BOEM DEEPWATER GULF OF MEXICO HISTORY PROJECT
OFFSHORE ENERGY CENTER HALL OF FAME

Interviewee:	Drew Michel
Date:	October 10, 2009
Place:	Houston, Texas
Interviewer:	Tyler Priest

Ethnographic preface:

Drew Michel was born a native of south Louisiana, where he naturally gravitated to the oil patch. Michel left his home in Morgan City in 1960 to join up with the U.S. Navy, after which he worked for both Honeywell Electronics, in California, and NASA. On a trip back through Louisiana, Michel heard about an open position at Ocean Systems, having to do with deep diving, and he joined up. Michel soon moved on to Taylor Diving in 1968, and stayed there for eighteen years. Taylor deployed both divers and early-generation ROVs at Shell Oil's massive Cognac fixed platform in the Gulf of Mexico in the late 1970s. Michel was also involved with the installation of the Auger tension-leg platform, and continued to provide ROVs and subsea expertise to the offshore oil and gas industry for decades afterwards.

File 1

TP: This is an interview with Mr. Drew Michel for the Offshore Energy Center Hall of Fame induction in 2009. The interviewer is Tyler Priest. We're in Houston, and it's October 10, 2009.

Let's start out with some background. Tell us where you're from and how you got into this business.

DM: I was born in Morgan City, Louisiana, which is probably a good reason I wound up in the oil patch. I actually left Morgan City in 1960 to go into the navy. I studied electronics in the navy, and after the navy I went to work for Honeywell Electronics and then for NASA.

TP: When did you go into the navy?

DM: I went in the navy in '61.

TP: Did you know Hank Van Calcar when you were at Honeywell?

DM: No, I didn't.

TP: I guess maybe he was a little later.

DM: Well, this was a division in San Diego that made test instrumentation. Then I actually saw an ad in the San Diego newspaper when they were preparing for the moon shot. That was 1965. The interesting thing, I actually answered the ad, interviewed, got the job, went to Bay St. Louis, Mississippi, and decided to quit the day I got there. So it wasn't what I thought it was going to be. It was a bureaucracy; it was boring; it was just not what I thought it was going to be. It took me five months to decide to leave.

I was actually headed back to San Diego to my old job at Honeywell, and I stopped in Morgan City to see my mom and dad. And when I stopped in Morgan City, an old high school friend said that a company called Ocean Systems, which was owned by Union Carbide at the time, was starting to do deeper diving and needed an electronics technician. And I never, in my wildest dreams, thought I'd end up back in Morgan City, but I took the job.

TP: Did you ever make it back to San Diego?

DM: I never made it back to San Diego, much to my wife's chagrin. She's from San Diego. I met her there, brought her to God's country in Morgan City.

While I was at Ocean Systems, I was only there eighteen months and Union Carbide decided to sell Ocean Systems and get out of the business. The interesting thing about that is Union Carbide had actually purchased Ocean Systems to go into deepsea mining, subsea mining. Remember that? They were back in the sixties.

They quickly realized that was not going to be a viable enterprise, so they decided to get out. And when they decided that they were going to sell the company, of course, there was no more money for research, no more money to build the company, they weren't interested any longer. About the same time, Halliburton had purchased Taylor Diving in Belle Chasse, and when I say purchased, they purchased 80 percent of the stock, with Mark Banjavich retaining 20.

TP: Is this when they acquired Brown & Root?

DM: I actually saw the letter. The letter says, "Halliburton purchases Taylor Diving & Salvage Company of Belle Chasse, Louisiana, and assigns it to Brown & Root for operational purposes." They had already purchased Brown & Root at the time. So they purchased Taylor to be a division of Brown & Root.

TP: Hadn't Taylor worked with Brown & Root?

DM: And that was why. The reason they purchased them is because they were already on all of the Brown & Root barges, and they said, "Hey, why don't we put this money in our pocket?"

TP: So you didn't stay with Ocean Systems long.

DM: Eighteen months.

TP: Who did Union Carbide sell it to?

DM: The Singer Company.

TP: I talked to Dick Frisbie this morning, but I didn't get this whole corporate history of Ocean Systems.

DM: And later on it was sold to a rope—something rope, but I don't remember the name, but it traded owners—

TP: Then eventually to Oceaneering.

DM: —several times, then eventually to Oceaneering.

TP: So when you went to Taylor Diving, what year was that?

