Interviewee: John Rossman Huff

Interview: September 24, 2011

BOEM DEEPWATER GULF OF MEXICO HISTORY PROJECT

OFFSHORE ENERGY CENTER HALL OF FAME

Interviewee:	John Rossman Huff
Date:	September 24, 2011
Place:	Houston, Texas
Interviewer:	Tyler Priest
Ethnographic preface:	John Rossman Huff played football at Rice University and Georgia Tech in the 1960s, and he graduated with a degree in civil engineering from the latter. After graduating in 1968, Huff joined the Offshore Company before signing up with Zapata in 1970. At Zapata Huff was involved in major business operations, where he especially enjoyed the marine side of the work. Huff moved to Oceaneering in 1986, at the nadir of the economic slump in the petroleum business. At Oceaneering, Huff rose steadily through the company and retired around twenty years later as its President.

File 1

TP: The date is September 24, 2011. This is an interview with Mr. John Huff, one of our inductees this year. The interviewer is Tyler Priest.

Congratulations. Why don't we start off with having you tell us a little bit about your background.

JH: Okay. Well, I went to Rice University for two years, played football for Jess Neely, transferred—

TP: Wait, wait. Before you move on, you've got to tell us about the Longhorn game in 1965. [laughs]

JH: That was my moment of fame at Rice. It was a great game. Texas was number four in the nation. We went over there with virtually no chance of winning, and we beat them at the end of the game. I had a good game, and I was a sophomore. It was a victory that I still remember today. I'm sixty-five, so that was forty-three—no, forty-five years ago.

TP: I understand you recovered a fumble in that game.

JH: I did. It was a great game. As a matter of fact, our position coach, Red Bale, was a pretty famous guy, and on that particular play I graded zero, because coming out of the backfield I was supposed to cover him, and I thought I could catch the quarterback before I could catch this halfback from the University of Texas that could beat me fifty yards in a sixty-yard sprint. So I ran the guy down, and he fumbled and I recovered the fumble. It was a great play, but I scored zero on the play. He told me later, he said, you know, that a lot of people that had done well playing for him had to take some initiative, and a busted play became something that was good. He said, "But don't ever do that again." [laughter]

So, anyway, it was a great experience. I enjoyed going to school at Rice. My dad got a Ph.D. at Rice, and that was the reason that I wound up there. I fell in love with a girl from Sophie Newcomb, and she decided that we would go—or we both decided that we would go to school in Atlanta. She went to Emory and I went to Georgia Tech. I had to go someplace I could get a scholarship, and so I played football for two years at Georgia Tech and graduated with a degree in civil engineering. That's kind of an interesting story, how I got that degree in civil engineering.

TP: Were you planning to major in engineering when you went to Rice?

JH: No, I was actually majoring in geology, and this is the funny part of the story. So I get to the Athletic Department at Georgia Tech, sign all the papers, and so I asked one of the coaches, "Where's the Geology Department?" Well, he didn't know. Well, that didn't surprise me or shock me, but I thought, "Okay."

So I went to the registrar, and she said, "Well, you need to go to the School of Ceramic Engineering."

I said, "Okay."

So I went down to the School of Ceramic Engineering, and the lady that was at the desk there, she said, "Help you?"

I said, "I want to register to get a degree in geology."

She says, "Fine. No problem. Just sign right here."

I said, "Fine. Can you give me the courses and stuff I need to be doing?"

She says, "Well, it's a master's degree."

I said, "Well, I think I need to get a bachelor's degree first."

She said, "Oh, yeah, well, you probably do."

I said, "Well, I need the curriculum for the bachelor's degree in geology."

She said, "Well, we don't offer a bachelor's degree in geology."

I said, "You've got to be kidding me." [laughs] I mean, I hadn't even sought permission to change schools from my parents, and this was during the days when you did what your parents told you to do.

Anyway, make a long story bearable for you, the conclusion was, she said, "Well, why don't you take the degree in ceramic engineering, and then if you still want to be a geologist, you can get a degree in geology as a master's degree." So I agreed to do that.

So I got home and told my dad that I had transferred from Rice to Georgia Tech, and he said, "Well, okay. You going to be an engineer?"

I said, "Yes. Matter of fact, I'm going to be a ceramic engineer."

He said, "What in the hell is a ceramic engineer?"

I said, "Well, it's the closest thing to being a geologist you can get at Georgia Tech."

