlife and Fisheries that really needed the business, who came in and said, 'Look, it is a food problem. The fish are not here because what they eat is not here. You have to go where they' . . . one of those pretty obvious types of things. But when you are up there on the East Coast, it is a different world in the exploration because you are close to Washington. You have got these awfully powerful people who know everybody and lobbyists and that sort of thing. So us poor geophysicists, seismologists are not ready for that sort of thing.

The other thing that really killed us up there was they had a crew, and I forget who it was. It was one of the major contract companies, that had been working on the west coast of Africa, something like that - in Nigeria or one of those offshore areas that we are just beginning to develop. They brought a crew from over there to work offshore and the East Coast, and they started off of Virginia Beach, of all places. It

was on a popular weekend: Memorial weekend or Fourth of July. They are out there shooting. Here is a crew that has gone fresh from Nigeria, that when they shoot explosives in the water, they kill the fish, and the natives out there would follow the boats around picking up the dead fish! They did not care. They got pictures of them being there with the water showering down on them. That is how they got their food. That did not work when they got offshore Virginia there, particularly when a couple of senators were out there in their sporting boats and they got showered by those darned contract things shooting. And there was, of course, a big deal and they would act like they were being attacked. Because when they saw the line coming, they did not know what a seismic line looked like, and the boat comes down shooting regular charges, they thought they were being chased or something by this boat was shooting. It made all the headlines up on the East Coast.. You could imagine what a prominent fellow nowadays, if you want to attack something like that, it could really make you sound bad. We were building things that you would not want to do anyway. But that is an interesting . . .

TP: So, how long were you . . .

AB: That was the end of our shooting in 1962. We stacked that stuff, and by then we bought into some big surveys that were . . . I forget who did it. Probably GSI, for one. Maybe two or three different people who did . . . everybody did not do the same area. But the first surveys up there would be like eight by four miles. It would

be four miles going into deeper water and along the coast, would be every eight miles or something like that. And it was fairly good data. You could mostly bring geological markers you could see. You could also see even down to the so-called basement. It kind of demonstrated that there was no other side to this basin out there. Something happens but it is not a basin in the sense that all subsides. It is not like the Gulf of Mexico where we have what they call . . . it is a basin, but the thing that kind of muddies the water is there are lots of little basins. We used to call them mini-basins. And that would be these things in between the salt beaches. Because there were lots of salt beaches that are not just salt domes; they are big pads of salt. And they create things we would describe in Shell as mini-basins. Those are true because, you know . . . You can see that the sediments go in and they meet in the middle. But they might be as big as 50 miles or as small as a few miles across on the mini-basin type thing.

Each one of those is kind of interesting because when you have a mini-basin and you have got gravity working, gravity goes and it tends to . . . Many of the traps were formed by the sediments being pulled down by gravity, and when the thing was cracked, faults would develop. When they did, it would keep growing, and the sediments would come in and fill in the features that these cracks and all made. Most geophysicists and geologists alike would use almost a template. When you would see certain types of faults, certain types of things in the mini-basin, you would use a template to try and shape up the structure on that. Of course, it progressed

much beyond that, but that was the way it worked. And the concept of growth faults came into being. The growth fault would be where the fault just continues growing all during this time. In other words, you have a bunch of sediments here and if a fault develops and this starts going down and this gets bigger. These up here, things come in, but this is growing constantly this being replaced up at the top. You come over this way or how ever it comes in there. But you have probably heard those terms and the growth fault.

In the 1940s and 1950s in the Gulf of Mexico and even onshore and all, there were a lot of arguments about how those things developed. It put a mark on the exploration because the models they had that showed the typical depositional pattern . . . First of all, you have shales come out there and they would go into the deeper water. Then finally, you come down and you start getting down where the sands come down, and they were delivered in various ways, channels or whatever. They come down, and they only go out so far because the heavier, bigger sized particles start falling out first. And when they fall out, then it kind of tapers off. And so, you have got these pods of material that during the . . . And then, people would project all this and think, "That only happens so far and it only happens at certain depths." They are in the files, I am sure. And if they could be resurrected, there would be things where people would demonstrate quite decisively, not decisively, but with elaborate descriptions of why, say, at Weeks Island, you cannot go down below a certain depth because the sands do not get there. If you take them up and dip them, blah,

blah, blah . . . there are fields all over that stuff now. And the fellows who wrote those originally were not dodos, but they were just kind of going with the policy at that time. Because it was almost policy. It was not interpretation.

TP: Who would have made the policy?

AB: The policy of whoever kind of was in charge of the thing then, saying, "Well, it would be hard to sell a certain type of features that did not fit the plan." And I am talking about the plan of what you are looking for is some kind of policy that people favored on there. One of them was that in certain depths, you are not going to find the same thing you did up dip on there. But you have got basins inside of basins, too, by the way. But the big basin would be the Gulf of Mexico basin. But within that, the small one.