DM: I went to Taylor Diving in June of 1968, and the reason I went to Taylor Diving, that's an interesting story in itself. It was Thursday afternoon and we were all sitting around the coffee mess having coffee. We were all bored, had nothing to do, business was bad. A diver named Don Terry, he walked in and he threw a magazine down in front of me, an *Ocean Industry* magazine. It had a very short article that said, "Halliburton buys Taylor Diving, and to build a 4-million-dollar research center in Belle Chasse." And he said, "Drew, you don't belong here with us old divers. You belong at a place like this."

I picked up the magazine. At eight o'clock the next morning I was literally sitting on the front steps of Taylor before anyone got there, and when the guy who came there to open the door, who was actually the business manager, he said, "What are you doing here?"

I said, "I'm looking for a job." And he unlocked the door, and I went in and I got the job, and I stayed there eighteen years.

TP: What kind of work were you doing with Ocean Systems before that?

DM: I was an electronics technician. They were really just at that time getting beyond the tender pulling on the diver's hose for signals. They were just getting to the point where they were trying to get reliable electronics or voice communications in the divers' helmets. Now, you have to remember, in those days we were just making the transition from hardhats,

I mean literally big brass suits, canvas suits and brass hats, to light gear like they're using today. In fact, the interesting thing, one of my first jobs ever in the industry was changing the cardboard speakers in one of those old hardhats. [laughs] You know we've gone a long way from those days.

TP: I've seen those big giant things.

DM: And some of the divers that I worked with in those early days at Ocean Systems had a tough time making the transition from hardhat diving to the light gear. They just didn't trust it. They felt safe and comfortable dry in the canvas suit, with the big heavy boots and the big helmet on them, with a pocket of air around their head, and getting them to wear light gear and to make that transition was a tough challenge. Some of them didn't make it.

TP: So you showed up at Taylor's doorstep in Belle Chasse.

DM: Yes, and it was really—talk about timing, I mean, I literally showed up, and these guys at Taylor then had all just gotten out of the U.S. Navy Experimental Diving unit. They were all Experimental Diving unit guys. Ken Wallace was actually the enlisted head of the experimental diving unit when he got out, and Bob McArdle worked for him, and George Morrissey was there. These guys were the icons in navy experimental diving. The thing is, none of them had any electronics or technical experience. They were all navy divers.

So when I walked through the front door, it was like manna from heaven. Somebody that can put two wires together. So it really was perfect, and we started building that research center in Belle Chasse. I mean we literally sat down and brainstormed over lunches and on pieces of paper, and drew it out and laid it out and designed it. It took us a couple of years to build it, and it really became the premiere diving research center in the world. In fact, during that period of time, the naval experimental diving unit in downtown Washington, D.C. was shutting down. They were actually closing it down, and the new navy facility in Panama City wasn't built yet. So Taylor Diving became *the* place that the navy did their experimental dives. So we were very instrumental in all of those dives.

TP: Taylor Diving was like the seed for other commercial diving companies. It all came out of that.

DM: Absolutely. Yes, it all came out of there, including the people. In fact, we used to joke that we trained the world, because we would train guys and then other people would hire them away for more money. But it was a great time, it really was. And, of course, we just kept pushing the limits of diving. We were making working dives in the Gulf of Mexico to 1,000 feet. The Cognac platform in 1977 was one of the deepest working dives. I mean, there were a few after that. I think the deepest was seventeen hundred feet by Global Industries, but not very many. It was a rare occasion to put divers in 1,000 feet, and we realized that something had to happen.

We had to make a transition from diving to something else. We didn't know what at the time, and we tried manned submersibles for a while. We tried the arms bells. We tried manned submersibles. The arms bells, being a bell that went straight vertically and had no horizontal movement, but two men were inside the bell dry and remain at one atmosphere and operate remotely operated arms outside the bell. It was great for drilling support, because you just hang it down on a drilling riser. There's no need for horizontal excursions. So it worked great for that specific task, but it wasn't any good for anything else, and it was very awkward and very hard to do a task.

So we tried to go to manned submersibles, and Brown & Root, in particular, tried to go to manned submersibles because of pipeline excursions, because there you did need long horizontal excursions on the bottom. The problem with manned submersibles became clear pretty quickly: limited bottom time, there was a risk for human life. Even if the guys weren't at risk for their life, they were uncomfortable, cold, miserable; they didn't want to stay down very long.

In fact, in the early seventies, we spent a year completely refurbishing a manned submersible that Brown & Root had purchased. It was the *Perry PC-9* boat. We completely refurbished it, built a dedicated vessel for it, got it all ready to go, spent millions of dollars on it, and never put it to work, because just about the time we were finishing it, was when we started trusting ROVs. So while we didn't skip the phase of manned submersibles, it was very short-lived.

TP: What year was that when you had that *Perry PC-9*?

DM: I remember correctly, that would have been about 1975, ’74, ’75.