He said, "Well, look. If you're going to go to Georgia Tech, you need to be a real engineer, and so you can either study civil engineering, mechanical, chemical, or electrical engineering." So I just happened to choose civil engineering, so that's how I got a degree in civil engineering.

TP: You're the second famous engineering graduate from Georgia Tech who played football there that I—

JH: Who's the other guy?

TP: Ron Geer.

JH: Ron, sure, absolutely. Yes. At that time, football was not a twelve-month program. I think it probably ended pretty much in the sixties, maybe some in the seventies. You go all the way back to the thirties and forties and these guys, not really, but figuratively speaking, they showed up for the games and they did a little practice, but as far as off-season weight training and running and all that, they didn't do that, and that string sort of ran out. Today I'm involved in the athletic program at Rice to a very moderate extent, but these kids are working out twelve months a year, lifting weights and practicing. It's a job. It's not a fun thing to do.

TP: So tell us, after you got out of Georgia Tech, did you go to Zapata?

JH: Well, no, I went to the Offshore Company. That's kind of an interesting story. I graduated in 1968. This is pre-Internet. Now, this is hard for the next generation of your historians looking at this tape, they won't know what I'm talking about. But I knew that I wanted to be involved in some sort of ocean business, and so I went to the library and I picked up all of the business literature. There was a few companies, Offshore Company Ocean Drilling and Exploration Company, Ocean System, which was a subsidiary of Union Carbide.

Georgia Tech had a great Job Placement Center. I mean, they really did a wonderful job teaching the kids how to get a job, and one of the things that you learned at Georgia Tech was how to work. I mean, I didn't think it was academically that difficult, but I thought the work was hard. I mean, there was a lot of work, a lot of schoolwork involved, a lot of homework, a lot of projects, a lot of experiments, labs, and so forth. They put the same effort into helping their alumni kids find jobs.

So they told us when you go to the job interview, you need to know as much about that company as you can, and so, as a minimum, you read the annual report, you read other reports about the company. I read that Union Carbide had this little group called Ocean Systems in Reston, Virginia. So when I went in, I interviewed the recruiters, or they interviewed me, and I said, "Well, I really was interested in this one particular part of Union Carbide, Ocean Systems."

Well, they didn't even know that existed in the company, and I think they were impressed by the fact I knew something about their company. So I got an interview with Ocean Systems. Turned out, as fate would have it, the guy that interviewed me, his name was Bruce Gillman [phonetic], and he had been in contention for the president's job at Oceaneering like thirty years later, or twenty-five, whatever the number of years. It's funny that he didn't hire me for his company then, but I wound up being president of Oceaneering.

TP: What did their company do? Was it manganese mining nodules?

JH: It was diving operations. Union Carbide made industrial gases. A big use of helium starting to emerge was the Heliox mixture that you used in saturation diving. So it was kind of a vertical integration with Union Carbide.

So, anyway, to go back to what happened, I got a job. I said I knew Houston, I liked Houston. My wife—we got married. The same girl that caused me to transfer, we've been married for almost forty-five years now. So everything worked out well in that scenario.

The company that came down to interview was the Offshore Company. The Offshore Company is now, at least in my mind, sort of the foundation for Transocean, and it was a wonderful company. It had been headquartered in Baton Rouge. It had recently moved to Houston, like five or six years prior to that. The guy that I interviewed is also one of the pioneers, is Tim Pease.

TP: He used to be with Brown & Root, too.

JH: Right. Exactly. He was with Brown & Root. He was one of the 5,799,000 people that had something to do with Moho. [laughter]

TP: I wrote a chapter on Mohole for the Brown & Root book.

JH: Did you really?

TP: Yes, I'll have to show it to you.

JH: Well, everybody that I met from about 1975 to 1980, everybody has something to do with it. That was sort of the birth of—well, it wasn't the birth; it was the second-generation semis.

Anyway, Tim offered me a job, and true to Tim's—I was hoping that I would make the handsome sum of $10,000. So, I don't know, somehow I must have revealed that to Tim, because he offered me a job at $825 a month, which was $9,900. [laughter]

So, anyway, I went to work for the Offshore Company. My first year there was almost a nightmare. It was my worst dream of being a structural engineer designing structures, and I think that Tim took pity on me and he realized that my real talent probably was more in field operations than it was in the back office, designing stuff.