On the East Coast, it is, to a large extent, just what they call a basin. It is just kind of one big overended type of thing. It would be hard to find really good reasons why you would find any hydrocarbons at all in those. But my guess would be, just like all around the world all the time, it is just a matter of time. Some day, somebody is probably going to find hydrocarbons in spots in the Gulf, eastern Gulf, in Florida, or on the East Coast, like I say, the Continental United States or something. They will find it for reasons that have not been discovered yet. That is the way most big oil fields and things that are their own. They are unique. They are not models you can

carry around the world to fit. So, that is kind of the way it evolved. They have got places in Canada up there in some of the reef areas, they have like 70 wells they drilled within a relatively small area by Calgary and nobody found anything.

TP: So, when you came back to the offshore division . . .

AB: I had been back and forth in that time in the 1960s. Actually, by 1966, I came down and I was in the onshore. By then, offshore Florida, offshore East Coast, were not in the offshore division. They were out of the Jackson office. That is how I got involved with those because when I was in those, I was in the Jackson. Jackson had everything at that time other than that.

TP: But you do not hear about it. I have never really heard about the East Coast area in E&P there.

AB: Well, nobody was interested in it. And at one time, I was working in areas thousands times bigger than prospectors and geophysicists looked at elsewhere. My work was more with like something as big as a carpenter's pencil on whatever. They were using microscopic things to do. But they were finding oil because I was in a well where you still . . . Jackson was, the concepts we used there and the kind of hydrocarbons we were finding were very different.

TP: That was necessary ground work for when they did stuff in the 1970s, Baltimore Canyon .

AB: The worst thing is sending guys from working in Louisiana where they were finding big terrific things and big sales and all that. Come up there and you have got South Florida out there to deal with. In Louisiana, you are there and you have got so many seismic reflections and markers and subsurface and all to work with. You go to South Florida and you have got, you know, almost nothing. There are some areas where you have got just little scraps around and you have got to justify every little deal on it. And it takes quite a bit of difference. It is kind of heartbreaking when you are there, you go to a meeting, and other guys show all this beautiful stuff.

TP: Difficult to compete with them.

AB: Yes, I became very unpopular. I went to a technical meeting one time, and we had people showing seismic data from Florida, how they processed it and all that sort of thing. So, what I did is I went back to my office and took absolutely 100% random information and did a seismic section on it. Then I took these fellows' processing system, ran that through and it looked the same. Their thing which was supposed to be an improvement, improved data. They were saying that the random data was no different than that. Actually, the friends of mine that were doing those finds, they did not like what they did. They were working as hard as they could to make

something out of it. That was a guarantee when you were working on things and you would get some kind of results, you would just find you try to make it turn into something. So, I was not trying to embarrass anybody, but I was just showing them, "Hey, look, we cannot do this. "

I do not know how much has improved. Some of our techniques have made it possible to do a little bit better in those areas. Just like everything else, I am sure that everything is going in the right direction but it is just not as easy to do these specific things. And you do not have the kind of structure. You do not have the salt domes in South Florida. You try to look at carbonates and some real subtle stuff. Everything is much thinner, much more difficult. Well, all of us had some of that experience, or most of us did. And Jackson was one. We had pretty good seismics. We had some areas which were the tertiary stuff, which was not too much different than offshore areas, particularly when they converted. They said everything onshore and offshore now. Then we inherited stuff onshore which would be not too different. It would just be onshore and not too different from what was offshore. And that would be, say, up to . . . Well, you know roughly, Highway 90 to the south is kind of a dividing line to the offshore and then about the time you get to Highway 190, which would be . . . Well, you go through the Appaloosas over to Baton Rouge there. Then most of the productions are shallow type things and younger type beds. And that has been pretty profitable for many years.

Well, I do not know where I am taking you.

TP: Tell me a little bit about the development of bright spot after you joined the offshore division. Were you around . . .

AB: Yes, I was pretty much in all of that stuff. But, of course, you know Mike Forest's story. You know about his stuff on there. Most of us in the geophysical end of it there said, "Well, yes, we see the bright spots. That is fine." Boy, Mike took it over and there were all kinds of theories. He kind of was responsible for selling all the stuff. And then, carried it to the place where our people in Houston in research kind of got interested in that sort of thing. It got more and more support as it went on. Until finally, by the time we got to the 1970 sale, it became a major use we had. There were some lesser sales before that type things and some development work, and all that pretty much convincingly showed that . . .

End of Tape #1, Side 2

Tape #2, Side 1

AB: . . . that Mike and some others had selected. I guess there were 30 or 40 areas where they thought that perhaps the reflection data that they had there would demonstrate, or was demonstrating, some association with the subsurface on it.

TP: Around the country?

AB: No, in the Gulf. No, this is offshore out there. And about that time, our particular type of deconvolution was beginning to catch on pretty well. So, what they wanted to do is they wanted to get somebody to look at this data and see how well it fit. Well, it sort of fell on this fellow, Dean Vanderstoop, who was a geophysicist, and Dean was in Houston. He was a kind of quiet, mild mannered guy, but probably a real ace when it comes to the brain stuff.