TP: Did you do diving yourself?

DM: Well, I never dove commercially. One of the things that got me interested in going to work for a diving company, I was scuba diving as a hobby.

TP: I don’t mean to interrupt. So you’re moving on from the *Perry PC-9*.

DM: Yes. Shell Cognac, which actually went in the water in 1977, was really the first major use of ROVs. There was some work done on the Hondo platform out on the West Coast prior to that, but that was just inspection work. First major construction project was the Shell Cognac platform.

TP: Was Taylor Diving doing the ROV work? Tell me more about that.

DM: Well, Taylor Diving actually had the contract with Shell to do the diving on the Cognac platform, which went in 1,030 feet of water, what we considered the limits of saturation diving at that time. So while we were preparing for that project, and this was a very long preparation, more than a year, I was actually doing some work with a company called Hydro Products in San Diego, California. They provided all of our underwater lighting and our television cameras, the cameras that the divers used and the fixed cameras we had on the bells. The navy was doing a lot of work with Hydro Products at the time, which had, up to that point, been classified.

So the navy finally decided to release the technology. I think they called it Building 4 or Building 8, I don’t remember, but it was another part of the factory that nobody could normally go into, and they finally said, “Okay, you can come in here now and look.” And they showed me what eventually became the RCV 225. It started out as something called a *Tortuga*. It didn’t have propellers; it had water jets. Think of a pony keg with a television camera mounted in one end and some water jets on the other end.

The reason it was shaped like a pony keg and was that size was because it fit in a torpedo tube. So the submarine would go down, the *Tortuga* would fly out and do whatever it had to do, look at whatever it had to look at, and do its mission, and then hopefully they get it back in the torpedo tube and close the door. The problem with the *Tortuga* was that it had very limited maneuverability because the water jets just weren't powerful enough to maneuver it well.

So then they went to another vehicle, and I don't remember what the navy called it, but it was a twenty-six-inch-diameter sphere with four thrusters on it, two transverse thrusters, and transverse meaning they're at an angle pitched up, and then two longitudinals for forward movement, and that became the RCV. The commercial version became the RCV 125, and then later the RCV 225; and those were the first widely used ROVs in the industry.

TP: And who built and sold those?

DM: Hydro Products, which later became a division of Honeywell, which later became a division of Kongsberg.

TP: Did Taylor have those for the Cognac project?

DM: The first RCV 125s were sold to a company called Seaway Diving in Norway. The next two were sold to a young independent company in the Gulf of Mexico called Martech. In fact, they're the ones that did the Hondo inspection on the West Coast.

TP: With the 225?

DM: With the RCV 125, actually, and then the RCV 225s. Taylor Diving had serial numbers. Serial numbers 1 and 2, I believe, never really existed. I think those were military. Serial numbers 3 and 4 went to Seaway. Serial numbers 5 and 6 went to Taylor, and then Martech, I don't remember, had 7 and 8 or something. Anyway, Taylor had seven of them total, and out of the seven, we lost about five. We lost all seven at one time or another, but we recovered a couple of them.

TP: I think I read—were you the one talking about you lost your first two ROVs?

DM: The first time we went out. And that's a great story. We had this saturation diving contract to do the Cognac platform for Shell, and someone at Shell—I guess because of my sales pitches—I went in to Shell several times and said, "Look, we can augment the diving with these flying eyeballs, with these little new ROVs, RCV 225s." And I said, "Give us a chance."

Well, in those days, of course, everyone was skeptical. They said, "No, we're not going to do that." And then finally someone agreed. They said, "Well, look, we'll give you a chance. We've got a little pipeline job to do in about 300 feet of water. Go out and do an inspection of this pipeline and riser and platform with them, and if you can prove that they work and that they're reliable, we'll go along with you, and we'll give you the Cognac project."

So I went out the first day, we took one RCV 225 out, and we lost it on Good Friday. The tether broke and it actually dropped to the bottom. So on Easter Sunday morning I had the second one flown in from San Diego, and went to rescue the first one with it, and lost it too. [laughs] So I actually lost both. By the way, there was no insurance on them in those days, because we didn't know how to insure them. The insurance company didn't even know what the venue would be or how to insure these things.

TP: How much were they?

DM: The vehicle, the ball itself, the eyeball itself in those days was only $500,000, so it was peanuts compared to today. They're 5 million today.

TP: But "only" $500,000. [laughs]

DM: Yeah, "only" 500. But it was funny because, you know, I lost the first one. I convinced everyone back at the office, instead of sending divers out to get the first one, I said, "No, no, we can do it with the other one. You don't need to send divers." They sent the second one and I lost it. [laughs]

TP: Were you able to recover those, either one of them, with divers?

