BOEM DEEPWATER GULF OF MEXICO HISTORY PROJECT

Interviewee:	Dan Godfrey
Date:	June 9, 2009
Place:	Houston, Texas
Interviewer:	Tyler Priest and Jason Theriot
Ethnographic preface:	Dan Godfrey moved to New Orleans in 1968 after completing a master's degree in structural engineering at Washington State University. Godfrey soon signed on with Shell Oil. Some of his early engineering work focused on introducing saltwater disposal methods, newly required by federal environmental laws passed in the late 1960s and early 1970s. Other stints included work from The Hague on North Sea platform installation, and in a Houston research center on methods for drilling in the Alaskan Beaufort Sea. At the sanction of the Cognac fixed-jacket production platform in the mid-1970s, Godfrey was tapped to supervise its fabrication work. By the early 1980s, Godfrey had come to manage Shell's offshore engineering and construction group in Houston, after which he served as a production superintendent for multiple Gulf of Mexico block areas. Come 1987, he also worked briefly in Brazil as a Shell manager with multiple responsibilities. Godfrey returned stateside in 1990 to work on the deepwater Gulf of Mexico Mars project early on in its development, shepherding it through a changing economic climate and challenging technical issues.

File 1

TP: This is an interview with Mr. Dan Godfrey and it's June 9, 2009. Tyler Priest and Jason Theriot are the interviewers, in Houston, Texas.

Let's just start off with some background. Where are you from and how did you end up in this business?

DG: Well, I'm a farm boy from Washington State. I got my Master's degree in structural engineering. In interviewing, it seemed like these deepwater platforms were like erecting a thirty-story building but doing it out in the sea, building it on your site, taking it out and erecting it. It seemed like it was a big challenge. So I accepted a job with Shell and came to New Orleans.

TP: Where did you go to school?

DG: Washington State University. So I started doing that.

TP: You came to New Orleans. What year was that?

DG: I started in June 1968.

TP: Was this in Bob Bea's Central Engineering Group?

DG: No, at the time this was in the Offshore East Division, which had Art Fisher as the section leader of Civil Engineering. Art later went on to work for McMoRan.

So following an early start there, I went and actually did onshore work. I did the first work after the EPA regulations, the Clean Water Act, and we had to figure out had to do a better job of saltwater disposal. So I worked on cleaning up saltwater. Of course, that wasn't a very well-received job at the time because salt people working in the field thought they knew how to do everything right, anyway. And anything I came to do cost money.

JT: Was this all in South Louisiana?

DG: This was South Louisiana. This was like Black Bayou and West Lake Verrett and West Hackberry. I don't remember quite all of them.

TP: Weeks Island?

DG: Yes, I actually did the saltwater disposal system at Weeks Island. I don't think Shell owns Weeks Island anymore, but yes, I did that.

TP: Jason has a camp right down the road from there.

DG: Oh, does he?

JT: Cypremort Point, that's where I grew up.

DG: Haven't been there in many a year. But I did that and then I went into the Offshore Group and worked with Norris Dodge, who was the construction superintendent. I think that was probably his title. So I worked in Norris' group doing some offshore work for a while and then I went into design engineering and worked on some of the early North Sea design works, the off-platforms and some of the Brent Alpha work. So this covered a period from about '68 till the early seventies.

TP: So you went over to London, then, or were you still in the U.S.?

DG: I did a three-month assignment in The Hague working on Brent Alpha installation engineering. They wanted me to come home for a week and come back for two months. Larry Smith decided I'd go for six months and take the family with me. So Linda and my youngest at the time went and we spent six months and four suitcases in eleven or twelve locations. But we got the platform loaded out and installed and worked on at Brent Alpha.

Then I came back to the U.S., to Houston, and that's when the design group started in Houston. I spent only a couple of months there and then I went to the Bellaire Research Center to work on concepts for drilling in the Beaufort Sea, which basically meant cone-shaped platforms. I did that for about a year, and at that time Cognac had been awarded. They were about to start it and they decided they needed somebody to supervise the fabrication, so I went back to New Orleans to do that.

TP: Was Gordon Sterling at Bellaire then too?

DG: No. He was downtown in the Central Engineering Group at that time working on design of Cognac. I worked for Wayne Ingram out at the lab at the time. Then I went to New Orleans, worked for Pete Casparian, who was project manager, so Pete had roughly sort of a three-group. He had me, he had Gordon, although Gordon was a dotted line to Pat Dunn. Gordon reported to Pat Dunn, dotted line to Pete, source of lots of consternation many times.

TP: Was Pat in the Head Office Central?

DG: Pat was in Head Office Central Engineering here at Houston, and Pat did that for many years until he retired. He did that from probably about '72, maybe even '70, until '94, perhaps.

So we worked on Cognac. One of the first things I remember is arriving and being asked to work on a cost estimate. I had recently worked on the engineering for offshore installation in the North Sea and things were expensive, and when I looked at what had to be done to put Cognac in, I came back and I think I said 275 million. I think it was only approved for 33 or something at the time. Then at some point it went to 105.

TP: For the cost estimate for the platform.

DG: Cost estimate for the platform, just the platform. And then another round of estimates at some point during that, and the next one I think actually did go up to 275.

TP: That seems to be the range that it ended up costing, right?

DG: It ended up costing about 245. And then some years later when I actually went back to New Orleans, I ended up selling the underwater hammers we'd purchased for that job back to McDermott. Didn't make much on it.

TP: So you actually purchased those from McDermott?

DG: We purchased the underwater hammers that were used to install piling on Cognac from a company called HBM in Holland. Or maybe HBG. I don't think they exist anymore.

TP: They were never needed for any other project?

DG: They were used, I think, on one other project and that's why McDermott paid us like $500,000 for them in about '81.

So I went to New Orleans to work on Cognac. Probably the biggest challenge on Cognac was we'd never built anything that large and the engineering people had a very unrealistic expectation of how accurately you could build things that are big. So our specifications had a quarter-inch tolerance on everything. When we got started, I said, "I don't think we are going to be able to do quarter-inch tolerance." But this was standard industry practice. You put quarter-inch tolerance in specifications, typically fixed-jacket. The dimensions are a little bit different, and the project team usually accepts it because it doesn't really make that much difference if it's pretty close.

I still remember on the very first leg section, which was probably 175 feet long for the Cognac base, that McDermott built the leg and made up the roll plate. I don't remember the diameter, eight feet maybe, seventy-two inches maybe, and they measured it and of course it wasn't within a quarter-inch of the specifications. So I said, "Measure it again." And they came back with a

different measurement. So I forced them to measure that thing for a week, and they always got a different measurement because of temperature effects. You couldn't convince anybody at the time in South Louisiana that this was an issue. So then I drew up a chart of what the dimensions would be at different temperatures and told them: don't go buy a thermometer, let's go measure, we'll correct those to reference temperature. Then I became convinced that we had to account for temperature in all measurements.