So, anyway, I worked there for a couple years, and then I went to Zapata. So I went to Zapata in 1970, which was at a time—actually, George Bush had left four years prior to that, and so the whole company was George Bush oriented, was a terrific guy. I later met him many times and got to know him, and he's just a wonderful guy. I worked for a Shell guy at Zapata named Kobus, Scott Kobus, and Scott worked for—

TP: How do you spell that?

JH: K-o-b-u-s. He was like the chief engineer. Then the vice president was Hoyt Taylor, and Hoyt was my first mentor. He was just an absolute giant of a person. One of my favorite stories about Hoyt was he actually worked for Kerr-McGee in the late forties. He was a pilot during the war and he worked for Kerr-McGee. Obviously, you know that story, drilling the first well out of sight of land, all that.

TP: The 1947 Ship Shoal platform, he worked on that?

JH: He worked on that. But his claim to fame—this is a real oil field story. This is the kind of story that legends are made of. He was tasked with, at Kerr-McGee, building a workup, a new type of vessel. At the time, back in the late forties, the oil companies were fully integrated. They had their own Seismic Departments, their own Drilling Departments, their own logistics. The oil field service business had not arrived. By the sixties, oil field services had begun to be a distinct part and it was starting to break away. It was starting to become an industrial segment identity. But in the late forties, the companies were fully integrated, probably stayed that way up until, I think—you would know this better than I do, I'm sure, but probably the late fifties. Then early sixties, it began, and by the late sixties you had a lot of companies that were—

TP: We had the drilling company, the ODECO really emerged by the mid fifties, but it was mainly drilling companies. The oil firms were still running those.

JH: We had Halliburton, Schlumberger, and—

TP: Yes, by the late fifties and clearly into the sixties, you had this whole wide-ranging service business.

JH: Yes, in the sixties, it really blossomed. So I didn't realize that, but I learned that from Hoyt. Well, actually, my dad worked for Phillips before he went back and got a Ph.D. and started teaching.

But, anyway, so he's sent to build this workboat, and the deckhouse was going to be built out of aluminum [unclear]. They decided, well, you know, aluminum just didn't hold up well offshore, so they built it out of steel. What happened was that in the oil field, if quarter-inch is good, then a half-inch is better. So they built the deckhouse out of half-inch steel plate, and the weight restriction was about three-sixteenths-inch steel plate. So when the ship was launched sideway, it just floated out into the bayou and turned over. [laughter]

So, you know, actually, this started when I first went to work for Offshore Company, but I remember going to a meeting at Doc Laborde's office, and I was sent over there as sort of the token engineer with the other drilling companies, and these were the people that ran the drilling companies. I don't know how in the world I got involved in a group like that, but it was people like Herbert Hunt, Bob Palmer, Doc Laborde, and a lot of the land-drilling contractors.

The decision was being made of who was going to regulate our industry. Of course, you had some of these big old gruff guys, "Nobody," Screw the government," Hell with it, "Full speed ahead," "Let's don't—." Doc took a much more calculated approach to life, and he said, well, essentially the industry had two choices. It could either be OSHA, which was regulating the land business, and they would go offshore, or it could be U.S. Coast Guard, and the U.S. Coast Guard had safety-of-life-at-sea type of approach to life. So Doc did a fantastic job building this consensus among everybody.

TP: This must have been in the early seventies.

JH: It would have been '69 or '70, something like that. So the decision was made that the Coast Guard, that the industry—and I guess it was IADC. At the time it was AAODC, American Association of Oilfield Drilling Companies, because there really weren't, as far as I know, very many foreign drilling companies, non-U.S. drilling companies.

So, anyway, that was one of the single best decisions that the offshore industry ever made. I mean, to take the Coast Guard—and you'll see how my mind thinks. When I think of Hoyt's story and this boat turning over and "big is better," I remember that I used to teach a course for the University of Texas Petroleum Extension called Offshore Operations, and part of that course was about stability. Well, if you're a civil engineer working in the oil fields, stability to you just means not rocking. Well, stability to the Coast Guard meant not turning over. So I learned about righting moment arms and how to design structures, naval architectures. You know, there are some wonderful naval architecture schools in the country, but we didn't have a lot of naval architects in the offshore business until mid seventies or later.

So, anyway, it was a great marriage. I think that the decision to use U.S. Coast Guard as the official safety governing regulatory agency was a fantastic decision, and today I think they have proven that they did a great job. They sent a lot of people into our industry.

TP: You're talking about the drilling industry?

JH: The drilling industry, right.

TP: Mobile drilling vessels.