DM: One of them we never found again. It's gone. It's never been seen, and I suspect I know what happened to it. When the tether broke, it broke just far enough away from the vehicle that it made the vehicle just buoyant enough to float off the bottom, to not sink and lay on the bottom, but not float to the surface. It just floated off the bottom, and it was carried south by the currents out into deeper and deeper water, until it just went away.

The second one actually floated, and floated around in the loop currents in the Gulf of Mexico, and I think it was three months later that it turned up on the beach in Grand Isle, and a Brown & Root welder found it on the beach in Grand Isle, buried in the sand, and we gave him a $5,000 reward for recovering it.

TP: Good for him.

DM: He literally dug it out of the sand, put it in the back of his pickup truck, and drove it to Belle Chasse.

TP: Did he know what it was?

DM: Yes, he knew. We had a plaque on it. We had a brass plaque on it. But he actually brought it to us, and he would not give it to us until we gave him the five thousand check.

But the funny thing about that story was that Sunday, of course, Easter Sunday morning, I called my boss, who was Ken Wallace, and I said, "Ken, I've got bad news. I want to come in and talk to you."

And he said, "Drew, I don't want to talk to you. It's Easter Sunday morning. I'm here with my grandkids. I'm not going to talk to you."

So I wrote my letter of resignation and got it all prepared, and I went in Monday morning to see him, and his secretary said, "No, he doesn't want to see you. He won't talk to you."

So I sweated all day long on Monday, and Tuesday I went back again and he let me sweat most of the day Tuesday. Finally, Tuesday afternoon his secretary said, "Okay, he'll see you now."

So he had me sit down in the chair, and he said, "Okay. Tell the story." And I told the whole story, which was rather long. And to give you the short version, the reason we lost those vehicles is because, number one, we didn't know what we were doing, I mean, it was brand new, we were all learning. But, number two, we were all trying too hard and we had been awake too long. We weren't getting enough rest. In fact, when we lost the first one, I had been awake thirty-six hours. I had been on deck thirty-six hours. Well, we don't do that anymore. Now there are rules against staying on deck that long now.

But he let me tell the whole story. We sat there for several minutes, he looked at me, and said, "Go upstairs to accounting and tell them to give you some more money, and go back to work." So that was the end of the story. That's how it worked in those days, you know. He said, "Buy two more and go back to work." And then we did convince Shell that we could make them work.

TP: So you got two more, and you actually did the inspection of the pipeline?

DM: Got two more, finished the inspection, and then got on the Cognac project. There's an interesting thing on the Cognac project too. On the Cognac project the divers were saturated at 1,000 feet. Some hoses got tangled up at 600 feet. Now, normally, if we had not had an ROV on board, there would have been no other recourse but to start decompressing the divers. Now, you've got two derrick barges on site, a tremendous amount of other equipment, you know, millions of dollars per day sitting there installing this platform. If there had been no ROVs on board, we would have had to wait four days while those divers decompressed from 1,000 feet to 600 feet, just to climb out of the bell and undo those hoses. It would have taken five minutes to do it, but it would have taken four days to get them there.

So with the RCV 225, we were able to just fly up to the hoses, and there were no manipulators and all, it was just flying eyeball, but we actually made some little appendages on the front of it, where we'd just go and pick at the hoses until we untangled them. That saved four days. So we saved 4 million dollars worth of barge time in that one incident. So everyone right there everyone said, "Hmm. Maybe we do have something here." [laughs]

TP: Even though they weren't working ROVs, they were mainly just, like you said, the flying eyeballs.

DM: That's right. And there were many other things that we did with those ROVs in those days, even though they were a flying eyeball. One time a platform had been installed, again in several hundred feet of water, saturation diving depth, and someone had forgotten to put a simple pipe plug in the bottom of a grout line, so that when they started grouting the legs in on the platform, the grout was just pouring out on the seabed, and I mean, it was a disaster. They would have had to mobilize saturation diving. It would have cost millions.

We actually—and when I say "we," I've got to make it clear that this is—by this time, I'm back in the office and these are technicians who probably will never get interviewed like this, but they're the real heroes. But these guys said, "Okay. No, we can do that." So they got a plastic, a regular plumbing plug like you would use at your house to clean out a drain line, plug a drain line, and they put one of the spare RCV motors, made a shaft and put it on that plug, and went down and screwed that plug in, and saved again, mobilizing a saturation diving system. And there were many episodes like that, many things like that in those early days.

TP: They found new uses for a remote operated vehicle.