TP: No one was doing that even when they were building 300-feet platforms?

DG: No, you didn't need to do it for that. Well, the issue here is you've got twelve legs, which is unusual since most of them are eight. It's built in three sections. The base is built sitting in an upright position and the mid and the top are built in a horizontal position. When you put them together underwater, they all have to fit together and you have to put these kind of eight-foot-diameter long steel pipes down there and then cement them up to make the three sections into one. So I was afraid that we wouldn't be able to make it fit.

TP: Because once you installed it, it would contract or expand because of the temperature effects of the water.

DG: Because of the temperature effects of the water, the temperature effects during the day, the support conditions as to how the legs are supported, because you've got four truss rows. So we went through a lot of effort there. Then we eventually hired Boeing to use a device called a spherodolite, which had some military use at the time.

TP: Spherodolite?

DG: It's a large laser measurement device that you mount up on something.

So we set it up there and mounted it, but to be able to make the measurement, you have to determine what you're going to measure to. So you have to establish the right reference elevation and you have to establish the right kind of X and Y lateral coordinates. So you think you have a round leg, but remember, this round leg is made out of flat plates, so they're never quite truly round, but if they're within about three-eighths of an inch, major to minor diameters, they're acceptable. So where's the center?

But we developed a process to do that and designed large measuring templates specially made that would establish the center of the leg. We created a device that you'd shoot the laser in and it's like a prism and it shoots back out the other hole. And so by positioning this and a threaded rod, you could get it and say, "Okay, this is our reference." So we brought that thing down, set it up on top of the base

section, and measured the base. I was already worried about the middle and the top because they're built on their sides; they're not built upright.

TP: And had construction started yet on the middle and top sections before you guys were finished with the base?

DG: Yes, both were underway.

TP: So they had to be really close.

DG: The total project was three years, so the base started; let's say January of '76, maybe December of '75, and it was installed in June or July of '77. The midsection was installed probably about May of '78, and the top section probably about June of '78.

And you've also got sixty-two conductors in which well slots go through. Those all have to line up. And you have to be able to put the conductors through them and you've got, I think, twelve pull tips. So measurement, strange as it seems, was actually one of the big challenges on Cognac.

I remember we had to do a lot of software to be able to calculate all this stuff. So an HP 65 for one of my project engineers, Dave Hewett, told him, "Dave, imagine you're sitting back right here and they've built this midsection absolutely perfectly, these twelve legs. What readings should you get?" So when we went to Boeing in Seattle and they gave us the demonstration of why everything worked, you know, just using a nice rectilinear, like a rectangle, which doesn't get the impact of all the angles in it, it looked good. And then I told Dave, "Well now, given this set of data—." Because the answer they get should be exactly the correct dimensions. Well, it wasn't.

This is one of the things that I learned in the North Sea. Things that are at a matter of two different ways, you have to be really careful about the work, because things don't always intersect and come out where you think they do. So we did that, and they were duly embarrassed, but they found the error and we went ahead and did things, and it all fit together.

Probably two other big things on Cognac were the height at which you had to fabricate in the yard. Nobody had ever been that high before. So all the employees were asking for more money and there was these kind of labor issues going on. I'd probably be fired for this today, but in those days, Myron Rodrigue, their project engineer, and Fritz Focco [phonetic], the superintendent, and I, we got in a bucket and got up on the top and went around and took pictures and stuff. After that, there wasn't any problem. [laughs] Which wasn't too bad, but it was a long way in the air.

Then the other was how to install the sections. That solution we came up with was big lowering winches put on DB 15 and 16. Gordon probably told you all of this. He was in charge of all that, so he knows more about that than I did.

So we used people that worked -- Honeywell, Houston Systems, and whoever -- on the Jennifer Project recovering the Russian submarine.

TP: Global Marine?

DG: Yes, Global Marine. And so those were the people we used to design and do this system.

TP: I didn't know that they were involved in that.

DG: Oh, yes, they were. And we knew that they had done something, but they didn't tell us what they had done. Only many years later I learned about Project Jennifer.

TP: One of the OEC hall of fame guys I interviewed, Curtis Crook, he was deeply involved in the Jennifer Project.

DG: I know who he is, but he was, I'm sure, way too high up to ever have been involved in Cognac.

So those were probably really the big issues on Cognac; how to build it, and how to install it. I think the design tools had been pretty well developed. That part was okay, but the infrastructure to build it in one piece didn't exist at that time. So multiple pieces were the solution, but it brought a set of challenges.

TP: What did Gordon say? It's easy looking back in hindsight to say, "Well, we just should have built it bigger." But it would have been easier to build a bigger barge, if we had known we were going to install platforms this size routinely afterwards. But man, the amazing engineering that went into this three-piece structure.

DG: Then after that, I went back to Bellaire and supervised the offshore engineering group there for a couple of years. Wave forces, structures, solo mechanics, earthquakes, pipelines, and the Arctic. When I was there, I sort of moved our research direction away from what had been a lot of deepwater analysis. The dynamic analysis for drilling risers was basically solved and done. We needed to focus on the Artic and the behavior of the ice structure interaction and that kind of thing.

TP: So you worked on the icebreaker platforms?

DG: We started them. Then I left in January of 1981. I went back to New Orleans to be the manager of offshore engineering and construction. I think the Arctic research effort carried on for a few years, but for other reasons it got shot down. They made the Seal Island discovery, but it turned out non-commercial. I don't know the details. But anyway, the Beaufort Sea didn't pan out and the other prospects didn't pan out.

TP: The Chukchi was the most extreme environment.

DG: Yes, although we had worked on solutions that would work on the Chukchi. Actually pipelines were one of the big issues, but that had been worked on.

But in 1981, I went to New Orleans again; this time as manager of engineering and construction. At that time we were doing work on projects like Picaroon, the Corsair trend, deep gas and Cougar. I've forgotten the block number of Cougar, I think it was 331.

TP: That was pretty far out there, right?

DG: Yeah, Cougar was 300-and-some feet. But I think the significance of Cougar actually is that it was probably one of the earliest ones with some amount of turbidite reservoir characteristics.

TP: It was close to Bullwinkle, right, and Bullwinkle also had turbidites.

DG: Yeah, it's probably inshore from Bullwinkle somewhere. But as you get into deeper water there, everything that I worked with anyway was primarily turbidites. And it was a process of learning that the production behavior out of the turbidite reservoirs was greatly different than those on the shelf.