JH: Mobile offshore drilling. Of course, they don't do the fixed structures in the Gulf of Mexico. And they have a great relationship with American Bureau of Shipping, which at the time was truly the pioneer in writing all the rules and regulations for ship classification. Now, they came at it from a little different direction. It's a nonprofit organization, and what they were used to doing is that they were essentially the certification agency for the insurance companies to say, "We believe this structure is properly designed, properly built, properly maintained," and for that, the insurance companies gave you a break in the rates. I remember early on in my career where the insurance rates were above 10 percent. I mean, this was just incredible.

TP: In the sixties, there were a lot of jack-up—

JH: A lot of accidents.

TP: Accidents, yes. And the rates went way up. Then you had hurricanes, three giant hurricanes, and that's probably when the summit with all the people with Doc came together and said, "We've got to figure out—."

JH: Yes. Well, Tim was one of the real pioneers in doing that. He was on the MODU Committee. That's really when they coined the phrase "mobile offshore drilling." So all of the rules and so forth for design, structural integrity, ABS did a fantastic job, and, of course, they continued to do research. I was fortunate to be on the board of ABS for five or six years. Really outstanding group of people, outstanding group of people.

TP: Tell us the story about Hoyt Taylor that you included in your file.

JH: Well, that was a kind of funny story. About, I guess, in the early '72-ish time period, I was transferred from engineering into operations at Zapata, and I was in charge of all the rig movers. And so the rig movers, we had special people that moved the jack-up rigs. Zapata had a fleet that was a pretty funky group of rigs, and the first LeTourneau rig that had ever been built, second LeTourneau rig that had ever been built, we used. We had slant-legged rigs.

TP: The truss-type legs, I remember Zapata was known for, yes.

JH: A lot of those slant rigs, flat-legged rigs were hard to move. So, anyway, we developed some procedures how to do it. That was sort of my thing, is that marine [unclear]. Now, keep in mind I was not a marine person. I was a civil engineer. I was more oriented to the industrial operation or the drilling operation, but I really enjoyed the marine side of our business. It's a great marriage of a marine operation and industrial operation.

So, anyway, I got called back. The president at the time, they were having problems building the *Zapata Ugland*. The president said, "You did a lot of work in construction, you built a lot of our equipment, and I want you to go over there to the shipyard and give me your idea of what it's going to cost to build this.

So, anyway, I said, "Fine. I mean, I'll be delighted to do that."

So I went over to Bethlehem, Belmont Shipyard, and I sat down with everybody, got all my figures and spreadsheets. This is pre-Excel spreadsheet now. This is all Big Chief tablet and No. 2 pencil and a lot of erasers. So, anyway, I laid it all out, and it was about a little over $25 million. Well, the AFE, or the Authority for Expenditure, was about $14 million, so it was almost twice as much.

So I go back to Houston and I turn this in, and this guy just went bonkers. I mean, he just went—

TP: Hoyt too?

JH: No, not Hoyt. The president of the company. So, I mean, I'm about as far from the president of the company as I am right now from the President of the United States. And I'm thinking, "I don't know why a guy would get that upset. I mean, maybe I'm off a few dollars here or there, maybe 2 or 3 percent in one direction or another, but I couldn't be off that much." I thought I'd done a good job. I'd spent ten days doing it, weekends, hours and hours of work.

So he gives it back me. He says, "I want you to go redo this."

So that's when I went to see Hoyt. I said, "I don't know why he wants me to redo it. I spent ten days, and this is the right answer. I mean, I'm positive of that. I mean, now, I know what he wants, Hoyt, is an answer that's less than this, but if he wants the correct answer, then I've given him what I think is the correct answer, and I don't think any additional work is going to really change that answer, but I'll be happy to do whatever you think is right."

He said, "Well, you've got to do what's right. You can't just change the damn number. You've got to do what you think is right. Now, why don't you go back, spend a couple of days, review it, look at it from a distance, and get into details. Don't start with the details. Just get the concept of it, and then when you think you've got it right, you give him that answer."

I said, "Okay."

So I went, spent a couple days reviewing it. It was great advice to look at it from a bigger perspective than looking at the details. Of course, everybody, you know, you see that and then you go to the details and you build from the ground up.

Anyway, make a long story bearable for you, I do it, and this time the number comes out to be like $25.8 million. So I take it back to him and I handed it to him, and I thought he was going to cry. I knew that he was really disappointed in this answer, but I also thought in his heart of hearts that he really genuinely understood that I had done the best job I could and that my answer was going to be a lot closer to the truth than what they had originally decided was going to be the cost. As it turned out, I think the actual cost of the thing was about $27 million.