DM: Exactly. And then, eventually, of course, we worked into open-frame vehicles. For a period of time, a company called ISE, International Submarine Engineering, in Vancouver, British Columbia, was building an open-frame electric vehicle at the time. Perry Oceanographic was building another open vehicle.

TP: What do you mean by open frame?

DM: The RCV 225 was literally a ball, looked like a beach ball or basketball. Everything was enclosed inside syntactic foam. These vehicles had a block or a slab of syntactic foam high with an open frame hanging below it, and all of the thrusters, the motors, the mechanism was all on that open frame. So now you could bolt things on the vehicle, rather than them being internally in the vehicle. In fact, the demise of Hydro Products was that they refused to make the transition. As we started getting into bigger and bigger vehicles and were looking at putting manipulators on them and

actually trying to do work with them, we kept going back to Hydro, because they were our go-to company. And we said, "Look, this is what you have to do."

Well, they were very—I'm trying to figure out what word to use—obstinate. And they just said, "No. This is what we build. You either buy it or else." Well, guess what? Everyone quit buying it, and they went out of business, whereas other companies, like Perry and ISE, they did say, "Okay, what do you want? We'll do it."

They started out with electric vehicles and we quickly realized that we could get more bang for our buck. We could actually take one electric motor, driving a hydraulic power supply, and then running various hydraulic motors and tools off of that hydraulic power supply. We could get more done, more cost-effective. Better than more cost-effective, we could get it done more power-effective, less power going down the umbilical to perform multiple tasks. That's why we went from electric to hydraulic.

I'm going to jump ahead thirty years. The interesting thing now is that they're learning more about electric vehicles, we're actually going back to electric vehicles. Now, the big powerful, huge work-class vehicles are going to stay hydraulic, but in a lot of the work that's being done offshore now there is actually a trend to go back to electric vehicles, but that's a story for later.

At the time, Perry Oceanographic in Riviera Beach, Florida, AMETEK Straza in San Diego, California, and ISE in Vancouver were really the three companies that started manufacturing open-frame vehicles. This is in the seventies, so the seventies was really the big transition into ROVs.

TP: What kind of capabilities were added over time for ROVs, as they were building successive generations of these things?

DM: The first thing that was added was sonar, in addition to the black and white television cameras. The television cameras improved dramatically. The ROVs are a perfect case where we borrowed technologies from other places. We could never have developed this technology ourselves. Only budgets like NASA could do that. For instance, right now, the TV cameras that we're using on the ROVs come out of the consumer industry.

I mean, now you can practically have one in your pocket that's lower light level and higher resolution than anything we could have dreamed of in the early days.

So they're just repackaging consumer electronics now in the ROVs. Better television cameras first, better and more effective lighting, neck sonar. Sonars are constantly improving. And then we went to manipulators; first simple electric manipulators, then more robust hydraulic manipulators. We tried to make a giant leap with manipulators into electronic arms; the arms on the front, mimicking your hands and arms.

The first thing, again, was a government contract. The government contracted General Electric to build something that's commonly called the GE arm, which actually had force feedback. Now, force feedback is an interesting thing. When you press on something, you feel it and you know that you're pressing on something so you know to stop. With all of the arms on all of the ROVs in the world, when you press on something, the only way you know that you're hard up against something is because you see it. You can't feel it in your joystick. So General Electric got this contract from the government to build force feedback arms, where you would have that force feedback into the master controller. The problem with that, it was very complicated and very expensive. So even though those arms were built in the seventies, they're still not in use today, even with all the new technology.

TP: So there's no force feedback today?

DM: There's not force feedback. Because the complexity and the cost, we just have not made the case to do it. I would love to have done it on many many occasions in the past, but if I go to Shell Oil Company and say, "Shell, the manipulators I've got on this vehicle now, your day rate is $3,500 a day. I can put force feedback on it, and that's going to bump the price up a $1,000 a day." They'd say, "No. What are you going to give me for that?" And the answer is, "Not a lot." So the technology is there, but is the need there? And the answer is no.

TP: It doesn't give you a whole lot more than what you get when you're already seeing what's happening down there.

DM: What we did transition to was rate manipulators. The early manipulators and a lot of the manipulators that are still being used are what we call rate manipulators. If you think about a manipulator, it has different functions. You have a wrist function, a hand function, an elbow function, a shoulder function. With a rate manipulator, as that manipulator is sitting out there, each function that you move, you've actually got a row of toggle switches on your control console, and you hold one toggle switch down to open a hand, you hold it the other way to close the hand; you hold another toggle switch down to move the wrist, and so forth. So that's called a rate manipulator. It's very inexpensive, very reliable, because there's not a lot of electronics and feedback pots and things in the arm.