TP: What is his name?

AB: Vanderstoop. Dean was a very quiet, mild mannered type of guy. He and I went together and we tried to evaluate these things and find a system. And it was a real pain to try and figure out some kind of system. How will we evaluate what we know on there. So, everybody was cooperative and they gave us a lot of subsurface data and the seismic and all. And what we determined was that, yes, down to 5,000 feet, that most hydrocarbons, particularly gas . . . We almost got to the place where you could look at the sections and see, "All right, that is gas there." But it did not tell us much about the thickness of it or what the quality of it was. We realized pretty fast that one of the first things we learned is that there is not just a matter of a bright spot there, that the little puffs of gas can cause a bright spot and it would be

kind of misleading. But yes, it was effective. The interesting thing about that is it was effective. I mean, there was just no mistake but that is the gas or some gas.

TP: You could be fooled into thinking there was more there . . .

AB: You could be fooled if you did not know how to evaluate the darned thing. So, down to about 5,000 feet, we could say, "Yes, that is right." And then from, say, 5,000 to about 8,500 feet, we would say, "Yes, they are on there now. Now most of what we are looking at is kind of a mixture of oil and gas, one or the other. And we started seeing other things on there that the signs themselves were not little slim things. Sometimes we could see the top and the bottom. In other words, rather than just see a bright spot that is associated with a little piece of sand in there with hydrocarbons in it, you see the top and the bottom of the thing. And that, being fluids, they tend to have . . . Say, here is your convex feature right here, and you come down to here and it comes up. And here comes the sand up like that, and here comes the gases to a certain point in there that the gas and the oil are going to be separated by some sort of flat surface. Not really a surface but a flat whatever it is. So, we begin to see the places where you could see the bottom and the top of the darned thing. And then, there are a few places where we have got ourselves believing that not only could we see that, we could see the oil would go further on but it would be as outstanding quality. All these things . . . there were some areas, yes, by golly, that was the case. There were a large number of places where we

would get bright spots or things at higher amplitudes and you did not know what the heck they were - where they fit or what. Then we would go below that and you would see occasional places. If you go below 8,500, you would see occasional places where, by golly, you had a bright spot and you would not know why. You had found gas, you know. Some of the deeper gas things, it was kind of amazing because they were kind of outstanding. And then, we got the lab people involved. We did some ourselves trying to find out how well did this go with our expectations and analysis of what it really should look like. Then we saw the modeling and all of that kind of stuff.

So, what Vanderstoop and I did was we gave them some maps that showed possible areas and to what depth. These three general areas you would see them here. That kind of fits. And some places it works better than others on there. And so, that was the kind of contribution we made by doing that. And there, again, I say, we did not know what the heck we were doing!

We started to get into various systems to measure these things and as far as analysis of the stuff, I developed some stuff. The guys in the lab developed some systems for doing that. Mike and his group were trying to apply all of this stuff. And it worked out that there were some areas that things were working well enough that we could actually have the thickness. I forget the name of it. He was talking about Chuck Roripaugh. Chuck Roripaugh used one of the programs that we developed in my

group there to map the thickness. In other words, he just drew a map of where the darned thing was. As a matter of fact, it was so darned obvious that you kind of wondered how anybody could ever miss it to begin with. But he did a wonderful job in doing that.

Another fellow named Jules Lane. By the way, I had lunch across the table from him today. Jules, by the way, had his aortic valve replaced. He had it repaired about 1-1/2 years ago. I might have mentioned that. Anyhow, he did some really interesting work on the thing.

TP: And all this work you were doing, this was before or after the 1970s . . .

AB: This was before the 1970s sale. Well, I hate to say, but after that, it kind of became a political type of issue. And they moved in some other guys to take over what we were doing. And they sent Chuck and myself to the onshore to try and apply all of this medical stuff to what was going on in the onshore.

TP: It did not work as well as . . .

AB: Well, yes. What we learned was that not only did it not work, but in the kind of rocks that we were working in, the kind of structures, that actually end up with dim spots. So, where we really discovered that before is that you can go through a

certain place. The gas in there is going to make it actually have the effect of making it brighter, and the other places where actually it works in the other direction. It just depends on what depth and what the nature of the stuff is. And it is a very valuable area. There are not just rules that you can make that cover everything out there. We tried our darndest to look at things and by that time, onshore, we had the Texas data. We had inherited Texas as well. And the poor devils in Texas, they were really in malign because they were supposed . . . These guys in offshore Louisiana doing this wonderful work on there, and by that time, the guys in Nigeria had come in and had beautiful bright spots. They were beginning to work like a charm. And here, these guys . . .

TP: The Shell guys in Nigeria?

AB: Yes, a couple of them were actually people from the United States over there working with the Group over there. But we were not sure in all of the Group. So, we did not tell those guys. It was a terrible situation at that time. But the poor guys . . .

TP: You didn't share the concept of bright spots with the Group?

AB: No, you do not tell the guys over there. We did not tell them, and they were not telling us. Communication was horrible. They thought they knew something that

we did not know and we thought we knew something they did not know.