So, anyway, the funny part of the story is I went back to Hoyt and I relayed the impression I had of the president and his reaction to it, and so in a very bold manner—this was like 1972—I told Hoyt, I said, "Well, the only thing I really learned from this, Hoyt, and I'm positive of this, is there will never be a rig as expensive as this $26 million rig that Zapata's fixing to build." [laughter] You fast-forward forty years, and we're building rigs that are approaching a billion dollars now, and the truth is, they're not a hell of a lot different than they were forty years ago. I mean, now they're more sophisticated, they certainly drill in deeper water depths, and they are bigger and so forth.

TP: That's a variation on a theme that you run into in the history of the offshore drilling business. "We'll never drill beyond sixty feet of water."

JH: Exactly.

TP: Or a hundred feet. "How could we ever drill in 500 feet of water?"

JH: You know, one of the great things is how the offshore business kind of got siloed. I mean, when I came into the business, I was looking at the Gulf of Mexico. Offshore Company had mostly jack-ups, hydraulic jack-ups, the old DeLong system. They had some turret-moored drill ships, which they really didn't use the turret much for. This was pre-semi time, but I mean the Mohole Project had shown the efficacy of a semi design.

TP: Well, it shows *Bluewater* [rig] more and more.

JH: Well, I'm talking about The Offshore Company owning one. They were definitely coming into the industry. They were looking at some conversions of the submersibles into semi-submersibles where they bore them. In 1968, the industry was on the cusp of developing the semi-submersible. It was an outgrowth of the Mohole Project. Seventy-two was the first semi for Zapata, and I think Offshore Company built one in that same timeframe. So it was a new design, it was a new concept, and it was in deeper water.

What I was going to say is that if you worked in the Gulf of Mexico and that was your main province, you really thought that Cameron blowout preventers were the only blowout preventers that were allowed. You go to the West Coast, and you work out there, and it's Hydril. They were working in a thousand feet of water off of these floaters, and you say, "This is impossible. How do you do that?" Then you go to the North Sea, and they're working in fifteen-foot seas. Of course, this is when the semi was at its height.

So, anyway, it was funny. And, now, of course, it's becoming a lot more homogenized. The rules are still more regionally specific, but even the rules are more worldwide, ABS, DNV, Lloyd's Register, all of the classifications societies are moving closer to homogenized rules at the drilling site. Then the production site is enormously creative and now have floating LNG plants. We're not very far—well, actually, we're there, certainly in the early stages, beyond prototypes where production facilities will be on the seafloor.

TP: That's what I've heard. I think Petrobras is planning.

JH: Petrobras. Statoil is doing it now in the North Sea. But there's no question that next-generation equipment is going to go on the seafloor.

TP: Won't even be platform.

JH: We won't have any sort of—I mean, when you start to eliminate the vessel interface, now you're talking about some real cost savings. If you can eliminate something that floats out there, you can eliminate a lot of hassle, and so if you don't need something floating over where the trees are and producing, there's really no reason that you need that, other than the ability to put your hands on it.

I mean, if you think of technology as an evolution, as opposed to a revolution, what you've got is you've got the same sort of tree sitting on a fixed platform, and that's why it got into our mind you had to have a fixed platform because pumpers, gaugers would go out there and they would tweak a valve and they would do something to maximize the production from that field. There'd be maybe twenty, thirty wells in the field, and they would go out there and do that.

It's no different than out in the Permian Basin, a guy gets in his pickup truck and he goes around and looks at the same thirty wells in the reservoir. We just use boats offshore. You go in the marsh today and mostly surface equipment, virtually all surface equipment, it is all surface equipment, and you see these little runabouts boats with these guys going—it's the same thing.

So the evolution is that the next phase is going to be to put it on the seafloor, and to be able to separate the fluid phases on the seafloor is going to be much more efficient than having to bring all that fluid to the top, separate it just because you can see it. I mean, actually, you can't see it. It's behind valves and pipe, anyway. So the fact that you're doing it in—pick a number—five thousand feet of water, just happens to be that's where you're working. And that really kind of gets us to Oceaneering.

TP: That's what I was going to say, this is where Oceaneering really comes into its own.