Now, the transition that we did make was to something called the spatially correspondent arm. Spatially correspondent means that the operator has a master controller that mimics—it's like a small model of the arm on the vehicle itself, and as he moves this thing in real time, the arm mimics his movement. So now if I'm going to reach over here and grab this, instead of doing like this with toggle switches to grab it, I've got a fluid motion just like the motion of my—

TP: When did that come into play?

DM: That actually came in in the late eighties and became reliable pretty fast. Several companies tried it, a company called Kraft in the early days. The company that really succeeded was Schilling Robotics. Schilling is in Davis, California, and they are the Rolls-Royce of manipulators in the world. Everyone in the world who uses ROVs, and even the companies like Oceaneering International and Subsea 7, who build their own ROVs, buy their manipulators from Schilling Robotics.

TP: Is there any crossover? It reminds of surgeons. You see surgeons using robotics in microscopic operations. Is it the same principle?

DM: Same principle, except if you can imagine, theirs are very delicate. They don't have very much strength, but they have a tremendous amount of resolution and delicate movement, whereas ours are more robust and strong. Some of our manipulators can actually reach down and pick up hundreds of pounds, whereas surgical manipulators can't, but it's the same principle.

Schilling provided us with that spatially correspondent manipulator, and that was a big step, because now a job that you might take two hours, if you could do it in twenty minutes with an SC arm, spatially correspondent arm, it's a big deal. Two hours doesn't sound like a lot of time, but when you got a $600,000-a-day drilling rig waiting on you, you know, two hours is a long time. So the oil companies are willing to pay the extra money for the SC arms.

TP: Are most ROVs today equipped with those? You don't have the toggle switch ones anymore?

DM: Most people are right-handed, so we always talk about the left arm as a grabber arm. So it would still be the toggle switch one. It's usually stronger, much more robust, and a rate arm. Just like if you were going to work on something, you'd reach over with your left arm and pick it up, and you work on it with your right hand. Well, we reach over and grab something with the left arm, maybe hold onto a subsea tree or something, and then with the spatially correspondent arm we do the task. And that's the way almost every large work-class ROV in the world is set up today.

TP: You said you had seven of these units initially when you went in to the Cognac project.

DM: Well, I think with Taylor the most we ever had was seventeen. And then there was Brown & Root. You've done the whole Brown & Root story, so you know the whole transition. Brown & Root decided to get out of the business in the Gulf of Mexico, and 2W, and transitioning over to Europe, so we shut that down I guess about 1986.

TP: That's when you left Taylor Diving?

DM: Yes, I left there in March of '86.

TP: And you started ROV Technologies?

DM: ROV Technologies, yes.

TP: Was that your company?

DM: Yes, that was my company. ROV Technologies was strictly consulting. Interesting thing, when I left Taylor Diving, I actually had a contract with the U.S. Government in Washington doing some theorist work and another contract with Virginia Power as a consultant. And then, an old friend, Karl Wickizer, who passed away last year. Karl called me actually in Washington and said, "Drew, we're getting ready to install another really neat platform. You were on Cognac. Now I'm going to give you a chance to be on another big one," and that was Auger, the big TLP. He said, "It's only about six months work at the most. Come on down and help me with it." So I did, and that six months turned into ten years. And at the end of the ten years, I had twelve people working for me, also all working for Shell.

TP: So what year did you start on the Auger?

DM: Eighty-nine. It didn't go in until '92.

TP: They drilled in '94, '95, I think.

DM: Yes, but I actually started working on design work in late '89.

TP: Just ROV design work for them?

DM: Yes. What kind of ROV do we need? How big does it have to be? How much space do we need on the TLP? That sort of thing.

TP: Do those ROVs go all the way down to 2,600 feet? I think that was the depth there, or 2,800 or something like that.

DM: In those days, 3,000 feet wasn't a limit, but most of the ROVs in those days were designed for 3,000 feet or 4,000 feet. Today they're all designed for 10,000 or 12,000 feet.

TP: What are the limitations? Just the ocean pressure and length of communications?

DM: The limitations are, of course, that all the components have to be designed to take the pressure. In fact, there are ROVs that are designed for 20,000 feet or more, most of them for the government. I mean, there are no commercial requirements at this time.

[tape change]

TP: So you were talking about the depth limitations.

DM: Yes. I do a lot of work with academia and some government work, and people are always trying to push limits for the sake of pushing the limits. Well, in the oil industry we don't do that. We do what's required. So while people like Woods Hole and some others were saying, "Oh, we can build a 10,000-foot ROV." But we only needed a 3,000- or 4,000-foot ROV, so that's all we were willing to pay for. Well, now we do need 10,000- and 12,000-foot ROVs. We need 10,000-foot ones today. We're going to soon need 12,000-foot ones. For instance, the project that I'm now for Shell, I've been on it for three years now.