Then they decided I should have a broadening experience, so I became a production superintendent for the Maine Pass, South Pass, and West Delta areas.

TP: The old producing areas.

DG: The old producing fields. So everything from a few feet of water out to about 300-and-some. I don't know, I probably spent a year doing that. Then they decided I should be manager of production administration, which dealt with joint ventures, dealt with the regulatory, did the production manager's viewgraphs, presentations, the budgets, the long-term plans, the standardized measures. These are the things you had to report to the government to sort out how your assets would play out over thirty years or something. And the applications for drilling and production for the MMS. Spent about a year doing that.

Then I went to staff planning. So I spent two years and three months in Houston, doing staff planning, which means sort of figuring out who are the right people to put in the right places, how to convince you to give up your star and how to convince Jason to take your star, who he thinks isn't worth a damn.

TP: Did you get a sense of why then you were being moved around that way?

DG: Oh, yeah. I enjoyed many aspects of that. A lot of times you'd go out and learn from the people what they wanted to be when they grow up, and it'd help you do a better job of how to assign. Today that system has largely gone away and it's a system of job postings.

The other thing I did there was I went through two of these staff reduction exercises where you get called in and they say, "Dan, we've got 1092 technical professionals. Figure out how to get to 860." That was no fun.

So I went through a couple of those episodes. Then they asked me about four times to go to Brazil, and I went to Brazil.

TP: What time period are you talking about?

DG: I went to Brazil in mid '87.

TP: Right during the downturn.

DG: It was two years and three months before that, so it was the end of '84, '85, '86, early '87. Yeah, during that time period. Then I went to Brazil as general manager for the operations there for Pecten and as project manager for the Merluza project, which was a gas project in about 470 feet of water. Basically for Petrobrás.

TP: Was this one of those risk contracts?

DG: Yes, this was a risk contract, *o contracto do risco*. And you're a contractor, so I learned what it felt like to be a contractor doing that. But we got that job done. Then I came back to New Orleans in 1990 to work on Project X, which was Mars. There was a small team.

TP: So you were assigned specifically to Mars. Did you work on Auger?

DG: No, Auger was well underway when I came back. Well, we probably thought it was further underway than it was, but it still was well underway. No, I was working on the next one.

So we had an integrated team with BP, and Gordon was leading it. To start out, we worked on various concepts. So early on I led a group of a few people to work on a compliant tower for Mars. So we looked at the compliant tower for three drilling rigs.

TP: Three drilling rigs?

DG: Yeah.

TP: On the single compliant tower?

DG: Yes, on the single compliant tower.

TP: Did you look at Lena? Were you sort of going off of Lena?

DG: Well, no. It wasn't going to be a guyed tower. But it was just long and slender enough that the natural period was outside of things so it would work. McDermott really did the engineering work for most of that. A young guy from BP, Mark Bly, he worked with me on it. But it had several things, so we looked at a small version of the TLP, and we looked at subsea back to East Bay. I think there were eleven or twelve concepts. Gordon should remember, but I don't.

TP: He talked about that.

DG: We really moved to the TLP. This is probably a little bit of my perception or opinion, but I don't think the TLP was actually preferred by a number of people at that time, maybe if for no other reason that Auger was. I don't know. We looked at all kinds of things, but what it really got down to was the production you're looking at, what we thought the uptime or downtime was for subsea wells, the perceived advantages of being able to directly enter the wells from the platform. You know, every time we would do it, it would show an advantage to TLP.

TP: For those who didn't prefer the TLP, what concept did they like or did it vary?

DG: You choose your favorite. The compliant tower with three rigs actually looked like a good solution, but I think at the end of the day our senior management was really concerned about that amount of risk with the simultaneous operations of three drilling rigs. And as it turned out, somewhere during that time frame we got more information on the productivity of these kinds of wells.

TP: From Auger, or was it from Bullwinkle?

DG: No, this was actually from a Mobil lease and I don't remember which one it is. It wasn't from Auger or Bullwinkle. Auger wasn't installed yet, and Bullwinkle wasn't that good . . .

JT: I know they increased the choke on some of the Bullwinkle wells, just to see how those turbidite wells would react.

DG: Yeah, it may have. But I'm pretty sure it was a Mobil platform that was one where they were like 7,000 or 9,000 a day. So if you don't need eighty wells, you're not going to do a three-rig compliant tower.

Then there were people in Pat Dunn's group in Houston that liked the idea of the tension-leg well jacket, which has never been done, but it's basically building a tension-leg platform with a couple of lateral mooring lines going out and you pull it over. So if you've got to work on the wells, you come and work on the wells. Are you familiar with what a well jacket is? It doesn't have its own rig. It's sort of the shallow-water well jacket analog for deep water. And we looked at that for up to 16 wells. But you know, the field looked like 24 was more the right number. Probably maybe not enough, but this is all balance of trying to figure out what's economic. So somewhere in there we learned. For doing cost estimates on Mars when we said, "Okay, it's going to be a TLP," and BP agreed. Well, we had very good analogs because Auger was recent. I mean, it had been underway maybe two or three years, but the data was good. It's was good as you're going to get.

TP: They had a lot of wells at Auger.

DG: Well, no, it's still at McDermott at the time we're doing this. This is before we ever get Project Mars approved. But you know the construction costs. Well, we know the construction costs for Auger and you can make estimates of how that would be for Mars. So make an estimate, you know we'd do this, and you can't make the project meet the third world. Now, of course, from the time Auger was approved, it went up from like $500 million to $730 or something, for just the structure part, and I think oil prices had gone down. So whatever the combination, we had to improve the economics.

So I remember Pattarozzi calling me in one day and said, "Dan, you've got to improve the earning power by 3 percent." So earning power is kind of like rate of return. Well, it's hard to improve 3 percent on 1.2 billion. It really is. You know, if you did it all by the time value of money, on schedule, you'd basically have to do the project in no time at all. If you did it all by cost, you had to get out something like $400 million, I think, which nobody thought was even remotely possible. So what do we do?

So I put the project on hold for three months, we kind of went back to basics. What do we have to have? What fits the purpose? What do you really need here? So we said, well, we don't really have to do this like Auger did it. We don't have to have a lateral mooring system. We don't have to have that egg-crate truss

system they've got on top and then you set all the modules on top of it and the drilling rig that used the lateral mooring system to move it around. What you're doing is you're using one structure to support another structure. Well, if we integrate those modules, weld them together and make them a part of the structure, you don't have to have as much steel, costs you somewhere between five and fifteen dollars a pound to float the steel. It's a way to get the costs down. We looked at other things, did a risk analysis, decided we didn't really need to have these big nets between the columns to catch a wayward boat that's going to hit the well risers. Then we thought, even if it did, that you had protection, at least two pads. So we spent three months kind of going back to basics and sort of redefining what the TLP function and design basis, what it all looked like.