JH: It's an important segue. I think that Oceaneering—and, believe me, I don't take credit for this. We've got some extremely smart people. We've got some great engineers. Probably more importantly, we've got some fantastic technicians that are technically capable, creative, innovative, and what we've done is we've taken the remotely operated vehicle concept and made it reliable. We have vehicles that stay on bottom for weeks and weeks and weeks. We have experimental vehicles now that are autonomous, and the production facilities of the future are going to have autonomous vehicles like these ROVs that are sitting down on the bottom. They're going to be the pumpers and gaugers and they will operate with acoustic signals. There will be power packs down there to recharge them. There will be power sources to operate the equipment on the ocean floor, all of the separation issues where you get the gas and water and the liquid hydrocarbons. These autonomous vehicles will go to all of these subsea trees and do whatever manual work needs to be done.

The ability now to get data, the oil field is in the same data revolution, evolution, as the rest of the world is. We typically put fiber-optic cables in all of our—they diagnose their own malady. I mean, we operate them like you operate aircraft. We actually call the kid who runs the thing a pilot. They can look at a two-dimensional screen and they can see three dimensions.

I mean, part of it is—this is kind of an interesting analogy. I remember one time when we were drilling some wells in West Africa, and the governments in West Africa were asking us to train indigenous labor and help them do that. Well, partly there was a language barrier, partly there was a cultural barrier. One of our tool pushers when I was at Western came to me and said, "You know, what you don't understand, John, is that these guys didn't grow up fixing bicycles and fixing cars. They didn't have the same mechanical nature about their history that kids in the U.S. did, and that's why they're struggling to learn some of these techniques."

I thought, "That's pretty true." That really made a lot of sense to me. So we started training them on mechanical issues before we sent them offshore, and it really helped a lot. There's no reason that you can't be as capable a driller anyplace in the world as you can in the U.S. They're just as smart as we are, but they didn't have some of this background.

All right. Fast-forward to Oceaneering and it's like, why are these kids so good at that? They grew up playing videogames. [laughter]

I was in Afghanistan a few months ago, and we went out to the rifle range, and the rifle range were real M-16s that were outfitted with lasers, and they could tell you exactly where you hit. You had a simulation of these guys coming at you and you're trying to shoot at them. I thought, if the Army is now teaching you how to shoot with lasers, and the kick of the gun was the same as a real M-16, this is here to stay.

So the same thing is happening. You have two dimensions. I would say with the changes in electronics now, actually stock I've been looking at is a 3D production company, and I'm convinced that the 3D when I was a kid, the spear coming out into the thing is not what we're looking at. What we're looking at, simulation in the third dimension that will make your ability to be part of whatever it is [unclear], and so I don't think there's any doubt the next generation is going to be subsea.

TP: From previous interviews I did, the ROVs themselves are gaining new tactile capabilities. That's what really amazes me.

JH: I would put it this way. I don't think that we're going to be able to—well, let me phrase it this way. There's an intermediate step before we reach the ability for ROVs to be as tactile as a diver would do. In other words, the [unclear] between the diver versus the ROV was that the diver's there. He can diagnose the situation. He has multiple points of attachment for himself. He can be upside down.

TP: Less likely to damage the equipment.

JH: He can assess the situation. ROV, you're looking at it with a camera, generally it's not even stereoscopic, so you see it in two planes, two dimensions, and so you have to pre-engineer your activity better. So you can do down there and push, pull, turn, torque, lots of things, but you've got to have an access corridor, you've got to have things big enough, you've got to have things that you can react against. You can't, quote, "rig it up" onsite. You need to have enough information that you can engineer a solution, and that's why I compliment not only our engineers, but our technicians, who have plenty of engineering capability. So to some extent you're trying to invent those tools, but we have thousands of tools that fit all these different types of tool requirements, these sequences of operations. So that's kind of an intermediate evolutionary step that I see that we're going to.

Now, if you go back to the onshore and you look and you say, well, what are robotics doing onshore, well, the first robotic application of machine tools was automatic welding assembly line, being able to automate certain assembly line processes. We're probably one generation, maybe two, away from the ability for a robot to interact with you verbally, that has enough tactile ability that it can go and take the pillows off that couch, vacuum them, put them back on, fluff them up but not tear them. We've used forced feedback systems for a long time.

So the onshore robotic technology is going to precede the offshore, and so that tactile capability is here, but to be able to make it reliable is going to take some more time. I mean, I can see a period that fighting wars with robots, I mean, soldiers on the ground is—our great-great-grandchildren are going to wonder why in the hell we didn't do that a hundred years ago. I know this sounds kind of like Jules Verne in *20,000 Leagues Under the Seas*, but I'm telling you it's going to happen and I firmly believe it.