TP: Is this Perdido?

DM: Yes, Perdido. Our deepest well there is at 9,600 feet. So all of our ROVs are 10,000-foot ROVs.

TP: These are subsea wells, right?

DM: Yes.

TP: So the ROVs do sort of workovers?

DM: A tremendous amount of work now. Right now, of course, Perdido is in the construction phase, in the drilling phase, so all of the work that's going on right now is actually the installation work and the hook-up work. Now, after it's in and it's in production, it'll be an ongoing maintenance and drilling support job. The jobs that are going on out there now are everything from hooking up pipelines, installing jumpers, what they call steel-flying leads, which is actually a bundle of steel flowlines, hydraulic flowlines that come down from the spar.

TP: So how many ROVs were at work in installing Auger? Can you give me a picture of what are all the various tasks, how many did you need at one time, going down to depth?

DM: Initial work at the Auger site was for an ROV to go out there on a survey boat and actually do the survey, decide where the wells were all going to

go, pre-mark where the wells are going to be spudded in. The way we did that—and this was a rather unique thing—the survey boat's out there, it surveys everything. Of course, all the geophysicists and all those kind of people have told them where the wells go. We find the spot, and the way we marked the spot was with buoys.

We had buoys that were about three feet tall, with a fifty-pound lead weight on the bottom, and a football float on top. I mean literally looks like a football, a piece of syntactic foam with a three-foot piece of PVC pipe between the lead weight and the football float, and a polypropylene rope inside the PVC pipe. The reason for the PVC pipe was if the ROV tether crossed it, it would just knock the buoy down and the buoy would flop back up. If you didn't have the PVC pipe on it, when the tether would hit it, the football float would wrap around the tether and get tangled in it.

TP: Did that happen or did you anticipate that problem?

DM: Well, that happened several times, so that's why we build the floats. [laughs] They were like—what do you call those little toys that you knock them over and they stand up? In fact, the guys nicknamed them the Drew buoy, because I came up with the idea.

TP: Oh, did you really?

DM: Yes, putting the PVC pipe on them. But what we would do is actually go down and determine where the well was going to be, and this is all with the survey companies, and that's a whole 'nother story, is the survey technology, subsea acoustics and lining everything up. And then we would put four of these buoys; we'd actually make a box. So then when the drillers came along to spud in the well, to actually put the first 36-inch casing in to start the well, in addition to all of the electronics positioning equipment, they would see the buoys. The ROV would be down there monitoring the piling coming inside the four buoys until we could visually see it, then let it go and spud it in. And we did that time after time after time.

So that was really the first use for the ROVs. Number one, going out and surveying the area, setting the buoys, then guiding in and spudding all of the wells. And then, of course, once you drilled the wells, all of the

infrastructure that gets hooked up, installing the guide bases for the tension legs, that's all ROVs that are on derrick barges and all the various pipe-lay barges and everything that are out there. There is usually a pair of ROVs on each major piece of equipment.

TP: So it's a lot of them.

DM: Yes, there are a lot of them. For instance, on Perdido I guess there was a time in the last few months when we probably had as many as ten large work-class ROVs on site at one time. Various companies, various prime contractors, construction contractors, and various ROV companies.

TP: So each prime construction contractor has their own ROV company?

DM: They either own their own ROVs or contract their own ROVs. For instance, Saipem has their own ROVs. Subsea 7 has their own. Oceaneering has their own.

TP: Dick Frisbie was saying Oceaneering makes their own.

DM: Yes, they make their own, and Subsea 7 makes their own. Heerema, which is the largest contractor, they're the ones that installed the heavy stuff, they do the heavy lifting, they have just contracted Chouest C-Innovation. Chouest has a division called C-Innovation, who a couple years ago let a major contractor, Schilling Robotics, who now builds a big work-class ROV, in addition to the manipulators, and Heerema has now contracted Chouest to go on all of their equipment.

TP: Did you work on Mars, too, or just Auger for Shell?

DM: One of the guys who worked for me was the ROV consultant on Mars, his name is Mike Sarafin [phonetic]. So the answer is yes, my company was on Mars.

TP: My research assistant has actually interviewed him, I think.

DM: Mike Sarafin [phonetic]? Yes, I actually hired him out of the navy. He had just gotten out of the navy, and I actually went to a trade show in Washington, D.C., and found him.

TP: I think that's the name of the guy.

DM: Yes, we were on Auger, Mars, Ram Powell, Popeye, Rocky—well, every Shell deepwater project for about ten years. I sold the company to Global Industries in late 1995.