JT: What about the geology of the Mars Field? How did that play into these cost estimates? Was the geology pretty close to what it eventually turned out to be? Was it that big? Did you guys know that at the time?

DG: Well, the geology doesn't really have much impact in this case on what the surface facility is.

TP: It could reduce the number of wells, though, right?

DG: Well, the geology can affect the number of wells. I mean, Mars has at least seven producing horizons, and I don't remember what they all are. So you have to have the scheme of how you're going to complete the wells. The bigger issue, actually, was the shallow-water flow problem that in some 1 to 2,000 feet you'd drill and there's a pressured-up zone in the water and they'd lose the well. This led to the idea that, well, we would batch-set all the wells. They would be underneath the TLP. We'd batch-set them through that zone and cement them in before we ever went out there. You know; all twenty-four wells. Because you didn't want to take a risk of doing that and then having one of those flow problems and losing what you had and possibly even losing the foundation for TLP. This had been a problem on the Mars wells, on the Ursa wells. It was a big problem. So this was one of the big problems, the shallow geology at the time, and the shallow water flow.

The deeper geology, I don't think it had any real impact on what we put on the surface. If it had all been one big box, one big reservoir, could you have done fewer wells? That might be the case. But given what we had.

Now, how has it turned out? To the best of my knowledge, it's turned out pretty much better than expected. The reason I say that is that in November I went and did what's called a value assurance review on Mars B, which was a proposal, and what's called Mars Deep, or Deimos. So if you've heard of Deimos, there's a couple wells tied back to Mars. Well, this is deep stuff. What most people have forgotten is Mars was always a phased development, but we didn't actually know

for sure whether we needed the second. But the plan was, you would do Mars A and then you would find out whether you need Mars B or whether a second TLP.

TP: I didn't know that.

DG: Oh, yes. That was always part of the plan.

TP: Because it was such a big field?

DG: We thought. I mean, we thought it was around 700 million barrels equivalent. The first platform was supposed to develop 500-ish. But you couldn't figure out exactly how to get it all. And there was thought to be more potential in some places, and I think that has come to pass. Now, will Mars B ever happen? I don't know. I don't think, at the cost estimates I saw when I was over there. Mars has got a 50,000-ton displacement and Mars B was about 110. So this is a digression, and probably you can forget about it when you do your stuff because it may never come about. But, you know, the reason is that after the recent hurricanes, the criteria has increased, and so the column height and the deck clearance, so now you've got a bigger structure. This one is drilling to what's called Mars B, so you have to have a bigger drilling rig so there's more weight. So when people kept asking, "Why is this thing bigger than Mars A?" Well, I don't know if it needs to be a 110,000-ton displacement, but it does need to be bigger than Mars A for those two reasons.

Anyway, Pattarozzi said, "We have to improve the earning power 3 percent." We started over. We ended up with a plan.

TP: You found ways to redesign a little bit, but you couldn't get the 3 percent just by doing that.

DG: No. So I said, okay, Shell has a fairly high internal discount rate. Or did, anyway. Probably still does. So the time value can be significant. So how do you reduce the time? Well, the guy's sitting at the computer designing is probably not going to be able to reduce that much, and the guy welding it can't put one over his shoulder doing it, so you have certain limits. So what in that space of time can you reduce? Well, you can reduce that where you're doing all the detailed design, your bidding it out, your getting bids, your evaluating, your negotiating and . . . Warning: that's a long time. That's probably nine months, and today, a lot of times, that's probably even more than that. So I said, "Well, maybe we can improve on that."

TP: So whose initial idea was this? Was this your idea?

DG: I think it was, but I think I stole it from the guy doing the aluminum plant in Brazil.

TP: Oh, really?

DG: I learned a lot in Brazil about doing things under 94-percent-a-month inflation and doing things differently.

TP: There is high time-value of money down there.

DG: I think it was my idea, but I think I plagiarized it. You know, a completely different setting, but the idea was the same. Well, how can we do something and set it up in a risk-sharing way that we can do this? But it's not a totally new idea, because if you go out here to—I think Texas Highway Department at the time was doing design/build fast-track. I mean, you hear different words, there are a little different meanings to all these things, but it's not a new idea. But it's kind of new to the offshore.

TP: It was novel for that part of the industry.

DG: And the reason is because you can't get three bids in a cloud of dust and feel confident, "Okay, now I've got a fixed price." What nobody ever realizes is, well, you've got a fixed price, but things always change and that fixed price didn't mean that much anyway. But senior management never really seemed to remember that.

TP: If you ever had any renovations done on your house, you know that's what happens, right?

DG: They can't keep their hands off of things. So it happened. So what we did was we looked at the different contractors, we interviewed them. I actually probably covered that fairly well in that paper I gave you. And said, "Well, here's your chance." You always said that if we did things differently, it wouldn't cost as much. Come make a proposal how to do it differently." And they really struggled with that.

I remember Bobby Rawl from McDermott coming in about three times saying, "What is it you really want?" And I said, "I want you to make a proposal that leverages the way you work, your facilities, your stuff. You always say 'Show customers 5 percent more than others.'" "Okay, tell me how you can take it out." Of course, when you do this, none of them ever can. And I think the reason Shell and Exxon cost more is probably because we're more involved in the management of the execution and so we probably cause more consternation to the big fab yards because of that and this probably leads to some higher costs. But to say it's the specifications, it's really not the specifications, usually, because many things are sort of based off of API or other things. People can add onto them and do stuff. So I won't say it's all that, but a lot of that.

TP: Besides McDermott, who else were you asking for proposals?

DG: We looked at forty different contractors. We narrowed it down to those that we thought could work this way or had an interest in doing it this way or weren't already occupied for the time period. So we had three hull people and four topsides people. And you're probably going to ask me who they were.

TP: Were they international?

DG: Belleli was the hull. Avondale Shipyards and Aker Gulf Marine, I think, because they had an idea for concrete because they were part of Aker Gulf at the time. The topsides was McDermott, Aker Gulf Marine, must have been Brown & Root, and the fourth one maybe was Gulf Island. I don't remember for sure. But it really came down to between Aker Gulf Marine and McDermott.

So the idea we eventually came up with was we would make this presentation and Jack Little would say, "Dan, we can always bid it."

"Yes, Jack, we can always bid it. No matter when, we can always bid it."