TP: Well, when you study the industry long enough, you realize that these kind of things are not inconceivable.

JH: Well, if you've been in the industry—I've been in it now forty-three years.

TP: Or, better yet, if you've been in it, yes.

JH: You watch it happen. I mean, I can remember when we first started the ROV business, you know, it was pretty common that the ROV spent six hours out of the water being repaired and worked on, for every hour in the water.

TP: Maybe just take us through some of the milestones during your twenty years as president of Oceaneering, if you can.

JH: Sure, I'll be delighted to.

TP: We probably should. We've still got some time.

JH: Okay. Just might break into another hour.

TP: I'll have to get in touch with you again and follow up on this, because this is great stuff.

JH: Well, it's interesting. I had just an absolutely fabulous time at Oceaneering. I mean, the people at Oceaneering are terrific. When I came to the company in 1986, it was broke.

TP: Like a lot of other companies at that time.

JH: Like a lot of other companies. We had already passed "Stay alive till '85." We were a year past that, and things were worse. So we didn't know if it was "Stay alive till '95" or just stay alive, and Oceaneering was in that situation. At the time, Oceaneering was the largest diving company in the world. Now, Comex may have argued that they were a little bit larger than that, but the truth is Oceaneering had a hull-cleaning business in the Middle East that they cleaned the tankers, and so we had enormous amount of diving hours doing stuff like that.

TP: I didn't realize that that was kind of its bread and butter at that time.

JH: That was just a just a job. You know what I mean? I mean, diving started with the guy who founded the company, is a pioneer, and I'm sure you must have done him in this thing too. Diving was pretty routine. It was getting [unclear] out of propellers and all, and then, of course, it went deeper, and that physiology of deep diving was where all the diving companies were going, and Oceaneering was leading the pack. What kind of oxygen gas mix could you do? Heliox was the most common. The most advanced was hydrogen and oxygen, but it was a very volatile mixture and very dangerous. So helium was the main source of an inert gas. Nitrogen, you couldn't use nitrogen because of the narcosis and the physiology of it.

So as a practical limit, about a thousand feet of saturation was what we had. Now, we had literally thousands of depth chambers all over the world. My first brilliant idea was that we'll make them into hyperbaric chambers for hospitals and stuff, and by the time I waded through all the rules of how you do it for a hospital, I decided it would be cheaper just to build the hospitals. It never really became as big a business as I thought, hyperbaric medicine, but we slowly started pulling back from some of our diving operations, particularly in the North Sea, where diving was very expensive. It was connected more to the vessels.

I did make a statement in 1986 that divers are forever, and today we run a very, very sophisticated diving operation in the Gulf of Mexico. We still have two saturation diving systems.

TP: Is that mainly for shallow-water repair kind of stuff?

JH: Well, it's mainly for sort of a mid-depth water. Shallow water would be anything less than, say, 160, 165 feet, where you could dive on air, and then mid-depth would be in the 300- to 400-foot range where you would dive on a mixture of Heliox, but most jobs, some jobs, you could do without having to go into saturation. Then any job that would be over like 400 feet of water would require saturation if the job had any length to it at all. So all that means is that the diver saturates his body and works it to ambient pressure, and in order to do that, he has to live in a chamber.

Now, we do a lot of sophisticated underwater welding, underwater activities that require a lot of difficult metallurgy, they require some pre-engineering work. So our kind of niche in diving business, we have a kind of niche at the bottom where we inspect platforms in fairly shallow water. We combine that with our computer inspection business, and so we can really do a pretty good job for—we have probably a better database than the oil companies do on what the condition of their platforms are.

Then the second phase of the diving would be the difficult metal-type activities, and that diving is restricted to just the Gulf of Mexico. We don't do any other diving outside of the Gulf. We do maybe a few jobs here and there where we export the whole team and then bring them back.

But really the guts of the company, we decided to concentrate on developing our ROV business. Instead of trying to push the frontier of diving to 2,500 feet, we said, "Let's push the reliability for remotely equipment and let's design the mechanical-type tools and let's get involved with the equipment manufacturers where we know what are the types of interventions that they're going to require in their business." So that was how all of that got started. That got us into the manufacturing business. We make a variety of products for—

TP: So when was that decision? When did you decide "We're going to go in big on ROVs for serious depths"?

JH: Late eighties, I would say.