TP: They were doing bright spots, that group?

AB: Oh, yes. They were on the bright spots but they were taking different techniques of the thing. And though everybody was off doing his own thing in the bright spots, they were not necessarily sharing the poop.

TP: Was the group as successful as Shell Oil in making it work?

AB: That was in Nigeria. Yes. That was fine. They did a good job on their own. They did not discover. They were prompted into it by the guys that were using these things. A lot of it they would figure out themselves. Plus, a few of them were in the oil organization at one time or the other, and kind of had friends that were actually working over there in the center there to work. And so, it spread out where you could not control, once you find out it is working. The guys in Texas were the ones that were really caught in the middle there. The poor devils were expected to make use of them. Their minds actually telling them, "You guys have got to do something with it." There were a few places where it worked, but from an exploration point of view, Texas was already pretty well covered in the areas that would be worthwhile on that. So, we did not have many opportunities. But they were able to say, "Yes, well, here, to document that. Yes, it worked." But it did not give them any new

opportunities. So, there they are and had some pretty smart guys involved in the thing, and they are right there by the lab. It was convenient to talk to them. But the opportunities for them were not like offshore Louisiana. We were lucky in offshore Louisiana because the whole thing went together, and now you are creating superstars with something that works. I am not suggesting that politically there was anything wrong, it was just that it was a natural phenomena that we are dealing with here. If you look back, you would not expect to do it any differently. It would not work any different than that.

TP: You mentioned dim spots.

AB: Yes, there were some spots where we could actually demonstrate, and other people in the literature were beginning to see where the reflections that are associated with the hydrocarbons . . . You did not see the top and the bottom. The top and the bottom essentially disappear, because the total reflectivity of the top and the bottom become more identical over the other direction. The physical properties of the rocks change when you put the hydrocarbons in them, and it can go from making a higher reflectivity of the surface to less reflectivity. So, something that is reflecting good and looks like a good reflection on here, not necessarily a brighter reflection, but it looks like a good reflection. When you put the hydrocarbons in there, it can say, "Okay, there is less difference in the rock properties. With the hydrocarbon, it dims out. Now, the fire behind that, too, was that in those days, we were beginning to

have luck in Michigan. In Michigan, the geology is entirely different. But the way they discovered these little pinnacle reflect things up there was that, when you have got the hydrocarbons and these pinnacle reefs, they kind of go away. It is not entirely because the reflectivity is a result of the hydrocarbon. Part of it is that there is a reflectivity because of the physical process of creating little reefs on there. They are not clearly reflected. It has got a jagged surface compared to one that is the flat surface on there. Is this the depositional type of thing? And the critters chose that place to go out there and die and mounded up, it kind of corrupted the reflectivity of that particular wave.

TP: Michigan is a great story.

AB: Well, that is a real story for telling.

TP: So, we can sort of move up through time here. I do not want to take up too much of your time, but I would like to eventually get to work you are doing in the 1970s and then on with *Shell America*. Your bio says in the mid 1970s, you came back to the offshore division.

AB: Actually, I was not gone for all that long. I came back. And then, I did kind of special projects and that sort of thing. I actually, did quite a bit of interpretation. A lot of it had to do with sales. What I seemed to catch was towards the tail end of

some of these areas, they would find one that they actually had some experience in before. And they would think, well, he can do it faster and we can fly this other guy over here to kind of step in. There are two or three like that.

In one case, like in the border, there were some prospects in the early 1970s that I inherited where we were right on the border between what you would call Louisiana offshore geology and offshore Alabama and Florida type things. But they were included in the same sale back then. But the geology and the things involved in them were quite a bit different. So, I had a couple of those I kind of inherited during that time.

TP: Was that just about the time of Destin Dome?

AB: This would be about that time but it did not include the Destin Dome. This would be more like a shelf edge deal.

[PAUSE]

TP: We were talking about some of the sale work you were doing.

AB: Oh, yes, well it is kind of differentiated there. But I also did other similar things and some regional. I got kind of caught in that we bought some long regional lines.

TP: I have heard about this. You bought it from contractors?

AB: Well, see, what happened was, for some reason or the other, they thought that if you, for example, took and shot all of Louisiana on a big grid. You can go and buy little parcels in 3D. They were kind of little pieces. It felt like you were finding one piece of a jigsaw puzzle and you've got that one and you got that one. But it did not do much for the overall picture on there.

TP: They wanted these long grids because they were really starting to think about really deep water?

AB: Well, for several different reasons. It never was really understood how the geology worked out there. And when I was explaining earlier about having a big basin and the mini-basins and that sort of thing, it was a long time before we kind of realized that . . . I think what we did there to prove it is if you take and you just take 10 lines across and put them uniformly a distance apart. And I do not know what that key said. It is 150 miles. Every 15 miles, something like that. And he shoots those lines, and one night, you are trying to take things here and put them together over there. They said, well actually, that does not work. We did not realize at that time that you could not really do that.