TP: You were just consulting? Were you providing ROVs?

DM: Shell has no in-house ROV expertise. None of the big oil companies do. They don't have any employees who are ROV engineers, experts or anything. So all of their work are people like myself. All of that work is done by consultants, and every one of these projects requires one or more of those kind of people. So for years I was providing those people to Shell, to Exxon, Mobil, before it was Exxon Mobil, BP, and then I sold the company to Global Industries in December of 1995.

TP: And you went to Global Industries then?

DM: I had to go to Global; that was part of my penance. My wife says she sold me into slavery to Global Industries for five years.

TP: To Bill Doré?

DM: Yes, to Bill Doré. Bill's an old friend, by the way. We've known Bill for thirty-five years.

TP: A colleague of mine , the guy I wrote the Brown & Root book with, Joe Pratt, he wrote the Global Industries history.

DM: Well, I was part of that history. In fact, I remember, now that you mention it, when they were coming around doing the research for that book. But, yes, in December 1995 we sold the company to Global, and I had to stay there five years, and I was Vice President of Deepwater Development for Global for five years.

TP: Doing basically the same work?

DM: Basically the same work. The difference was that where Bill and I disagreed, I guess you'd say, I wanted to keep a division going like ROV Technologies, and continue to put these consultants in all the companies.

Well, Bill felt like that was too much talent to just rent out to oil companies. He wanted that talent in-house as project managers, working on his projects.

So essentially what he did was he disbanded ROV Technologies as I knew it, and used all those people in different capacities as engineers and all, within Global, including me, of course. He made me Vice President of Deepwater Development and I was Vice President of Business Development for a while. I really wanted to do what I like to do, and that's the consulting work on ROVs. I like working with the technology rather than being in the corporate environment. So as soon as my five years was up, I left Global and went back to consulting, and worked on a very interesting project.

TP: So what's the consulting company now?

DM: Well, Bill was gracious enough to give me the name back, so it's ROV Technologies.

TP: So you're ROV Technologies again.

DM: So we did all the legal paperwork, and he quote, "sold," ROV Technologies back to me.

TP: So you've been working on Perdido since 2006?

DM: Yes, I've been working on Perdido since 2006, and four years prior to that, I worked on a pretty interesting Exxon project.

TP: The Subsea Intervention Module, SIM. Tell us a little bit about that one.

DM: SIM was really a fun project. It was different than anything I'd done up until that point, whereas another old friend of mine in Exxon came to me and said, "Drew, we're going to build this really neat tool and we need you to help us."

So I had no idea what it was about. It was coiled tubing, and I didn't know anything about coiled tubing, of course. Working in deep water most of my life, we didn't have anything to do with that. So what we really were building was essentially a remotely operated coiled tubing

unit, something that would be used to go down and clean out wells or refurbish an old well. But instead of doing it on land like they do now from the back of a truck, the whole thing would be a big giant ROV. Essentially we were building a 500-ton, 80-foot tall ROV, and we did all the design work.

We had forty-five people working on it for four years. I was one of four managers. We had a manager for each discipline. I was responsible for all of the ROV technology, all the control systems, and all the interface with the vessel. Another guy was the manager of the vessel. Another guy, the manager of the coiled tubing part. We spent four years working on it, spent a tremendous amount of Exxon's money, and Exxon decided to put it on a shelf till they need it. I said, "Okay."

TP: They don't need it?

DM: They don't need it yet. It's going to be a viable tool, but to actually build the tool, build the vessel that it goes on, the capital investment in that tool, in that entire system, is significant, and it will take a certain number of wells on the sea floor to make it viable. You can't say we're going to build all this to go and service a half a dozen wells. It's going to take hundreds of wells. And it'll come; it's just a matter of when.

TP: That seems to be the direction of how deepwater is going, spars, FPSOs that service hundreds of wells.

DM: Subsea remote wells, that's right. And it depends on the reservoirs too. That's not my area of expertise, but I understand off West Africa, for instance, the reservoirs are very scattered and very shallow, so you have to drill a bunch of wells. You can't put a small cluster of wells together like we did in Auger, that's a good example. You've got to put a lot of wells over a wide area.

TP: So they may call you back again when they decide to introduce that.

DM: Oh, yeah, it'll happen. It's just a matter of when.

TP: Let's see. Anything more? You told us a little bit about Perdido. Is there anything else you want to talk about it?

DM: No, I think Perdido, it's an incredible project, and I'm sure Shell is going to blow their horn quite loudly over that one. I'll wait and let them do that. [laughs]

TP: This might be a good place to stop. I thank you for your time and your stories. That's great.

[End of interview]