So he went, "Oh, okay, go ahead and continue with what you were trying to do." We'd continue, and three months later we'd have the same presentation and discussion. And so by about the mid part of '93 now we had proposals from the companies and we were told to go ahead. And so it's a 100,000 barrel-a-day facility. It's 2940 feet of water. "Okay, guys, you're a contractor. You know about what that is. You don't have all the details, but you have experience, you've done a lot of stuff. We have an idea what the cost should be, and so come up with a methodology for how we can price it without ever drawing—so here's 15 drawings. Generally what we're going to do, we're going to end up with 1500. But give us a price and a method."

I have to give Belleli, the Italian company, the biggest credit for coming up with some of the ideas about how to get a way to go about it that would be acceptable to both sides.

JT: Do you mean like cost overruns?

DG: I mean *preventing* cost overruns. And so the contract structure would be partly a fixed fee to cover the basic overhead costs and profit. So you choose your profit and put it in that fixed fee. Partly reimbursable based on, okay, we've got X feet of pipe. Well, we don't know if it's 20,000 or 25, but we know it's more or less somewhere around there, so give us a cost and you can adjust that. There's a unit cost. And then to fabricate things, you build things, I mean, they estimate cost based on man-hours to do some kind of work. So they all have this stuff back in

their cave back there somewhere or they've got it filed away. So you take a couple of your guys, take a couple of Shell guys—and then this was the big sticking point—you go back in that cave and you pull out analogous pieces of work, and you divide up a platform like this into a number of different kinds of work, and you target man hours for those pieces.

Then when we eventually give you the drawings, you calculate a price based on those man-hour targets. Then we'll have an integrated team at the site that will work together to try to find a way to do the process better. And if you can do that element in fewer man-hours, we'll pay you for half the hours between that and the target you didn't work. If you go over it, we'll pay you for half of what the overage was.

The 50-50 was important because then you could get the Shell guys to buy into this idea and work with the contractor to do it. McDermott wanted 72-28. That was Bobby's proposal.

TP: So if they went over, you had to pay them for 72, if you went over, and if they went under, then you had to pay them the 28.

DG: Well, if they went under, they'd get 72. Let me see if I got this right. Basically they took no risk, no real risk, because, you know, 28 would cover it.

TP: So that was a sticking point, getting McDermott to come down to that 50-50?

DG: Yeah, but they got the message. And you know, what we were trying to do is to say, "We're going to go into this on a sort of an intention basis. Yeah, this is a contract, so all of the terms and conditions, all that stuff, we've got all this stuff. But really it's about how are we going to say we're going to work together to do this job. And if you're successful at this job, we may all have a future and you should be well positioned for the next job."

So by the time we got these proposals in and evaluated them, we could say, "Okay, topside's going to cost X, and it might vary like this." We can tell it's going to cost X and it may vary like this, but it's not like we don't have an idea where we're going to end up. And so when we finally got to Jack and showed him what the economics were, "If you approve it today and we go get started, we're going to end up somewhere in here and this is going to be the economics. We can wait and finish the design in another eighteen months, have it designed, bid out, we can award it, and here's what the economics are going to be."

TP: Time is the issue, right?

DG: Time is the issue. So that value money brought back all that production. They always said, well, we trapped them in this because when they see that, they look

at it; well, you can't possibly be that wrong on the costs to affect the economics that much. So we went ahead, but all our senior leaders, of course, were very nervous. I was nervous because if the contractor doesn't behave on it, if your team doesn't behave on it, you can screw it up.

TP: And there have been some contractor problems on Auger, right?

DG: Yeah, and we were trying to figure out how to overcome those.

JT: Was McDermott the leading fabricator on Auger?

TP: Yeah, they did the topsides.

DG: McDermott did the topsides and Belleli did the hull on Auger. So it turned out Morris was the same contractor.

TP: Were you working with the same people that worked for them on Auger, or they had different teams involved on Mars?

DG: We pretty much set up different company teams and different contractor teams and we said, "We're going to do this differently and we're not going to have those problems." This was also in a time period when Shell was going through all this, I don't know, reinvention or—

TP: Transformation.

DG: Transformation. Phil Carroll and the transformation, you know this better than I do. So we brought the work process stuff into what we're doing. I mean, there are good pieces to some of that work. We actually took it to the Italians. So, setting up these integrated teams, then we had a steering team, so we'd have myself and my superintendent and somebody with McDermott or with Bobby Rawl and Frank Smith. So you'd try to get top guys and get a facilitator from outside and say, "Okay, what are we as a steering team going to do?" And most steering teams, what they do is, when people can't solve a problem, they throw it at the steering team, the steering team says, "Okay, here's the answer." We said, "We don't do that. Okay, guys, here's your guidance on how we want you to behave. Go sort it out."

TP: Push decision-making down at the lower levels, which gave them more freedom but also more responsibility.

DG: I'd say a lot of my work was more change management than project management. How do you change manage the company, the Shell company? Because there were many, many naysayers in Shell that thought this would never work. And this is typical for project teams. You've got to manage up, you've got to manage

all these other groups outside that think they know better than you do, and then you've got to manage the people below you. So doing something new, it's a changed management process. How do you get the organization bought in and supporting you?

What I see as sort of the measure of success on that was that when Ram-Powell came on, couldn't make Ram-Powell work, so it was decided to be sort of a clone of Mars. Well, sort of. But we eventually said the same site teams will take on both projects, with a little bit more help. This was actually a big area of disagreement between myself and Lou Wilkerson, because Lou wanted to take the Mars guys and get started on Ram-Powell and I said, "Wait a minute. You might get some, but I can't just give you everybody off of Mars at this stage of the game."

And of course Exxon was a partner; so, different partners. I don't remember how the decision got made, but eventually I said, "I think we've got to give it to the two teams. Lou, you and I have got to agree, we've got to do a performance agreement, and I think that I'm taking more risk in this and you think you're taking more risk, because I think the team will focus on the new stuff. They'll focus on Ram-Powell in the beginning, but then they'll realize they've got to finish Mars. We'll let them make the decisions rather than having two teams in the contractors' yard fighting one another." So this is just different viewpoints between me and the Ram-Powell team as to how it should be done. I think Pattarozzi finally had to break the tie. But we did that.

TP: How did you end up doing it?

DG: The way I wanted to. And it worked. Then Ursa came along. So by this time, the contracting approach was Bob Howard and Jack Little's idea. "We're just going to do it the same way." Okay, you can have the credit if you want it. [laughs] But it was a lot of work.

TP: So, going back to implementing this new contracting model, who else was working with you at Shell on doing this? Who were your chief lieutenants or the people on the steering committee and even below that?