The lines that were shot were not necessarily straight lines, but they were lines that we worked with the paleontologists and some of the geologists. As a matter of fact, Ed Picou, he was also . . . do you know Ed?

TP: You mentioned him and the work he did after the 1962 sale.

BA: Yes, well, Ed, we worked with him, and I guess, eventually, Chuck Roripaugh, on that. But Ed and I put out these lines across there, and we tried to make them nominally only 15 miles apart. I have forgotten exactly what it was. But they would also tie whatever subsurface we had or wells that had some peculiarity about them that would be significant on it. So, these lines went down, and they were not exactly like a bolt of lightning through there. But they kind of went through and tried to go through the . . . If there was a basin out there, we tried to go through because we had enough seismic of some sort to kind of know where these things were. We tried to get these lines and go through there. We would go from there off of the shelf edge on it. By doing that, we would have a set of lines that at least would be tied to the subsurface. And now, you are trying to get it all together. I don't think Chuck ever had or anybody had much luck with those particular lines doing that on there. But they were for scale. The big underlying salt masses out there and some other geologic phenomena that you could see in it would be where you have areas where all the data is aligned in a certain fashion - is up here and is like this and all. We were starting to distinguish between these different big packages on there. So,

instead of having much of the detailed information that you could take across there, there were things of a scale . . . if you see where I am going. There was just a scale. There were things that you could tie across there, and one of the things would be where the top and bottom of the salt mass were on there. So, we kind of know where the motherlode of salt was. Well, we did not really accomplish all that, but it was a step in the right direction. And some of that work for some of the geologists who were more of the pure geologist type and interested in how the world goes together and all, it meant a lot to them. Then, as far as the depth of various things happening and correlating that with even temperatures and all because the temperature in oil had to do with the maturity that you could expect. The area where the hydrocarbons were developed had to be a certain temperature to do this, that and the other thing. You probably have been exposed to that and I am far from an expert. I can tell you a little bit about it but not much.

TP: So, you were starting to put some of the big pieces together for the deep water or for . . .

AB: For whatever. No sooner than we had done that, talking about going off the shelf edge when now, they start saying, "Wait, maybe the turbidites are out there." In other words, these channels where . . . I do not know how much you know about the . . .

TP: Well, I know the turbidite geology is very productive.

AB: Well, that is right. Well, turbidites . . . the major channels and all that go through there. They flow like rivers down there. I do not know how many maps you have seen, but like a map of the Gulf Coast would be a bunch of little pieces out to the shelf edge and never went before that. Now, you can see where the turbidites went and where there are channels that exist where the materials is like coming down the present day Mississippi. They go up hundreds of miles out there to influence things. They got into another level or scale of what the Gulf looked like. Not only Shell but lots of people did that. Some of that is from the college type studies.

TP: You are talking about the late 1970s this was all happening?

AB: Yes, the late 1970s. It was just an ongoing thing. I do not want to speak for the other people. I suspect that from what literature that I used to read and all that they have been kind of into that for a while. Even, I guess, the guys at University of Texas were trying to do similar things off of the coast of Texas over there. So, the understanding of how this major basin and how all that worked was enhanced. A plan of where the turbidites went so you could expect what parts, what elements of the flow system at various times would deliver the right sized rocks and sediments out there and where the temperatures would be that you could expect the maturity of the oil and determine what size basins that you have got. I mean, you can go on and

on with all of this for the various individual projects.

When I finished that part, the regional type thing, I got back on the East Coast and did some interpretation off of Florida again, that sort of thing. And I eventually ended up back in the acquisition of part of the thing. And that is when I got back into boats again. During that time, I did not do much interpretation. As far as processing data and all, since it was in computer type work, and it was kind of a hobby sort of thing for me; I kept that up kind of on the side. I had always had some projects like that going. Mike and I wrote hundreds and hundreds of processing programs and data handling type thing. It was kind of like crossword puzzles in that it was fascinating. Some of them were programs that actually got adopted into the mainstream of the whole thing, which I was real proud of.

Back in acquisition, again . . . the reason I got into that . . . I am not quite sure, but they needed somebody that knew about ships and boats and that kind of stuff.

TP: Shell had its own seismic vessels, I remember, the three that they built in the 1960s. Did the company increasingly move away from doing its own seismic work and just contracting it out to GSIs and Western, or did they keep a fleet of boats through this whole time?

AB: Well, that is something I talked about in that article. I cannot remember exactly

what I said, but the general idea was some of the things you do in there would be in data interpretation and the way you handled things. And some would be regarded to fit in with the master plan. And some, like in the acquisition and all, had to do with a combination of things. The data processing and the way you acquired the data, and the hardware and stuff, you knew the way to do it. What happened in the late 1970s, was somebody kind of asked why they put the money in the budget to build the big vessel there. Things were getting further and further out there, and the boats we had were nice. But they just were not adequate for what we were doing out there. So that in the acquisition then, it was kind of funny, but what made it so much fun was that you just had to do what you had to do. In other words, if you are shooting in the desert, you do not need a vessel, you need something that goes out there. If you are going to be in the marsh, you need a marsh buggy or helicopter or something else. And so, the thing I was fascinated with was that you got to learn about so many different things.