TP: So shortly after you—

JH: Shortly after I got there, late eighties, we made that decision that that was going to be the driver of the future.

TP: When you saw the companies with these deepwater leases and they were drilling them and planning production, it had to happen.

JH: Well, you see, I had a drilling background, and a lot of the things that were happening in the drilling business, they were building into—like the riser systems and so forth, they were building a lot of diver-less and underwater-less intervention. In other words, the less work you could do underwater, the more productive you were going to be. So the drilling contractors and the operators were really not counting on the ROV; they were counting on the surface tools to not require any intervention.

So there was this sort of—earlier we talked about this—tactile versus non-tactile ability that if you had to—I don't know if you read the cartoon Dilbert. Okay. Well, one of the few cartoons that I saw of Dilbert that I actually understood what his boss was telling him was his boss goes in to Dilbert and he says, "Dilbert, I want you to give me a list of all the unexpected problems that we're going to have on this project." I laughed and I thought, you know, I wonder how many times I've said that to somebody, because I really knew what he was trying to communicate to Dilbert.

And that really is sort of the dilemma with an ROV. You're trying to anticipate unexpected problems. You're trying to engineer an intervention solution where if you think of the ROV as just a vehicle that delivers a work package that has something underneath, some type of hydraulic skid that turns something to the right or to the left or you can torque it to such-and-such a foot-pounds, or it can video something, just an observation, or it can pull pins, it can do things, a lot of that has to be engineered into the system that's at the surface that goes underwater, and so we have to know how we interact with that system. So it was not necessarily—I mean, you had the ROV for visual identification. In other words, drilling contractors and operators would use the ROV to observe landing sites.

TP: Basically underwater cameras.

JH: Exactly. Sort of a sophisticated underwater camera. The first cameras we used offshore when we were trying to avoid some of the divers, because we had saturation diving systems on all the semis from the early seventies till the late eighties, and by the late eighties we had started to replace all of the saturation diving systems with ROV systems. So we now had a mountain of saturation diving equipment out there by the late eighties that was not being used in the drilling side, the drilling segment of our industry, and it was being replaced by the ROV.

The ROV had become, first of all, reliable, and the first job of the ROV was to give us a view of what we've got. The cameras that we were running up and down the riser were just not reliable. I mean, the subsea engineer just had a very difficult time maintaining that kind of sophistication. In every one of the services offshore, you've got different levels of sophistication and, generally speaking, the more electronic equipment that you have, of course, everything now is becoming more electronic, you have a little more sophisticated personnel requirement. So the ROV was replacing divers, and so we were now not only having a reliable ROV that could provide excellent observation of activities underwater, but an ROV that could actually do productive work underwater, particularly as we identified those unexpected activities to occur.

So the more we identified that, the more tools that we built, the more interfaces that we had to the riser manufacturers, to the equipment manufacturers of BOP, I mean, we learned an enormous amount of stuff out here at Macondo last year.

TP: You saw the Oceaneering logo a lot during that operation. [laughter]

JH: We had a lot of activities out there, and I tell you—

TP: Yes, the country first learned about Oceaneering, and on a popular basis after that.

JH: We had a lot of ROV equipment out there. We did a lot of work for BP. I tell you, BP, they've taken a lot of criticism, but they did a lot of work. They did a good job on some things too.

But, anyway, the point I'm making is, is that evolutionary step was not like there was a decision one day in the corporate boardroom that said, "Ha! We've got it!" It's like most decisions, "Let's try it and let's see what happens." As the equipment got reliable and we started designing more and more solutions to real-life problems, the efficacy of ROV intervention became more and more standard. The operators became more and more confident. We put our equipment on more and more drilling support equipment. Today we're, without a doubt, the largest one in the world to do that, and so it became a big business.

The business now is moving to vessel-based operations. You remember a few minutes ago we were talking about autonomous vehicles. So imagine if you can eliminate that vessel interface, then you've eliminated a big cost item. So, right now autonomous vehicles are mostly bathymetric survey-type operations. They don't have a lot of work-related activity. But in ten-plus years in subsea processing equipment, that's going to be very operationally intensive. I'm not sure that our customers, our ultimate customers, the oil companies—right now the equipment manufacturers are taking that leap. I'm not sure that they realize how operationally intensive that equipment is going to be, so maintaining that equipment and maintaining it at maximum efficiency is going to require a lot of ROV intervention.

TP: Well, that might be a good place to stop. I thank you very much.

JH: Thank you.

[End of interview]