DG: We sort of changed the organization as we went along. But early on it was John Haney. Poor John has worked for me about three or four times. But John was done in Brazil and so I got him as a construction superintendent. So John was working on it, and then Dwight Johnston and Aubrey Pippin was the topsides. Aubrey didn't work on it so much; he was more involved with the engineering. And probably the big thing we did on the topsides engineering was we sort of pushed Bill Linder and Waldemar Nelson to form an alliance, and they did. Because Linder and Associates are great on the piping, but Nelson's good on the

electrical. You really need to get them together. After a while they got the idea and they proposed that.

JT: Your plan trickled down to the actual contractors perhaps.

DG: Oh, yeah.

TP: You build a certain kind of incentive system, right?

DG: I knew Bill Linder, Bill used to work for Shell, and Bill would call me, and I'd say, "Bill, you guys need to go figure out how to do this." Well, I mean, it's up to them, of course. You can't force anybody. You don't want to force them, but you can encourage them on the way. So we probably digressed a little bit.

TP: Was Ken Arnold still with Shell?

DG: No, Ken was long gone. Ken was gone in about 1980 and had started Paragon.

TP: He did topside facilities engineering.

DG: Yeah, he had Paragon here. But we did New Orleans because, as I said, I wanted the team here. I didn't want them off traveling all the time and I didn't want all those communication problems. We said, "We're going to, by the way, set up a place and we're going to put our people over in your building." So we put our facilities people over there to do that.

But on this idea, Stefano Ferrari with Belleli was their commercial manager, he was the one proposing a lot of the ideas. So I give Stefano a lot of credit for the ideas. Then Gulf Marine was under a similar kind of thing, but they wouldn't do the 50-50. They had a plateau. And we said, "Well, we don't know the right answers. We're willing to try a number of things." And we did it.

So in those early days on the contract, Joe Kramer was the purchasing guy. Joe's over at Woodcreek somewhere. John's actually at Woodcreek too. He's now working on the Australian floating LNG, I think. Aubrey is retired. Dwight Johnston is still in New Orleans. I don't know if Dwight's an asset manager or asset support manager. Actually, I went through three different guys as my yard manager. Dwight started it. Dennis Weber was on the contractor's side, on McDermott's side. Then we had John Tarbell, who came in for a while. And then Jay Thomas was the final one that led that team in Morgan City. There were other engineers working on there.

TP: That's a good list.

DG: I would probably have to look up stuff to figure out who they were.

TP: We could probably find them in *OTC*. Would they be authors of *OTC* papers?

DG: And then Charlie Stewart led the hull team in Italy. Charlie's like a construction superintendent kind of guy rather than an engineer. Charlie first worked for me on Cognac. He came from doing pipeline work, learned from Tony Nicosia [phonetic] and got his AWS qualification. He's an ex-LSU football player, but Charlie now probably knows how to construct offshore things better than the contractors.

TP: Is he still at Shell?

DG: Yeah, he's in K.L. So he led the team.

This is kind of responsibilities on this organizational chart. Well, that doesn't have everybody in it. It kind of shows the org chart and how it was put together.

TP: That's a good organizational chart.

JT: Is that all the people who work on it?

DG: No, not the people.

TP: Some of the people, anyway.

DG: Here are the notes to my speech to the Ram-Powell guys about how cloning would be the most difficult thing they ever did because no engineer wants to accept what somebody else did. It's the strategy of standardization.

This is that topsides group at McDermott. That's the kind of stuff that we'd put together in these facilitated meetings.

Let's see. John Haney. Under John we had Bob Marshall, who was a BP guy that's long gone. Bobby Cox, retired, Shell. Dick Shell, Dick Garside, who was with BP somewhere. Brian Miller.

TP: How did it work with BP on this?

DG: Well, I think it worked just fine. The early days were a little rougher, when Bob Wilbanks was their manager, because I think Bob thought he was at a higher level, he always wanted to deal with Carl Wickizer or somebody. Early on, though, he got replaced by Judy Wagner, and Judy was excellent to work with. I have no complaints. We had, I think, seven BP people on the team.

David Hayes, who used to be at Shell, who I knew from overseas, worked for Judy. They wanted to be involved in the worst way. They came over and so we agreed on some people. David brought them over and we sat down in my office and closed the door. We basically promised to treat them as best we could, like Shell people. And he basically told them, "You're here, you're on your own. Do the right thing." Once in a while they had to go back. They were BP employees, after all. They had to go back and do some things, but they were fine.

BP, in many cases, helped us move the project along because they actually approved it before we did, which is quite unusual for your partner to approve first. That's because they wanted to start their funding process early, they wanted to get it early in the year. There's a lot of talk in the industry about how BP learned so much from Shell and all that.

TP: That's what I was leading up to. I wondered what you thought of that.

DG: What I'd suggest is go find out the answer. Go find out how the projects these guys worked on after they left Mars turned out and then we'll know whether they learned off of Shell or not.

TP: Well, we know the answer to that.

DG: I think I know the answer. But within Shell and probably the industry there's this feeling that BP worked with Shell and they got all this and they went out and they got all this other stuff. Well, they did. They went out and they got the leases in Angola and they got stuff in the Gulf of Mexico. Well, nothing at all to do from the team that built the TLP. It might have been from the people that Shell let go in exploration that they hired. I know there were some of those. But I don't think they got it off of us. They went on to do Foinaven and Schiehallion, which were FPSOs off the west coast of Scotland. I don't know where all the guys went.

TP: Did they go to Thunder Horse?

DG: I don't know if any of them worked on Thunder Horse or not. At the end of the day on Mars, we started out on a schedule that all the contractors thought was not doable and we ended up beating it by three months with a cost that was too low. I managed to stick west of 143 as a platform to bring pipelines in there. It wasn't in the original scope. I don't know what we finished under budget, $40 million or $60 million or something. It's good to be lucky.

TP: So why did you say you call Mars the burning platform?

DG: Well, I call Mars the burning platform because it gave me the opportunity for people to recognize the need to change, because if everything would have worked out okay, we'd have gone right along and done much like Auger. We'd have

done the same old thing. But the economics didn't work. So it's a burning platform in the economic sense that it's a case for change. You know, burning platform is usually the analogy that's used, when the platform's burning behind you, you'll change your preconceived notions about what you'll do to get away from it. Maybe you haven't heard that one before.

TP: No, I hadn't heard that.

DG: It's an analogy usually that's used around change management in an organization. How do you change work processes? How do you change cultures?

TP: A burning platform will get you to do that.