At one time, I was on a helicopter crew. We were shooting at Marsh Island down there, and we had three helicopters. This would be in the early 1950s. And we shot the whole thing from using the helicopters there. In other parts of the country, they used helicopters for different reasons. We used helicopters, we used special kind of marsh buggies. We went to Florida, and we had to take special equipment down there. And the thing changes during the year. You go out there one time and you go through an area, and it is all smoldering and burned. You cannot breathe. A couple

of weeks later, you come out there, and you have got the cows out there and water up to here. You cannot get around it.

Well, something happened in the offshore that somebody recognized they needed to do something different. So, what happened was instead of building one themselves, they brought a fellow in who had the very same job that I had, who was a Dutchman. He had friends and associates over there in Europe. They had a different attitude. They would do everything with contractors, or they did at that time; not only the equipment but even the kind of computers and the processing they had. They had a different direction they were heading and I do not know how either worked out because everybody does not have to go the same direction to make it work. But his big thing was that he wanted this geophysical company in Norway, GECO, they called it. He made contact with them, and they said, 'well, we have got a boat that we are building and we will talk to you about putting it for Shell.' And we got these innovative ideas. Well, they did. They had some smarts. GECO were smart guys. They wanted to go with us because they knew, of all the companies offshore, we had the most experience in that type of thing. They could have gone with Arco, who had built the *Arco Resolution* at that time which was a big seismic vessel by itself. But everybody else was kind of looking for contractors as if different company type policies. I cannot think of his name right here, but at any rate, he talked them into chartering this vessel from GECO. And that was a good move because we learned an awful lot. We learned that the big vessel had these

advantages. And it also fit in with the big master plan with Shell. It was big enough and fast enough that we could use the vessel not only on the Gulf Coast in the summertime, but it could be like these crew ships, you could send it up to Alaska in the wintertime. So, that worked out fine. That is what inspired us to go ahead, but we found that GECO was also doing a number on us. Every time they would come out there and make a change, we would have to give some of our secret poop away on there, or what we thought was secret. I do not know it really was. But anyhow, that is when we started building *Shell America*, and it was at that time, you were either going to start just going to all the contractors or do our own deal on there. We had probably 150-200 men, Shell employees, that would have been good-bye if we did not. And also had different work ethics and abilities compared to the Norwegian/ whatever European nationalities they had on there. And that most of us felt that we would rather have our own people. Well, we did that and we kept it up as long as we could because it gave us a way to train. We did not know how many boats we were ultimately going to end up with. So, that is kind of how we got into that.

TP: And so, you were involved in . . .

AB: I was involved in the whole smear then, and in the meantime, we had other things come up. You will see a guy named Ziblich in there. Ziblich was an operator who was a smart guy. He had been in the seminary. He came out and went to a local

trade school here in town and learned about electronics and all. He became one of our key guys and things. He was responsible for innovative cable design. Nobody could do some of the things we could do with our cables. We also were the initial inventors of a bottom cable type thing that had useful applications for cancelling some of the reverberation type things we were talking about. Plus, we were probably one of the first ones to put in really long cables that you could record the different kind of wave. We had been doing reflection, and we had been recording different sorts of information. Most of the seismometers that we had, although they might measure pressures, what they were really doing is they were measuring the amplitudes of the vertical - things coming from below like that. What you did not see was the information that was coming in from waves that moved in that direction or even that direction. And so, we actually had a cable that had gimble little gadgets in there so they could measure the motions in this direction. The reason for that is that the shear waves that we were trying to measure do not have the vertical component. Sound like shear is this direction, and the reflective qualities of shear waves are different than the reflective qualities of the vertical. Exactly. Combining the information you get from the other with the horizontal on there. The two types, gives you some unique qualities . . .

TP: So, you were working on that because as far as I know, that is a big thing right now, the shear wave.

AB: Well, yes, but it is not exactly the same that we were doing. But we were pioneers in that. We were not the inventors of it. There was a lot of literature and stuff. But Shell had the foresight to let us spend the money. I mean, we were running with a pretty big capital budget in those days. And they had it up there . . . something . . . we had a picture in one of these books. I do not know, but the big boat for handling shear, I mean, they are some monster things. As a matter of fact, so big that I do not think they have ever used it for anything.

We did take special boats up to Alaska a couple of times and did some shear work for them. As far as the operation of the equipment and acquiring the data, we were like a contractor to the people up there on the West Coast.

TP: Can you tell me about the launching of *Shell America* again?

AB: The launching of it?

TP: We were looking at this photo beforehand. Did it hit bottom when it was launched?