DG: A burning platform will get you to do that. Status quo, it's really, really hard to get you to do it. You probably won't even recognize that you need to do it. So that's why I call Mars the burning platform. It gave us the impetus to do something different. So then you knew you had to do something different because you didn't have a project. If you didn't have a project, you didn't have a future. So what do you do? So you got a little more creative in how you go about putting the pieces together and about how you go about the contracting.

TP: So you were able to apply this model again to Ram-Powell, to Ursa. Brutus? Did you do it on Brutus too, or was that beyond your time?

DG: Brutus, I was already on the Netherlands. I don't think so. Well, the topsides may have been. But by this time, the Belleli brother that handled the air conditioning business, or whatever it was in Saudi Arabia had basically put the company under and it had been taken over by ABB. But ABB didn't have it for very long, so basically Belleli disappeared. Now, they had been having financial problems all the way through. I mean, we recognized during Mars that they had financial problems. In fact, when I was over there for the Mars load-out—the hull was built on land and you load that onto a barge and then you sink it out from under you. You put it on the Dockwise [ship] with the heavy lift vessel and bring it across the ocean.

When I was over there, you found out that the craft people had not been paid for a month. This whole issue about getting it loaded out was a big deal and I decided to contact our finance people and then we would sort of advance, I don't remember what it was, two million, maybe, half a million, a fair amount of money, but in the overall scheme of things for what you want to get done, you're going to pay for it anyway, and if it keeps those people there and gets your platform loaded out. So those kinds of problems existed. So Ram-Powell went into this thing with this kind of backdrop, and Ursa went in with this kind of backdrop and they were continually fighting it. I don't know the details about how it all eventually came apart.

So then they went to Korea, I think, with the Brutus hull, and I don't think that this methodology is going to work in one of those yards, not in a shipyard. Now, most companies have some stage-gate process for how you advance the design and get approval, go from stage to stage, and many of them hire independent project analysts, IPA, to evaluate your front-end loading, give you support. I actually used IPA on Mars. But there's no way they could support what we were doing, so I eventually had to get rid of them.

But all project management stuff will tell you, get the front-end loading done, get the design done, so we knew we were taking on a new way to manage something. So if you're going to do it differently, you really have to think about how you're going to manage it differently. So to manage it differently was the contracting approach, was the integrated site teams, it was how can we make these integrated site teams really work for the good of the project instead of them fighting one another, and how can you have a steering team that will provide the right kind of guidance and support to the site teams.

With McDermott we did one thing I had to get involved with that you might call an extra, and that was because they had given us a fixed price for drawing reproduction. But as our site team worked through this, we found we didn't know as much as we thought we did about the sequence to build things in. So we'd end up doing things faxing it down. So another unusual approach is building off of faxes. You don't really want to do that much. And then you'd get the drawings. Well, due to this nature, I think they had 30,000 in there for reproduction. When they hit 600, they thought that maybe it was, maybe it wasn't, so we agreed. And there were a few other little things.

With Belleli, there were two things in the contract that were just completely contradictory somehow. The site team couldn't resolve it. So he moved on and I sat in the back of a car one night as we were being driven somewhere and said, "Okay, what did we say is the steering team? We laid out how we would solve problems. So let's forget about how and let's just apply it. And we apply it. Neither one of us is happy with the result. So it must be fair." That was one of our guiding principles. We said we wanted to treat each other fairly, as best we could. So we didn't have a lot of extras to negotiate about because they were all covered under these mechanisms to make the changes that were already based on fact. That's key, to base it on some kind of fact from the past.

TP: So you were able to advance this paradigm on a couple of other projects. I've seen the talk you gave at Rice on this. How has it been received or applied elsewhere, or has it?

DG: Well, my talk on Rice was a bit different. They asked me to talk about something about contracting. I can't remember. So I tried to sort of revisit the history about

how I see things going between owners and contractors, and it's sort of who's got the power. A couple of years ago, this was at the time when we were seeing that big upsurge in contractors getting even. So my message was, it'd really be good if we could find ways we can work together to best manage the risk. Manage the risk, and be careful you don't kill the goose that laid the golden egg. That probably doesn't appear in my viewgraphs. I made viewgraphs, and my talk had something to do with the viewgraphs but it also had a lot of other stuff. And I probably tied it back into what had happened twenty years ago and how things had gone. But I probably did cover some of the Mars stuff.

TP: Do the operators in the deep water apply any of these principles or is this just a specific point in time?

DG: To the best of my knowledge, this disappeared with Ursa. It kind of coincides with the globalization of the EP business . . . . When Neil Gunn replaced me when I went to The Hague, so he's a Brit. And Herman Zonnen [phonetic] replaced somebody or filled a superintendent job. Well, none of these people have a background that leads them to believe you can work with a contractor this way. They all come from a background of adversarial relationships. There's a lot of that in the U.S., too. Most of Shell is just that way. But the idea of alliancing and partnering was in vogue for a period of time there.

TP: In the early to mid nineties.

DG: And I always took pains to say, "This is not an alliance. This is not a partnership. It's just an alternative approach. Because probably all three of us have a different idea of what alliancing means, and we probably all have a different idea of what partnering means." And those words are being thrown about and used, but almost always they have a connotation of a longer-term commitment. Well, you've got partners in these things, you can't say, and I don't think today we can say, that "Yes, we'll commit to give you the second one." I think that you should be in an excellent position to get the second one, and we ought to be able to convince everybody that's the right thing to do if you've done an excellent job. But to say that the next time we get a partner is Exxon or BP or whoever, and they're going to agree that we're going to do this, I can't make that promise. And you can't make that promise in Shell. All you've got to do is have a different boss. We were lucky we had Pattarozzi there. Once we got him supportive of it, he was supportive.

We actually expanded this Aker Gulf Marine on building with big twin cranes and setting the modules and integrating them with this contract. We expanded it to Heerema for the offshore installation. There the sharing was around the estimated times rather than the estimated man-hours because of the nature of how you price offshore work.

We extended to ABB Vetco Gray on building some of the jewelry that goes on these things. That was only partly successful, but it didn't last very long because there were too many naysayers in our organization and Exxon's organization at the time. The reason I wanted to deal with ABB Vetco Gray was a completely different thing, machine things and all that. The reason was we'd have this project, this project, this project, this project, and they're all fighting one another, and they're shot. Well, get together and have a team working with Vetco Gray on a leadership level. So we tried hard with that, Don Grierson with ABB Vetco Gray, and used Mike Cushman as a facilitator. Mike Cushman was the facilitator.

TP: Gordon mentioned him.

DG: He did a lot of work for McDermott, so they wanted to use him as a facilitator. I was fine with that, so we did it. Then I got Mike involved doing a facilitation of similar things with Aker Gulf Marine. On Heerema we did just on the team, John and I. I think that's probably all we used Mike for. I mean, I used him when I was in pipeline for a couple of safety meetings in Illinois and California. So he's got a lot of experience with this stuff, and since then he's done a lot of work for BP. He's probably somebody you should talk to for a different perspective.

JT: He is a consultant, right?

TP: A consultant and a facilitator.

DG: Probably an adjunct professor at Tulane and a general in the reserves or something.

TP: That's right, Gordon had mentioned that he was a military person.

DG: I don't know if Mike's exactly retired yet or not.

TP: Would he be in New Orleans?

DG: Oh, he is.

JT: Is he in the reserves, or in the National Guard?

DG: National Guard is probably the right description. But he got called up. I mean, he was involved in this business when we had the wayward —where did we have the wayward bomb and the Chinese Embassy stuff? And the Bosnian stuff. Well, he got called up and he was in Washington and somehow involved in some of that stuff. But Mike would have a very interesting perspective, perhaps, on how this process worked between the owner and the contractor, because I tell you, many a time I used him between Bobby and I as a way to solve the problem rather than us

just having to sit down and solve it right now. Give us space to work out the thing through an intermediary. I suppose Bobby realized we were doing that.

JT: Let me ask a couple of clarifying questions, if you don't mind. Going back, you said that part of your ideas for this new contracting model was stimulated by your involvement working in Brazil. Is that right? Could you describe that a bit more?

DG: Well, when I was in Brazil, we were doing this offshore gas platform. That was a subsidiary of Shell Oil called Pecten International. Now, at the same time there was a Royal Dutch Shell group in Brazil in the downstream distribution and they were involved in building an aluminum plant in the northeast part of Brazil. So I used to have a number of discussions with the head guy of Shell do Brasil down there about how things were, and occasionally would go to his staff meetings, especially if somebody from The Hague came, so I knew some of the different approaches they were doing. They had the same problem I did.

JT: High inflation.

DG: This was driven by the high inflation problem. We bid it out, and the bids you'd get from the local Brazilian companies because of this are huge. I mean, they're maybe ten times what the international bids are.

JT: Because they're factoring in 100 percent inflation.

DG: Now, of course, we had estimated our project based on doing the work in Brazil. We had estimated some amount of increase and a certain amount of imports, but not too many. There are rules about how you import things to Brazil. There's the ICM tax, the IPI tax. Basically it costs you three times whatever the cost is to get it in. You've got to go through the certain government department. I'm not sure if it's Customs or not, but there's a group you've got to import through, and you have to go through Banco do Brasil. So it's a real pain in the butt to get it imported, but you can do it. There's a rule set up and you can either get the Brazilian companies to say, "We don't do it," or you can take the comparison on the bids, and if the difference is that much, you can do it.

So we ended up importing all the topside stuff out of the U.S., but, of course, it cost twice what we estimated because to import it is three times the actual cost and we'd only estimated a time and a half to do it in Brazil and not ten times or eight times or whatever. So I was interested in how they were getting around some of these problems in the aluminum plant. Well, they were getting around them because they weren't doing these lump-sum contracts and locking things in. So you'd go along and you'd do this. You've got this inflation and then pretty soon you'll cut three zeros off the currency. So in a way, they were basically working with that system. But what I saw it did was it allowed them a way to do it faster and they can still get it done. So I said, "There's an idea there that maybe

will work here." I think I read something from Construction Industry Institute about this fast-track stuff or design/build stuff. I read something about it, I think there was a 2-90 interchange.

TP: I didn't realize the group was involved in building aluminum plants in Brazil.

DG: That was MRN. Now, this is 1988-1989 timeframe, so today I don't know.

TP: Before they scaled back into the core businesses. Interesting.

Well, I don't want to take up too much of your time. This was helpful.

DG: You can come back any time you want.

JT: I wanted to ask you a question that Gordon couldn't entirely answer for us. It was about the oil and gas from Mars. He didn't know what the contractor was that built the pipeline, but he seems to believe that it was sent to a salt dome cavern for storage.

DG: Yes, it was.

JT: Can you tell us a little about that? He wasn't very clear on what happened to the oil and gas once it got to shore.

DG: Some of the problem with the Mars crude is that it's 2, 2 ½ percent sulfur, so it's not low sulfur. It's got high metals content and this tan number. The implication is that refineries like Norco can't take it. So how do you get rid of the crude? So Shell Pipeline at the time did the pipelines on our behalf. But that was quite new. So you'd have a 24-inch oil pipeline, steel catenary riser, pipeline, I don't know, 90 miles or whatever it was, West Delta 143, the booster, and then 79 miles or whatever, I think it's 30-inch, into Cloverly. We got a rig and we leeched out one of these 3-million-barrel caverns to store it in. This is at Cloverly, St. James. Then you can go into five different pipeline systems, which can get to refineries that can take it. I think the gas line is fourteen inch. I might have messed up the diameters on it. It might be eighteen-inch pipeline out of Mars and fourteen-inch gas line to West Delta 143, and then from there it's a pipeline into Venice for the gas. And that is written up. I don't know if it's in here or not. Do you have the OTC papers?

TP: I haven't gone to get them yet.

DG: I haven't looked at this, I don't know what's here. But there was special session at OTC, and then I gave one of the luncheon talks, which I can give you the presentation, I just can't give you the words because I didn't write them down. I

gave it from the charts. They're all the same thing. I thought it was the whole set. I must not have the whole set.

TP: Well this is good. We know where to go, then. We have it in the library.

DG: Yeah, I presume the others are referenced too. And they probably get into a lot more technical detail than you guys can. Let's see which ones.

TP: All May 1997.

DG: Rodrigue, John Haney—number two, the one that John—

TP: The Alternative Contracting Strategy. Okay.

DG: Yeah, that's interesting. I don't have a copy of that.

TP: And Ferrari is authored there.

DG: Well, this is all the key people. John was probably my real sort of leader in doing this. Dwight was there too, but John was across hull and integration and the installation, probably none of the topsides and Dwight is probably just topsides. So you've got Stefano, Meek with Heerema, Myron Rodrique with AGM, Frank Smith with McDermott at the time, Charlie Stuart.

TP: Is that the same Charlie Stuart who wrote *Geopressures*?

DG: No.

TP: No, that's a different Charlie. There was another Charlie Stuart at Shell who worked on drilling, and geopressure drilling concepts, way back. The name is spelled exactly the same. I wonder if they're related at all.

DG: I don't know the answer to that. Simplification, second, time reduction, number three might be good.

TP: Oh, good. Why don't we shut off the tape and we can look at all the materials you have. But that's very useful.

[End of interview]