AB: It did. It was kind of funny. To kind of sum that up, the interesting thing with the *Shell America*, right from the very beginning, was that everybody in Shell wanted to come up and be there to see the laying of the keel. Well, actually, the way *America* was put together is the same as most modern ships now. It is different

compartments and parts. And it is just a bunch of boxes you put together in a certain fashion. There actually is no laying of the keel. What we had to do is we made a deal with the Marinet marine people up there and had them . . . We went to a big storage warehouse up there and put a flat piece of metal out on the floor. A welder wrote into it *Shell America* launched this, such and such a date. And we had our dignitaries come in there and arrange a dinner that night for the six or eight Shell people who flew up there to witness this thing. So, we had a little celebration for the launching of it. I do not know whether that was every used. I do not even know where that piece went.

So, eventually, it was all pinned together, boxed up. A lot of funny things happened on there. One of the funny things . . . This fellow Ziblich, I have to laugh about him. On the bottom of the ship, ordinarily we had these things that were at the bottom of most big ships to make measurements and velocity and soundings, various things. It is like a hydraulic pole, only instead of going this way, it goes that way.

Even telescopes. So, we had a room and all designed to put the thing in. So, one day, they came to us and said they needed to put this thing in there. It had been delivered, this device that we had, and I figure it was about 30 feet long. They said, "We have a little problem. How do we get it into the ship?" And so, luckily it ended up we found a spot where the elevator shaft had been in the ship and we were able to take that thing down through the elevator shaft and bring it over and, with very little

damage to anything, put that darned thing into the bottom. Boy, we got by that one! Ziblich, I never saw him get confused but for a while there, he was kind of puzzled on how that was going to work.

So by that point . . . When it came to launch, we had Billy Flowers who came up there, had some plain little guys from Houston, and the company up there put on a nice dinner to celebrate the launching of the ship, and guess what? When they went to put that thing in the water, it banged on the bottom and bent the shaft. We had to have it towed over to a ship yard across Green Bay. I do not know if you are familiar with the geology . . .

TP: I went to school in Wisconsin.

AB: Well, then you know what it is. We had to go across, we had to get it towed across Green Bay to about three or four yards where they built small vessels over on - what is that piece of land that comes up from Green Bay?

TP: Door County?

AB: Yes, whatever. They had a shipyard over there. They handled it, and they were able to replace that shaft and the propeller and all that on the thing. It was like on all ship launches when the lady breaks the thing on there, it usually does not break. Until

finally, I think they had a fellow sneak up there with a sledge hammer and finish the bottom. For the picture, they had to figure that one out.

The other thing was the Marinet River, in Menomonie, Michigan and Marinet are right across the Menomonie River. It is the Marinet River, I guess, there, because the Menomonie River is down by Milwaukee. But anyhow, the people who worked on the ship and their families were all excited about coming out there and watching this launching. Everybody in that area was pretty much involved because this was the biggest thing to hit that part of the country in a long time. The cost of that ship was probably several times more than the cost of the shipyard, and, at that time, there were not many people up there working. They had a . . .

TP: It was forty something million dollars.

AB: Well, that did not go to them.

TP: But that was the cost . . .

AB: The cost of the ship, and they were kind of responsible for it because a lot of that was the equipment. A lot of the cost was in geophysical type stuff. Those big compressors and all were a big hunk, plus the technical stuff that went on there. But nevertheless, I had quite a battle with them up there because when we went to do

that, they had a genuine type of workers. Well, I will not get into that, but what it is, their union is a little different than most unions. And we were scared that they would have a strike. We needed to get the ship out of there. If they started in say, June of one year, we needed to get the ship out of there by, say, October of the next year, or you could not get through the ice. We had to go out through the St. Lawrence sea way there. And we knew; we had the statistics on when the thing froze over and all that. And we knew that there was a cutoff point where you cannot get through. So, we worked out a deal where we would give them a reward if they found early, and they would pay us a penalty if they were late and all. So, the other thing was their union striking on there? I came back to Shell and told them that I did not have any control over that. The word was, you cannot do it if they will not.

So, I am on vacation down in Florida. I get the phone call and they say, "Well, we cannot do that." "What do you want us to do?" "Well, what you need to do is" . . . he said the unions had voted against it and they did not want to do it. They asked me what to do. I said, "Well, just keep voting until you get it right!" So, they had a big campaign up there. They enlisted everybody in that part of . . .

TP: The no strike pledge?

AB: The no strike pledge and all that kind of stuff. So, they came back and said, yes, they would do that. So, they had a big interest in this thing. But when the families

came out there, they were across the river and they were all lined up out there. The thing hit the water with a bang and guess what? There was a tidal wave that went over it and a bunch of people . . . Swish! It hit half the town by the tidal wave!

TP: With the wave?

AB: Oh, yes. It was a big wave. And those who were on the other side, were not used to all that . . .

TP: I see the picture.

AB: Well, you cannot tell there. When it hit the bank . . . It was small in the water. The wave was going across and was kind of small in the water, but when it hits the bank, it goes out there. It piles up. In other words, it was more than . . .

TP: It was an accumulation of waves.

AB: Yes, it was an accumulation. It just went up and bingo! I had to laugh, and so did everybody else when this happened. But at first, those of us on one side of the ship could not see too much, but we knew from the crowd. You could hear the crowd screaming and hollering! My God, I hope we did not drown anybody!

TP: That is great. I do not want to take up too much of your time. You have really been generous.

AB: Well, you got me talking here.

TP: A lot of things I had questions on. This has been great. Is there anything else you can think of that you would want to add?

AB: The famous trip of the board of directors to see *Shell America* was funny. I do not know whether you have met Bob Howard. Bob Howard was the president of Shell Offshore, and Mike Forest was the company exploration manager at that time. The board of directors were going to meet in New Orleans. So, they said, "Well, you need to arrange something for the board of directors here. This will be our entertainment for them.? Well, what would you like to do? They said, "Well, we want to take them out to see *Shell America,* but we do not want to give them a long trip." We do not want to do this, that and the other thing. "But above all, we do not want to do anything that would appear to be disrupting our work just for the sake of showing it to the board of directors. By the way, we need to make up this little booklet" . . .

End of Side 1

Tape #2, Side 2

AB: . . . this is the *Shell America*. This is Washington, D.C. This is the marine technology deal. I went up there and gave a talk on it. Boy, did they give me a tough time. We did everything wrong!

TP: You gave it to the MMS?

AB: The marine technology guys up there. I do not even remember the details of it, but they were . . . it was tough because they were not very nice about . . . this book and Bob Howard told me in general what was supposed to be in here. And this thing, I will bet these little books cost $150 apiece by the time I put in all the changes. A little pamphlet telling this is . . . The original plan was this: when the storm started coming in, they had about 8 to 12 Bells lined up to take these guys out, escorts to take them out to the ship.

TP: Once it came out of the Gulf you are talking about?

AB: We had it and we actually took a dummy line which we told them was part of a big important thing that we have got going on. Because they said, "We do not want to take them off a job to do this, but, on the other hand, the only way we could make it work is have it within range of the airport." We did not want to take everybody

down and have a big fuel stop on the way and fly for two hours out to where the ship was. So, we managed to work it to have them come back in. And so, anyhow, these helicopters belonged to a bunch of different companies. We only had access to certain ones and certain contractors, but we were able to get enough of them. But when the storm started coming in, they would go to helicopters. Everybody was saying, 'hey, we need our helicopters for . . . '

TP: Evacuation.

AB: . . . evacuation and all that sort of thing. And they said, 'Well, you have got to do something else.' We said, 'O.K. Well, we are going to have to come in anyway.' They said, 'Well, you only can come in if it is really necessary.' So, they said, 'Well, we have to come in over at Gulfport in Mississippi.' And incidentally, we got over there, there must have been six or eight vessels that came in because of the storm out there. So, the next thing was . . . I will look at whatever you want to look at here. Here is all the stuff. That is what Bob Howard wanted to do on the thing. The funny part of the story is, is that the morning they finished the board of directors meeting there and Bob Howard, who was a stickler for getting everything just right, he said, he said, "Do not worry. You guys cannot screw this up" like we had anything to do with this! He said, "I will get my secretary to arrange for a bus with a PA system and all of this stuff to go down to Gulfport." So, the board of directors were meeting that morning, and two or three of us went over to look and see what

this bus was that drove up. It looked like the board of directors was a pretty big crowd of guys, had a lot of paraphernalia that they had taken with them. The thing looked like one of these airport vans, you know, if you are taking people out to the parking lot, with about 10 suitcases. Oh my God! At any rate, we got up and asked Howard out of the meeting and said, "This bus your secretary got is not going to work, and we had one of our people do the . . . "Believe me, sir, they do this all the time, moving people." He said, "O.K., do not screw up!"

We had to borrow a bus. The Tulane University was doing some construction work on their campus, and they had the parking lot all fouled up. And they had an auxiliary parking lot and they had chartered this bus from I do not know where. But it was a nice big limousine type thing, this bus that they chartered. So, one of the guys in our department, they were talking to the rental company there, and taking this bus off and putting something smaller. Or a couple out on Tulane's deal and gave us this bus. So, we bring it downtown there and they are still just about to finish their meeting there, the bus pulls up and this black driver of the bus there . . . They are all rushing over to the other little bus, and they had about two or three little ice chests of goodies, all kinds of booze and everything to put on the bus there. So, the bus driver and I and another guy were trying to put all of this stuff onto from one bus to the other. And who comes in but one of the big shots from upstairs, an Englishman who had climbed Mount Everest - one of these guys that had done everything. Nice man. He comes out and he steps onto the bus. Guess what the bus

driver said? "Hey buddy, are you going to be the bartender?" But he had class. It just went by him like in one ear and out the other ear. I told the bus driver, "Please do not worry. That has been taken care of!"

TP: Do you remember who the guy was?

AB: Forrest might remember. He knew those people. He had worked with the board of directors a couple of times. Mike would probably know.

TP: The board of directors for Shell Oil.

AB: Yes, the board of directors for Shell. He would know. Do we have a list of the board?

TP: I do not see the board listed . . .

THE END